

AGRIBALKAN

BALKAN AGRICULTURAL CONGRESS



**8-11 SEPTEMBER 2014,
EDİRNE, TURKEY**

BALKAN AGRICULTURAL CONGRESS

<http://agribalkan.org/>

8-11 SEPTEMBER 2014,

EDİRNE, TURKEY



In Trakya University Congress Center, Edirne, Turkey

Organized by Trakya University

with

Namık Kemal University, Onsekizmart University - Turkey, Agriculture University of Plovdiv, Trakia University-Stara Zagora - Bulgaria, Democritus University of Thrace – Greece and with contribution of other Balkan Institutions...



Dear Colleagues,

You are welcome to our congress will be organized by Trakya University, Namık Kemal University, Onsekizmart University, Agriculture University of Plovdiv, Trakia University-Stara Zagora, Democritus University of Thrace and together with other Balkan Universities and Institutions.

The aim of our international congress is to present the newest research results and research goals, analyze current conditions and perspectives in agriculture.

Conference activities;

Plenary sessions with oral and poster presentations are on September 8, 9 and 10, 2014 and Sightseeing tours are on September 11-14 2014.

You are welcome to our congress and Edirne, TURKEY,

Yours sincerely,

Prof. Dr. Yener YÖRÜK

Rector of Trakya University
Honorary Chair of Congress

Prof. Dr. Ivan STANKOV

Rector of Trakia University
Ex Minister of Agriculture of Bulgaria
Honorary Chair of Congress

Prof. Dr. Osman ŞİMŞEK

Rector of Namık Kemal University
Honorary Chair of Congress

Prof. Dr. Dimitar GREKOV

Rector of Plovdiv Agric. University
Minister of Agriculture of Bulgaria
Honorary Chair of Congress

Assoc Prof Dr Yalcin KAYA

Head of Organizing Committee

FOREWORD

Agriculture is so important sector feeding all humankind, but it needs new developments and technologies to supply enough food for increasing world population year by year. Turkey is one leading agricultural economy in the world. Balkan region is one the important agricultural areas of the world having rich soils producing different crops vastly and keeping enormous biodiversity for our future.

As there have been many different scientific meetings around the world, we intended to bring three community together, namely science, research and private investment, in a friendly environment of Edirne / Turkey to share what they have and get benefit from each other. Trakya University intended to aim that agricultural community in Balkan areas should come together in that important event. Our congress goal is the agricultural subjects should be kept broad in order to provide opportunity to the science community to present their work that can be off value for agriculture.

We hope that this congress will help to solve our problems with establishing good network collaborations, joint projects and better relationships among countries with sharing our knowledge and experiences together. We wish success for this meeting and hope a great scientific achievement with your contributions.

Edirne is very nice, lovely and historical city at just the edge of Europe, but just right at the heart of Balkan region and history endowed with monuments reminding imperial past. We are much pleased to host you all in Edirne and in Turkey.

We would like to thank you to join this congress and we would like to give also special thanks our sponsors and collaborators for giving us big supports to organize this event.

We wish you nice stay in Edirne for truly rewarding days.

Prof. Dr. Yener YÖRÜK
Rector of Trakya University
Honorary Chair of Congress

Assoc Prof Dr Yalcin KAYA
Director of TU Plant Breed. Res. Center
Head of Organizing Committee

ORGANIZING COMMITTEE

| NAME | INSTITUTION | DUTY |
|---|--|---------------------------------------|
| Prof. Dr. Yener YÖRÜK | Rector of Trakya University | Honorary Chair of Congress |
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| Prof. Dr. Ivan STANKOV | Rector of Trakia University / Ex Minister of Agriculture of Bulgaria | Honorary Chair of Congress |
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| Assoc Prof Dobri YARKOV | Trakia University- Stara Zagora | Member |
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| Merve GÜZEL | Trakya Agricultural Res Institute | Member |
| Hilal ÇİFTÇİGİL | Trakya Agricultural Res Institute | Member |
| Çağlar GİRGIN | Trakya Agricultural Res Institute | Member |

SCIENTIFIC COMMITTEE

| NAME | DUTY | COUNTRY | INSTITUTION |
|---|--|----------------------|-----------------------------|
| Prof Dr Ahmet ISTANBULLUOĞLU | Head of SC | TURKEY | Namik Kemal University |
| Prof Dr Harun BAYTEKİN | Deputy Head of SC | TURKEY | Onsekizmart University |
| Prof Dr İlhan TURGUT | Deputy Head of SC | TURKEY | Uludağ University |
| NAME | INSTITUTION | COUNTRY | FIELD OF INTEREST |
| Prof Dr Vesna MILIC | University of East Sarejova | BOSNIA AND HERZOGOVA | Agricultural Economy |
| Prof Dr Mirko KULINA | University of East Sarejova | BOSNIA AND HERZOGOVA | Fruit Growing |
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| Prof Dr Rozitsa BATCHAROVA | Agbio Insitute ,Sofia | BULGARIA | Molecular Breeding |
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| Assoc Prof Dr Tzvetoslav MIHOVSKY | Trojan Institute | BULGARIA | Mountain Agriculture |
| Assoc Prof Dr Atanas ATANASSOV | University of Ruse | BULGARIA | Agricultural Machinery |
| Assoc Prof Dr Miroslava HRISTOVA- CHERBADZI | University of Forestry, Sofia | BULGARIA | Oil Crops, Wild Species |
| Prof Dr Konstantinos GALANOPOULOS | Democritus University of Thrace | GREECE | Agricultural Economy |
| Prof Dr Rafail SANDALTZOPOULOS | Democritus University of Thrace | GREECE | Molecular Genetics |
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| Prof Dr Penelope J. BEBELI | Agricultural Univ. of Athens | GREECE | Plant Breeding |
| Prof Dr Fa (Phil) ARAVANOPOULOS | Aristotle University of Thessaloniki | GREECE | Forest Science |
| Prof Dr Desimir KNEZEVIĆ | University of Prishtina | KOSOVO | Plant Breeding |
| Prof Dr Julijana TOMOVSKA | St. Clement Ohrid University of Bitola | MACEDONIA | Agricultural Biotechnology |
| Prof Dr Gordana Miceska | Scientific Tobacco Inst.-Prilep | MACEDONIA | Tobacco |
| Prof Dr Milic CUROVIC | University of Montenegro | MONTENEGRO | Forestry |

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|------------------------------------|-------------------------------------|----------|--------------------------------------|
| Dr Maria PACUREANU JOITA | NARD Institute of Fundulea | ROMANIA | Sunflower, Broomrape |
| Prof Dr Dan-Marius VOICILAS | Institute of Agricultural Economics | ROMANIA | Agriculture Economy |
| Dr Vojka BABIĆ | Maize Res. Ins. Zemun Polje | SERBIA | Maize |
| Prof Dr Dragan SKORIC | University of Novi Sad | SERBIA | Sunflower |
| Prof Dr Sava VRBNICANIN | University of Belgrad | SERBIA | Weed Science |
| Prof Dr Andrej SIMONČIČ | Agricultural Institute of Slovenia | SLOVENIA | Weed Science |
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| Prof Dr Sezen ARAT | Namik Kemal University | TURKEY | Animal Biotechnology |
| Prof Dr Ahmet ÇITIR | Namik Kemal University | TURKEY | Plant Diseases |
| Prof Dr A. Halim ORTA | Namik Kemal University | TURKEY | Irrigation |
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| Prof Dr Selçuk YURTSEVER | Trakya University | TURKEY | Animal Genetics |
| Assoc Prof Dr Ayhan AYTAÇ | Trakya University | TURKEY | E-Trade, International Relationships |
| Assoc Prof Dr Mehmet AYBEKE | Trakya University | TURKEY | Plant Diversity |
| Prof Dr Esvet AÇIKGÖZ | Uludağ University | TURKEY | Forage Crops |
| Prof Dr Cengiz ELMACI | Uludağ University | TURKEY | Animal Science |
| Prof Dr A.Vahap KATKAT | Uludağ University | TURKEY | Soil Science |
| Assoc Prof Dr Mehmet ÖZGÜR | Uludağ University | TURKEY | Ornamental Plants |
| Dr Ali Osman SARI | TAGEM, Ankara | TURKEY | Aromatic Plants |
| Dr M. Ali GÜRBÜZ | Soil Agric. Met. Res. Station | TURKEY | Soil Science |
| Dr Sami SÜZER | Trakya Agricultural Res. Inst | TURKEY | Agronomy, Canola |
| Dr Halil SÜREK | Trakya Agricultural Res. Inst | TURKEY | Rice |
| Dr Metin BABAOĞLU | Trakya Agricultural Res. Inst | TURKEY | Oil Crops |
| Dr Cengiz ÖZER | Viticulture Research Inst | TURKEY | Viticulture |
| Dr Yılmaz BOZ | Yalova Horticultural Res. Ins | TURKEY | Fruits / Viticulture |
| Dr Vehbi ESER | BISAB | TURKEY | Plant Breeding |
| Kamil YILMAZ | TUBID | TURKEY | Seed Legislative |
| Dr Mete KÖMEAĞAÇ | TURKTED | TURKEY | Hybrid Seed Production |
| Yıldıray GENCER | TURKTOB | TURKEY | Seed Marketing |

INVITED SPEAKERS

(COUNTRY REPORTS) FOR BALKAN AGRICULTURAL CONGRESS

| NAME | INSTITUTION | COUNTRY |
|-----------------------------------|---|------------------------|
| Assoc Prof Dr Masum BURAK | TAGEM, Ankara | TURKEY |
| Assoc. Prof Dr Rigerta SADIKAJ | University of Tirana | ALBANIA |
| Acad. Prof. Dr. Atanas ATANASSOV | Joint Genomic Center | BULGARIA |
| Dr Vladimir MIKLIC | Inst. Field, Veg. Crops Novi Sad | SERBIA |
| Prof. Dr. Ioannis TOKATLIDIS | Democritus University of Thrace | GREECE |
| Prof. Dr. Gheorghe Valentin ROMAN | Univ. of Agronomic Sciences and Veterinary Medicine Bucharest | ROMANIA |
| Prof. Dr. Hazir POLLOZHANI | State University of Tetovo, | MACEDONIA |
| Prof Dr Maria DUCA | Academy of Sciences of Moldova | MOLDOVA |
| Emine DACI –ZEJNULLAHI | State University “Haxhi Zeka” | KOSOVO |
| Prof. Dr. Velibor SPALEVIC | University of Montenegro | MONTENEGRO |
| Prof Dr Hamid CUSTOVIC | University of Sarajevo | BOSNIA AND HERZEGOVINA |
| Prof. Dr Ivan ŠIMUNIĆ | University of Zagreb | CROATIA |

FOR BALKAN SEED WORKSHOP

| NAME | INSTITUTION | COUNTRY |
|--------------------------------|---------------------------------|------------------------|
| Yildiray GENCER | TURKTOB | TURKEY |
| Dr Todor GUBATOV | Bulgarian Seed Association | BULGARIA |
| Dr Vojka BABIC | Serbian Seed Association | SERBIA |
| Prof Dr Filippou ARAVANOPOULOS | Aristotle Univ. of Thessaloniki | GREECE |
| Dr Maria PACUREANU | NARDI Fundulea Institute | ROMANIA |
| Prof Dr Maria DUCA | Academy of Sciences of Moldova | MOLDOVA |
| Dr Suleyman SELIMOVIC | Ministry of Agriculture | BOSNIA AND HERZEGOVINA |
| Prof. Dr. Ioannis TOKATLIDIS | Democritus University of Thrace | GREECE |
| Acad. Prof Dr Atanas ATANASSOV | Joint Genomic Center | BULGARIA |
| Kamil YILMAZ | TUBID, TURKEY | TURKEY |

THE EDITORS OF PROCEEDING BOOK OF ABSTRACTS

Assoc Prof Dr Yalcin KAYA, Asst Prof Dr Necmi BEŞER

MAIN ORGANIZING INSTITUTIONS

Trakya University, Edirne TURKEY
Namik Kemal University, Tekirdağ, TURKEY
Onsekizmart University, Çanakkale, TURKEY
Agriculture University of Plovdiv, BULGARIA
Trakia University, Stara Zagora, BULGARIA
Democritus Univ of Thrace, Orestiada, GREECE

OTHER ORGANIZING INSTITUTIONS

Kırklareli University, Kırklareli, TURKEY
Uludağ University, Bursa, TURKEY
University of Agriculture of Tirana, ALBANIA
University "Fan S. Noli", Korçe, ALBANIA
University of Sarajevo, BOSNIA & HERZEGOVINA
Univ. of East Sarajevo, BOSNIA & HERZEGOVINA
University of Zagreb, CROATIA
Agricultural Academy of Bulgaria, BULGARIA
University of Forestry, Sofia, BULGARIA
Sofia University, Sofia, BULGARIA
University of Ruse, Ruse, BULGARIA
Aristotle University of Thessaloniki, GREECE
Agriculture University of Athens, GREECE
University of Prishtina, KOSOVO
State University "Haxhi Zeka", KOSOVO
State University of Tetovo, MACEDONIA
Ss. Cyril & Methodius Univ. Skopje, MACEDONIA
St. Clement Ohrid Univ. of Bitola MACEDONIA
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University of Montenegro, MONTENEGRO
University of Agronomic Sci. & Veterinary
Medicine of Bucharest, ROMANIA
University of Novi Sad, SERBIA
University of Belgrade, SERBIA
Balkan Agrarian Institute, Sofia, BULGARIA
Joint Genomic Center, Sofia, BULGARIA
Agbio Institute, Sofia, BULGARIA
Institute of Genetics, Sofia, BULGARIA
Karnobat Agricultural Research Institute, BULGARIA
Dobroudja Agric. Res Inst, Gen.Toshevo, BULGARIA
Institute of Physiology & Genetics, Sofia, BULGARIA
Inst. Mount. Stockbreed. Agric, Troyan, BULGARIA
Agricultural Research Institute, Osijek, CROATIA
Scientific Tobacco Institute, Prilep, MACEDONIA
Fundulea Agric. Res. Inst, Bucharest, ROMANIA
Agricultural Institute of Slovenia, SLOVENIA
Inst. of Field and Vegetable Crops, Novi Sad, SERBIA
Maize Research Institute, Zemun Polje SERBIA

SUPPORTING INSTITUTIONS

Bulgarian Seed Association, BULGARIA

The Hellenic Scientific Society for Plant Genetics and Breeding, GREECE

Serbia Seed Trade and Plant Breeders Assoc, SERBIA

Turkish Seed Union (TURKTOB)

Plant Breeders Union of Turkey (BISAB), TURKEY

Turkish Seed Industry and Producers Union (TSUAB)

Turkish Plant Breeders Association (TUBID), TURKEY

Turkish Seed Industry Association (TURKTED), TURKEY

Governorship of Edirne

Trakya Birlik, Edirne, TURKEY

Edirne Commodity Exchange, Edirne, TURKEY

Edirne Farmer Union, TURKEY

Province Offices of Ministry of Food, Agriculture and Livestock of Turkey

AGRIBALKAN - 2014 CONGRESS PROGRAM

GENERAL SESSION

| MONDAY, SEPTEMBER 08 TH 2014 | |
|---|--|
| 08 ⁰⁰ - 09 ⁰⁰ | Registration |
| 09 ⁰⁰ - 09 ³⁰ | Opening Ceremony |
| 09 ³⁰ - 09 ⁴⁵ | Coffee break |
| 09 ⁴⁵ - 12 ³⁰ | OPENING SESSION: Session Chair: DR VEHBI ESER |
| 09 ⁴⁵ - 10 ⁰⁰ | Invited Speaker Assoc Prof Dr Masum BURAK Country Report of TURKEY |
| 10 ⁰⁰ - 10 ¹⁵ | Invited Speaker Assoc. Prof Dr Rigerta SADIKAJ Country Report of ALBANIA |
| 10 ¹⁵ - 10 ³⁰ | Invited Speaker Prof. Dr. Atanas ATANASSOV Country Report of BULGARIA |
| 10 ³⁰ - 10 ⁴⁵ | Invited Speaker Prof. Dr Ivan ŠIMUNIĆ Country Report of CROATIA |
| 10 ⁴⁵ - 11 ⁰⁰ | Invited Speaker Prof. Dr. Ioannis TOKATLIDIS Country Report of GREECE |
| 11 ⁰⁰ - 11 ¹⁵ | Invited Speaker Dr Emine DACI –ZEJNULLAHI Country Report of KOSOVO |
| 11 ¹⁵ - 11 ³⁰ | Invited Speaker Prof. Dr. Hazir POLLOZHANI Country Report of MACEDONIA |
| 11 ³⁰ - 11 ⁴⁵ | Invited Speaker Prof. Dr. Velibor SPALEVIC Country Report of MONTENEGRO |
| 11 ⁴⁵ - 12 ⁰⁰ | Invited Speaker Prof. Dr. Gheorghe Valentin ROMAN Country Report of ROMANIA |
| 12 ⁰⁰ - 12 ¹⁵ | Invited Speaker Dr Vladimir MIKLIC Country Report of SERBIA |
| 12 ¹⁵ - 12 ³⁰ | Discussion |
| 12 ³⁰ - 13 ³⁰ | LUNCH |

| | FIELD CROPS – I | FIELD CROPS - II | HORTICULTURAL CROPS | SOIL SCIENCE | PLANT PROTECTION |
|-------------------------------------|---|--|--|---|---|
| | 08.09.2014 MONDAY | 08.09.2014 MONDAY | 08.09.2014 MONDAY | 08.09.2014 MONDAY | 08.09.2014 MONDAY |
| 13 ³⁰ - 15 ³⁰ | 1st Session: Chair: PROF DR NIKOLAY DZYUBENKO | 1st Session: Chair: PROF DR METIN TUNA | 1st Session Chair: PROF DR SAIM ZEKI BOSTAN | 1st Session: Chair: PROF DR A. VAHAP KATKAT | 1st Session Chair: PROF DR KASSIM AL KHATIP |
| 13 ³⁰ - 13 ⁴⁵ | Invited Speaker: Prof Zoltan BEDO “FUTURE TRENDS IN WHEAT GRAIN QUALITY IMPROVEMENT” | CLUSTER ANALYSIS IN COMMON BEAN GENOTYPES (<i>PHASEOLUS VULGARIS</i> L.) - Ali KAHRAMAN, Mustafa ONDER, Ercan CEYHAN | PHYSIOLOGICAL ROLE OF HUMIC ACID AND BORON ON OLIVE FRUIT QUALITY - Zuhair A. Dawood, Baan Khaleel M. Ali, | THE EFFECTS OF BIOGAS DIGESTATE AND CATTLE MANURE ON TOMATO AND PEPPER FERTILIZATION - Seçkin KAYA, Harun BAYTEKİN | OCCURRENCE OF ANGULAR LEAF SPOT CAUSED BY <i>PSEUDOCERCOSPORA GRISEOLA</i> , ON COMMON BEANS IN WESTERN BLACK SEA REGION OF TURKEY- S. OZAN, S. MADEN |
| 13 ⁴⁵ - 14 ⁰⁰ | | RELATIONSHIP BETWEEN SALT TOLERANCE AND ABA BIOSYNTHESIS APTITUDE UNDER STRESS OF TWO BEAN GENOTYPES - K. Taïbi, M. Boussaid, L. Aït Abderrahim, F. Taïbi, A. Ennajah, M. Belkhdja | ADAPTATION OF OLIVE TREE (<i>OLEA EUROPEA</i> L.) IN ALGERIAN SEMI ARID REGION - BENKHERBACHE N., BENNIOU R., GHERBI I., DECHE S., ET HAMDANI M. | ORGANIC AMENDMENT AND CHEMICAL FERTILIZATION IMPACTS ON CARBON MANAGEMENT TO EVALUATE SOIL QUALITY - Derya Yücel, Celal Yücel, I. Ortas, K. R. Islam | INTEGRATED APPROACH FOR THE MANAGEMENT OF NEW THREAT <i>STEMPHYLIUM BOTRYOSUM</i> WALR CAUSING BLIGHT OF LENTİL (<i>LENS CULINARIS</i> MEDIK) - S. Subedi, S.M. Shrestha, GB KC, R.B. Thapa, S.K. Ghimire, D.B. Gharti, S. Neupane |
| 14 ⁰⁰ - 14 ¹⁵ | EVALUATING YIELD AND YIELD COMPONENTS OF PURE LINES SELECTED FROM BREAD WHEAT LANDRACES COMPARATIVELY ALONG WITH REGISTERED WHEAT CULTIVARS IN CANAKKALE ECOLOGICAL CONDITIONS - Onur HOCAOĞLU, Mevlüt AKÇURA | EFFECT OF SALICYLIC ACID AND CALCIUM ON SALT TOLERANCE OF TWO BEAN GENOTYPES - K. Taïbi, M. Boussaid, L. Aït Abderrahim, S. Bensakhria, Ml Elong, F Taïbi, A. Ennajah, M. Belkhdja | CONTRIBUTION TO THE QUANTITATIVE AND QUALITATIVE STUDY OF SEED STORAGE PROTEINS OF <i>ARGANIA SPINOSA</i> L. SKEELS - MESLEM H., DJABEUR A., KAID-HARCHE M | EFFECT OF MICROBIAL FERTILIZER ON SOYBEAN YIELD IN ORGANIC AND CONVENTIONAL PRODUCTION - Dozet G., Cvijanović G., Đukić V., Cvijanović D., Kostadinović L | APPLICATION OF MEADOWFOAM (<i>LIMNANTHES ALBA</i>) SEED MEAL AS A SOIL AMENDMENT FOR MANAGEMENT OF <i>PYTHIUM IRREGULARE</i> - Y. Şimşek Erşahin, J.E. Weilandand, I.A. Zasada, R.L. Reedand, J.F. Stevens |
| 14 ¹⁵ - 14 ³⁰ | BALKAN CEREALS GENETIC RESOURCES HERITAGE IN GLOBAL COLLECTION OF VAVILOV INSTITUTE OF PLANT INDUSTRY (VIR) - Igor Loskutov | GENOTYPE X ENVIRONMENTAL INTERACTIONS AND ADAPTATION ABILITIES OF CHICKPEA (<i>Cicer arietinum</i> L.) IN CUKUROVA CONDITIONS - Dürdane MART | PISTACHIO AND ALMOND PRODUCTION AT SOUTHEAST ANATOLIA REGION IN TURKEY AND ITS IMPORTANCE - Bekir Erol AK | THERMODYNAMICS AND SORPTION CHARACTERISTICS OF ZN+ ONTO NATURAL AND CHEMICALLY MODIFIED ZEOLITES - Kadir Saltalı, Mustafa Kaya | DEVELOPMENT AND SURVIVAL OF <i>CHRYSOPERLA CARNEA</i> ON TWO DIFFERENT PREYS - Ali Kayahan, Betül Şimşek, M. Salih Özgökçe, İsmail Karaca |
| 14 ³⁰ - 14 ⁴⁵ | GE BIPLLOT ANALYSIS OF SOME LINES OF DURUM WHEAT STABILITY IN ALGERIA - DAHLIA F., MEKLIÇHE HANIFI L. MEKLIÇHE A. | RESPONSES OF DRY BEAN (<i>PHASEOLUS VULGARIS</i> L.) GENOTYPES TO WATER SHORTAGE – M. ONDER, A. KAHRAMAN, E. CEYHAN | THE EFFECTS OF CUTTING TIME OF THE ROOTSTOCK’S TOP ON GRAFT SUCCESS IN WALNUT - Burak Akyuz, Ahmet Ozturk, Umit Serdar | | DETERMINING THE TREAT OF SUNN PEST TO WHEAT GRAIN BY ARTIFICIAL NEURAL NETWORKS - Kutalmış Turhal, Ü. Çiğdem Turhal |
| 14 ⁴⁵ - 15 ⁰⁰ | Discussion | Discussion | Discussion | Discussion | Discussion |
| 15 ⁰⁰ - 15 ³⁰ | Coffee break | Coffee break | Coffee break | Coffee break | Coffee break |

| 15 ³⁰ - 17 ³⁰ | 2nd Session: Chair: PROF DR DESIMIR KNEZEVIC | 2nd Session: Chair: DR MARIA PACUREANU | 2nd Session Chair: PROF DR ISKENDER TIRYAKI | 2nd Session: Chair: PROF DR VELIBOR SPALEVIC | 2nd Session Chair: PROF. DR PENELOPE BEBELI |
|-------------------------------------|---|---|---|--|---|
| 15 ³⁰ - 15 ⁴⁵ | EVALUATION OF SOME QUALITY CHARACTERISTICS, YIELD AND YELLOW RUST DISEASE IN BREAD WHEAT ADVANCED LINES IN BREEDING PROGRAMS OF CENTRAL ANATOLIA REGION – S. Yazar, E. Dönmez, B. Özdemir, A. Salantur, M. E. Alyamaç, A. Kaplan Evlice, A. Pehlivan, K. Akan | THE DETERMINING YIELD AND OTHER YIELD TRAIT PERFORMANCES OF GENETICALLY RESISTANT SUNFLOWER HYBRIDS AGAINST BROOMRAPE IN TRAKYA REGION – N. SEZER, M. SEZGIN, G. EVCI, V. PEKCAN, M. I. YILMAZ, Y. KAYA | IN VITRO POLLEN VIABILITY AND POLLEN GERMINATION OF SERVICE TREE (<i>SORBUS DOMESTICA</i> L.) - Melekber S ULUSOGLU, Aysun CAVUSOGLU | DETERMINATION OF THE INFLUENCE OF SOME SOIL PROPERTIES ON AGGREGATE STABILITY IN WHEAT CULTIVATED AREAS - İ. Gümüş, C. Şeker, H. H. Özaytekin, Hamza Negiş, E. Karaarslan, Ü. Karaca | RESPONSE OF DIFFERENT GENOTYPES OF <i>DATURA</i> TO HAIRY ROOT INDUCTION BY <i>AGROBACTERIUM RHIZOGENES</i> - Nawal Ladraa, Lakhder Khelifi |
| 15 ⁴⁵ - 16 ⁰⁰ | GENETIC VARIABILITY OBTAINED FROM MATURE EMBRYOS CULTURE OF DURUM WHEAT (<i>TRITICUM DURUM</i> DESF.) SUBJECTED TO SALT STRESS - Ayed-Slama O. , Ayed S., Slim-Amara H | THE EFFECT OF MECHANICAL DAMAGE ON TO EMERGENCE RATE AND EMERGENCE FORCE OF SOME WILD SUNFLOWER (<i>Helianthus</i> L. spp.) SEEDS – N. Dağüstü, S. Özer | PRESELECTION IN VACCARIA HISPANICA (MILL.) RAUSCHERT FOR ORNAMENTAL PLANT BREEDING - E. ARI, S. YILDIRIM, H. BEDİR, M. BANKOĞLU, Ü. GÖKMEN, İ. GENÇ, İ. G. DENİZ, N. MUTLU, Y. İŞBİLEN, N. KULA | CADMIUM, ZINC ACCUMULATION IN MAIZE INFLUENCED BY ZINC FERTILIZER IN CADMIUM POLLUTED SOIL – B. SOZUBEK, K. BELLITURK, M. T. SAGLAM | DETERMINATION OF SOIL-BORNE DISEASE AGENTS IN CARNATION GREENHOUSES IN ANTALYA PROVINCE - A. Atakan, H. Ozgonen Ozkaya |
| 16 ⁰⁰ - 16 ¹⁵ | GENETIC AND PHENOTYPIC VARIABILITY OF GRAIN MASS PER SPIKE IN WHEAT UNDER DIFFERENT DOSE OF NITROGEN NUTRITION - D. KNEZEVIC, V. ZECEVIC, D. KONDIC, S. MARKOVIC, A. SEKULARAC | EFFECTIVENESS OF DIFFERENT METHODS FOR SCREENING OF SUNFLOWER (<i>Helianthus Annuus</i> L.) DROUGHT TOLERANT CULTIVARS - Mehdi Ghaffari | THE NUTRITIONAL VALUE OF PEANUT SEEDS GROWN IN WETLANDS VAR. LITTLE KALOISE - ATI, S. ARBOUCHE.F | PHOTOSYNTHETIC RESPONSE OF POTATO PLANTS TO SOIL SALINITY – B. ÖDEMiŞ, M. E. ÇALIŞKAN, D. BUYUKTAS | CHITINASES: USIFUL BIOPESTICIDES AND PROMISSING ALTERNATIVES FOR SUSTAINABLE AGRICULTURE - Ben Amar Cheba |
| 16 ¹⁵ - 16 ³⁰ | BREAD-MAKING QUALITY POTENTIAL OF WHEAT (<i>Triticum aestivum</i> L.) VARIETIES GROWN IN AEGEAN REGION - Osman Ereku, Ali Yiğit | THE LAST BARRIER FOR OO-TYPE INTERSPECIFIC RAPESEED (<i>BRASSICA NAPUS</i> L.): GLUCOSINOLATES – F. Seyis, E. Aydın | NUCELLUS DEFORMATION İN SWEET CHERRY PRIMARY OVULES AT ANTHESIS – H. C. SARISU, M. A. AŞKIN | ADJUSTING SPI FOR CROP SPECIFIC AGRICULTURAL DROUGHT - Kasirga Yildirak, Sevtap Kestel | EFFECTS OF GARLIC JUICE AND BLACK SOAP WITH PEPPER ON SPIDER CITRUS MITES - Y. ATIBI, A. BOUTALEB JOUTEI, T. SLIMANI |
| 16 ³⁰ - 16 ⁴⁵ | EFFECT OF SOME CULTURAL TECHNIQUES ON DURUM WHEAT (<i>TRITICUM DURUM</i> DESF.) YIELD AND ITS COMPONENTS IN SEMI-ARID HIGH ALTITUDE OF SETIF - MEKCLICHE A., BENMANSOUR H., HANIFI-MEKCLICHE L. | EFFECTS OF PLANT NUTRITION ON CANOLA (<i>BRASSICA NAPUS</i> SSP. <i>OLEIFERA</i> L.) GROWTH - Sami SÜZER | BREEDING OF LATE RIPENING SWEET CHERRY VARIETIES - Demirtaş İ., Sarısu H. C., Aksu M., Karamürsel Ö. F., Gür İ., Kocal H., Sesli Y., Öztürk F. P., Babalık Z., Aydınlı M., Eraslan F. | THE PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES OF BROAD BEAN (<i>VICIA FABA</i> L.) TO SALT STRESS AND SALICYLIC ACID TREATMENT – F. ANAYA, R. FGHIRE, S. WAHBI, K. LOUTFI | PALYNOLOGICAL SURVEY OF THE <i>MINUARTIA</i> SPECIES (CARYOPHYLLACEAE) IN IRAN - Golaleh Mostafavi, Iraj Mehregan, Amirpouya Sarraf |

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| 16 ⁴⁵ - 17 ⁰⁰ | | THE INCOME OF ENERGY CROPS IN GREECE AND THE ROLE OF CAP; A MULTICRITERIA ANALYSIS - D. Papadopoulos, E. Zafeiriou, C. Karelakis | Invited Speaker: Prof. Dr. Dan-Marius VOICILAS AGRI FOOD PRODUCTS' COMPETITIVENESS IN BALKAN REGION-STUDY ON ROMANIAN AGRIFOOD TRADE | EFFECT OF SAKARYA AKGÖL ORGANIC SOIL ON THE QUALITY PARAMETERS OF TOMATO – N. Çiçek Atikmen, C. Kütük | SCREENING MAIZE AND SUNFLOWER HYBRIDS FOR RESISTANCE TO IMIDAZOLINONES (IMAZAMOX) – M. Mezili, O. Roussou, P. Terzopoulos, P. Bebeli |
| 17 ⁰⁰ - 17 ¹⁵ | | STRATEGIC PRODUCT OF WESTERN THRACE `TOBACCO` - Ahmet Serdar | | SOIL HEALTH RESPONSE TO CONTINUOUS NO-TILL AND COVER CROPS - Derya Yücel, Celal Yücel, I. Ortas, K. R. Islam | DEVELOPMENT OF AN EARLY DETECTION AND RAPID RESPONSE PROGRAM FOR INVASIVE PLANTS IN TURKEY – A. Uludag, K. Al-Khatib, |
| 17 ¹⁵ - 17 ³⁰ | Discussion | Discussion | Discussion | Discussion | Discussion |
| 17 ³⁰ - 18 ³⁰ | Poster Session | Poster Session | Poster Session | Poster Session | Poster Session |
| 19 ⁰⁰ - | Dinner (TRAKYA UNIVERSITY MERIC RECREATION CENTER) | | | | |
| | 09.09.2014 TUESDAY | 09.09.2014 TUESDAY | 09.09.2014 TUESDAY | 09.09.2014 TUESDAY | 09.09.2014 TUESDAY |
| 09 ⁰⁰ - 10 ³⁰ | 3RD Session Chair: PROF DR MARIA SHISHINJOVA | 3RD Session Chair: PROF DR SUZAN ALTINOK | 3RD Session Chair: ASSOC PROF DR FOKION PAPATHANASIOU | 3RD Session Chair: ASSOC PROF DR ZISIS VRYZAS | 3RD Session Chair: PROF DR AHMET ULUDAĞ |
| 09 ⁰⁰ - 09 ¹⁵ | Invited Speaker: Dr. Alexander GOLIKOV “RAPID DETECTION AND IDENTIFICATION OF PATHOGENS AND GMO IN PLANTS WITH REAL TIME PCR” | PHYSIOLOGICAL CHARACTERIZATION AND PRELIMINARY EVALUATION OF PROGENY OF COCKSFOOT UNDER MEDITERRANEAN CLIMATE - ZHOURI L., KALLIDA R., SHAIMI N., BARRE P., VOLAIRE F., FAKIRI M. | PHYTOCHEMICAL PROPERTIES OF <i>PISTIA STRATIOTES</i> – Khan Bahadar Marwat | MANAGEMENT SYSTEMS IMPACT ON SOIL AGGREGATE PROTECTED CARBON AND NITROGEN SEQUESTRATION - Celal Yücel, Derya Yücel, I. Ortas, K. R. Islam | INVESTIGATIONS ON THE EFFECTS OF TWO DIFFERENT PLANT EXTRACTS ON THE GREEN PEACE APHID [(<i>MYZUS PERSICAE</i> SULZER) (HOMOPTERA: APHIDIDAE)] – P. Erdoğan, A. Yıldırım |
| 09 ¹⁵ - 09 ³⁰ | | INTRODUCING NEW SPECIES AND SUB-SPECIES OF SOME GENUS OF GRASS IN POACEAE FAMILY AND VALUATION OF THEIR TAXONOMIC CHANGES – M. Abbasi, M. Asadi | THE EFFECTS OF EXOGENOUS GIBBERELLIN ON SEED GERMINATION OF THE FRUIT SPECIES - Aysun CAVUSOGLU, Melekber SULUSOGLU | AN EVALUATION OF SOME PHYSICAL PROPERTIES ARISING FROM SOIL COMPACTION IN ÇUMRA PLAIN - Hamza Negiş, İ. Gümüş, C. Şeker, H. H. Özyaytekin | EFFECTS OF SOME PLANT ESSENTIAL OILS AGAINST <i>Botrytis cinerea</i> AND <i>Tetranychus urticae</i> ON GRAPEVINE - Duygu Mermer Doğu, Damla Zobar |
| 09 ³⁰ - 09 ⁴⁵ | DURUM WHEAT BREEDING IN BULGARIA – TRADITIONS, ACHIEVEMENTS AND CHALLENGES – V. Bozhanova, D. Dechev, R. Dragov, S. Nedjalkova, B. Hadzhiivanova, K. Taneva, M. Koleva, E. Todorovska, I. Petrova | THE CHANGE OF CONTENTS OF SOME MACRO AND MICRONUTRIENTS OF HERBS ON GRAZING AND ABANDONED AND DRIVEN TO ABANDONED NATURAL RANGELANDS - Mustafa GÜR, Murat ALTIN | CLADODE BIOCHEMICAL CHARACTERIZATION OF MOROCCAN CACTUS PEAR (<i>OPUNTIA SPP</i>) SPECIES – Y. El Kharrassi, H. El Mzouri, E. Mohamed, A. Kane, B. Nasser | SPATIAL AUTOCORRELATION OF SOLUTE TRANSPORT ATTRIBUTES IN A COMPOSITION OF TYPIC HAPLUSTEPS, MOLLIC USTIFLUVENTS AND LITHIC USTIPSAMMENTS – S. Erşahin, T. Aşkın, C. Tarakçıoğlu, D. B. Özenç, K. Korkmaz, T. Kutlu, S. Sünal | A POTENTIAL SPIDER MITE PEST SPECIES ON TOMATO; TETRANYCHUS EVANSI (ACARI: TETRANYCHIDAE); DESCRIPTION, DISTRIBUTION AND DAMAGE - Sultan Çobanoğlu, Louwrens R. Tiedt, Nabi Alper Kumral |

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| 09 ⁴⁵ - 10 ⁰⁰ | DURUM WHEAT QUALITY EVALUATION ACCORDING TO REGIONS OF TURKEY - Mine Ozcelik | USAGE OF FLOW CYTOMETRY IN CHARACTERIZATION OF GRASS GERMPASM COLLECTIONS – M. Tuna, G. Savaş Tuna | PHENOLOGICAL CHARACTERIZATION OF CACTUS PEAR SPECIES (OPUNTIA SPP) CULTIVATED IN MOROCCO – H. El Mzouri, Y. El Kharrassi, M. Yatim, S. Tayaf, A. Mabrouk, B. Nasser | APPLICATION OF THE INTERO MODEL FOR THE ASSESMENT OF THE SOIL EROSION INTENSITY AND RUNOFF OF THE RIVER BASIN DRAGOVO VRELO, MONTENEGRO – V. Spalevic, M. Curovic, V. Tanaskovic, N. Djurovic, T. Lenaerts, J. Nyssen | EXAMINING OF RESISTANCE MECHANISMS ON APPLE SCAB – VENTURIA INAEQUALIS (CKE.) WINT. IN TERMS OF NUTRIENTS IN SOME LOCAL APPLE TYPES – Kadir UÇGUN, Hüseyin AKGÜL, Şerif ÖZONGUN, Mesut ALTINDAL, Suat KAYMAK |
| 10 ⁰⁰ - 10 ¹⁵ | EFFECTS OF HARVESTING TIME ON NUTRITIONAL VALUE OF HYDROPONIC BARLEY PRODUCTION - H. I. Akbağ, O. S. Türkmen, H. Baytekin, İ. Y. Yutrman | ASSESSMENT OF PHENOTYPIC DIVERSITY IN BITTER VETCH (<i>VICIA ERVILIA</i> L. WILLD) POPULATIONS - Iraklis Livanios, Penelope Bebeli | RESISTANT LINE DEVELOPMENT MARKER ASSISTED SELECTION AND DOUBLED HAPLOIDY IN PEPPER (<i>C. ANNUUM</i>) – C. BOZKUS, N. MUTLU | HYPERACCUMULATION AND HYPERACCUMULATOR PLANTS IN TURKISH FLORA – K. Özbek | PLANT PARASITIC NEMATODES ASSOCIATED WITH GRAPEVINES, <i>VITIS VINIFERA</i> , IN TEKIRDAG –L. Ozturk , İ. H. Elekcioğlu, G. G. Avci |
| 10 ¹⁵ - 10 ³⁰ | Discussion | Discussion | Discussion | Discussion | Discussion |
| 10 ³⁰ - 11 ⁰⁰ | Coffee break | Coffee break | Coffee break | Coffee break | Coffee break |
| | | AGRICULTURAL ECONOMY | | | ANIMAL SCIENCE |
| | 4th Session Chair: PROF DR IOANNIS TOKATLIDIS | 4th Session Chair: ASSOC PROF DR SINISA BERJAN | 4th Session Chair: PROF DR ATANAS ATANASSOV | 4th Session Chair: PROF. DR BÜLENT ŞENGÖRÜR | 4th Session Chair: PROF DR SELÇUK YURTSEVER |
| 11 ⁰⁰ - 11 ¹⁵ | THE EFFECT OF DIFFERENT SEED DENSITIES ON SOME HYBRID MAIZE TYPE'S YIELD IN ESKIŞEHİR CONDITIONS - Kutalmış TURHAL | WHICH TYPES OF FARMING ACTIVITY DEVELOP FASTEST THANKS TO THE CAP FUNDS IN POLAND? - Barbara Wieliczko | INVESTIGATION OF ALTERNATIVE MANAGEMENT METHODS IN ORGANIC VINEYARDS OF THE AEGEAN REGION – K. KAÇAN, Ö. BOZ | USING RENEWABLE ENERGY SOURCES FOR AGRICULTURAL IRRIGATION – E. AYDIN, G. ŞEN, Y. AVŞAR, A. GÜLLÜ, M. O. AKI | Invited Speaker: Prof. Dr. Sezen ARAT APPLICATION OF REPRODUCTIVE BIOTECHNOLOGY ON ANIMAL REPRODUCTION AND CONSERVATION OF GENETIC RESOURCES |
| 11 ¹⁵ - 11 ³⁰ | MAIZE BREEDING, SEED PRODUCTION, PROCESSING AND QUALITY CONTROL IN MAIZE RESEARCH INSTITUTE ZEMUN POLJE-SERBIA – T. Petrović, N. Delić, V. Babić | AGRI-FOOD INTERNATIONAL TRADE STRUCTURE AND EXCHANGE RATES - Cezary Klimkowski | THE EFFECTS OF STRATIFICATION PERIODS AND GA (GIBBERELLIC ACID) APPLICATIONS ON GERMINATION OF SEEDS OF SOME GRAPE CULTIVARS - Mustafa Çelik | THE EFFECTS OF IRRIGATION MANAGERMENTS ON SOIL SALINITY IN TWO DIFFERENT IRRIGATION DISTRICT – H. KAMAN, M. Çetin, C. KIRDA | |
| 11 ³⁰ - 11 ⁴⁵ | EVALUATION OF DIFFERENT METHODS FOR DOUBLE HAPLOID PRODUCTION IN MAIZE HAPLOID PLANTS – I. Livanios, T. Metaxakis, O. Roussou , P. Terzopoulos, P. Bebeli | FINANCING AGRICULTURE: TRENDS AND ISSUES, EVIDENCE FROM TURKEY - Celal TAŞÇI | COMPARISON OF AMPELOGRAPHIC CHARACTERISTICS OF SOME IMPORTANT GRAPE VARIETIES ARE GROWN IN THE AEGEAN REGION, ROOTSTOCK AND CLONES- Y. Dilli, A. Ünal, M. Kesgin, M. S. İnan, G. Söylemezoğlu | COMPARATIVE ANALYSIS OF SOME IRRIGATION COOPERATIVES AND ACTIVITIES OF IRRIGATION UNIONS (Edirne, Kırklareli, Tekirdağ, Çanakkale provinces sampled) - E. ÖZKAN, B. AYDIN, E. AKTAŞ, H. HURMA | MARKET ANALYSIS of THE RED MEAT SECTOR in TURKEY - Arzu Kan, Ümit Gürbüz, Duygu Balpetek |

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| 11 ⁴⁵ - 12 ⁰⁰ | EFFECT OF DIFFERENT PLANT DENSITIES AND NITROGEN DOSES ON FRESH EAR YIELD AND YIELD COMPONENTS ON SWEET CORN (<i>Zea mays saccharata</i>) – E. ÖZATA, H. H. GEÇİT | STRUCTURAL CONDITION AND PRODUCTIVITY OF AGRICULTURE IN TURKEY ON THE WAY TOWARDS EU MEMBERSHIP - Gülfinaz Özoğul | | WATER PRODUCTION FUNCTIONS OF WHEAT IRRIGATED WITH SALINE WATER USING LINE SOURCE SPRINKLER SYSTEM UNDER THE MEDITERRANEAN TYPE CLIMATE – S. Tekin, S. M. Sezen, S. Boyacı, M. Yıldız | SUSTAINABLE USE OF TURKISH GREY CATTLE, ONE OF DOMESTIC ANIMAL SPECIES IN TURKEY, IN ORGANIC ANIMAL PRODUCTION - Hülya Hanoğlu |
| 12 ¹⁵ - 12 ³⁰ | Discussion | Discussion | Discussion | Discussion | Discussion |
| 12 ³⁰ - 13 ³⁰ | Lunch | Lunch | Lunch | Lunch | Lunch |
| 13 ³⁰ - 15 ³⁰ | 5th Session Chair: PROF DR ZOLTAN BEDO | 5th Session Chair: PROF DR GRETA ANGJELI | 5th Session Chair: PROF DR HAZIR POLLOZHANI | 5th Session Chair: DR FATİH BAKANOĞULLARI | 5th Session Chair: PROF. DR. SEZEN ARAT |
| 13 ³⁰ - 13 ⁴⁵ | Invited Speaker: Prof. Dr. Nikolay DZYUBENKO “VAVILOV’ S COLLECTION OF CULTIVATED PLANTS AS A STRATEGIC BASIS FOR FOOD SECURITY” | TOMATO TRADE BETWEEN MACEDONIA AND THE BALKAN REGION – I. Ameti, O. Vukaj, B. Idrizi, E. Krsteska | SITUATION OF OLIVE CULTIVATION IN THE MOTHERLAND - Hatice GÖZEL, Sibel AKTUĞ TAHTACI | FACTORS AFFECTING ADOPTION OF IRRIGATION WATER SAVING TECHNOLOGIES AND PRACTICES IN SAUDI ARABIA - Khodran H. Al-Zahrani, Siddig E. Muneer | NEW DEVELOPMENTS PREVENTING SUBACUTE RUMINAL ACIDOSIS AND ITS INFLAMMATORY RESPONSE - Ugur Serbestler |
| 13 ⁴⁵ - 14 ⁰⁰ | | EFFECTS OF MARKETING COMMUNICATIONS TOOLS UPON THE PURCHASE BEHAVIOR OF FOOD PRODUCTS CONSUMERS – N. Bahsi, D. Bostan Budak | DETERMINATION OF PERFORMANCES OF DOMESTIC WALNUT VARIETIES OBTAINED BY SELECTION AND INTERNATIONAL COMMERCIAL VARIETIES IN GAZIANTEP REGION – S. AKTUĞ TAHTACI, K. SARP KAYA, H. GÖZEL, Y. AKÇA, Y. OKAY, M. ÇELİK | THE EFFECT OF DRIP IRRIGATION AND TRADITIONAL MANAGEMENT ON THE DISTRIBUTION OF WATER LOSS BY EVAPOTRANSPIRATION FROM AN AREA ASSIGNED TO PISTACHIO TREE – S. Özmen, R. Kanber, P. Steduto, M. Ünlü, Y. Aydın, K. Diker | POLIMORPHISM IN MHC (MAJOR HISTOCOMPATIBILITY COMPLEX) GENE REGION IN SOME TURKISH SHEEP BREEDS – F. İLHAN, F. ÖZDİL |
| 14 ⁰⁰ - 14 ¹⁵ | PRELIMINARY RESULTS OF TURKISH RICE VARIETIES UNDER RICE GROWING CONDITIONS OF MACEDONIA -D. Andov, D. Andreevska, E. Simeonovska, H. Sürek N. Beser, G. Glatkova, K. Bandzo, J. Ibraim | STUDY OF PROJECT’S LAUNCHING "ARTISANAL COUSCOUS ENRICHED WITH LOCAL SPIRULINA", ENVIRONMENTAL ANALYSIS AND DEFINITION OF A STRATEGY – S. Doumandji, A. Doumandji | CURRENT SITUATION OF ALMOND CULTIVATION IN TURKEY AND WORLD – Ü. ELDOĞAN, A. ŞAHAN, N. ÇOBAN | SPATIAL AND TEMPORAL DISTRIBUTION OF PESTICIDE RESIDUES IN SURFACE- AND GROUND-WATER IN NORTH-EASTERN GREECE – Z. Vryzas, E. N. Papadakis, C. Alexoudis, G. Vassiliou, E. Papadopoulou-Mourkidou | INVESTIGATION OF ACCELERATED LAMBING POSSIBILITY OF ANATOLIAN MERINO SHEEP – B. BÜLBÜL, M. KIRBAŞ, A. H. AKTAŞ, M. KÖSE, M. B. ATAMAN, K. ÇOYAN, M. KAN, İ. HALICI, B. GÖK, N.K.AKBULUT |
| 14 ¹⁵ - 14 ³⁰ | EVALUATION OF TWENTY TWO RICE (<i>Oryza sativa L.</i>) GENOTYPES FOR YIELD AND YIELD COMPONENTS UNDER DRIP IRRIGATION – N. Beser, H. Surek, S. | AGRICULTURAL SECTOR PROFILE OF TURKEY IN THE WORLD - Yeşim AYTOP, Muhammed ÇUKADAR, Ahmet | DROUGHT RESISTANCE OF VEGETATIVE TRIPLOID TURF-TYPE BERMUDAGRASS - Songul Sever Mutlu, Serkan Tokgöz, Mert Cakir, Ceren Selim | DEVELOPING AN INTELLIGENT DECISION SUPPORT SYSTEM FOR ENVIRONMENTALLY OPTIMIZED IRRIGATION MANAGEMENT USING SENSORS, REMOTE SENSING AND METEOROLOGICAL | REPRODUCTIVE AND GESTATION LENGTH OF HAIR (KIL) GOATS AND THE GROWTH CHARACTERISTICS OF PURE KIL, SAANEN X HAIR AND ALPINE X HAIR CROSSBRED KIDS UNDER |

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| | Sahin, R. Kaya, B. Tuna, R. Cakir | ŞAHİN | | FORECAST – THE ENORASIS PROJECT - Tekes S., Symeonidis P., Simeonidou M., Syropoulou P. | MOUNTAINOUS CONDITIONS IN KONYA PROVINCE – H. Erduran, Ş. Dursun, U. Demirci, M. Kırbaş, A.H. Aktaş, B. Gök, B. Yaman, B. Dag |
| 14 ³⁰ - 14 ⁴⁵ | RICE BREEDING FOR HERBICIDE RESISTANCE IN TURKEY - Halil Sürek, Necmi Beşer, Recep Kaya, Rasim Ünan | FOOD WASTE POLICY DEVELOPMENT IN SERBIA: PRELIMINARY OBSERVATIONS FROM HOUSEHOLDS ATTITUDE IN VRSAC MUNICIPALITY – H. MILUTINOVIC, N. DRIOUECH, A. STOJANOVIC, V. TOMIC | PROVENANCE VARIATION IN CONE, SEED AND NEEDLE CHARACTERISTICS OF <i>CEDRUS ATLANTICA</i> MANETTI IN ALGERIA - M. Boussaid, K. Taïbi, Z. Boughandja, H. Yahia. | STUDY ON PREDICTION OF THE AMOUNT OF RECLAMATION WATER REQUIREMENT FOR SALT LEACHING OF SALINE AND SODIC SOILS USING EMPIRICAL SIMULATION MODELS (CASE STUDY LOCATED IN KHUZİSTAN PROVINCE – IRAN) - Amirpouya Sarraf, Golaleh Mostafavi | A PREDICTIVE MODEL FOR ESTIMATING SEASONAL DIETARY CHOICES OF GOATS IN A MEDITERRANEAN OAK-JUNIPER RANGELAND - Manousidis T., Malesios C., Kyriazopoulos A.P., Parissi Z.M., Abraham E.M. |
| 14 ⁴⁵ - 15 ⁰⁰ | Discussion | Discussion | Discussion | Discussion | Discussion |
| 15 ⁰⁰ - 15 ³⁰ | Coffee break | Coffee break | Coffee break | Coffee break | Coffee break |

| | | | <u>AROMATIC PLANTS, ETC.</u> | <u>FOOD SCIENCE</u> | |
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| 15 ³⁰ - 17 ³⁰ | 6th Session Chair: PROF DR MIRELA LIKA | 6th Session Chair: PROF DR GHEORGHE V ROMAN | 6th Session Chair: PROF DR GORDANA MICESKA | 6th Session Chair: PROF DR ZEYNEP HIÇŞAŞMAZ KATNAŞ | 6th Session Chair: ASSOC PROF DR TZVETOSLAV MIHOVSKY |
| 15 ³⁰ - 15 ⁴⁵ | IDENTIFICATION, ANALYSIS AND REPORTING OF LOCAL VARIETIES AND HYBRIDS AND INTRODUCED LINES OF CORN ZEIN BY ELECTROPHORESIS METHOD. - H. R. Mammadova | AGRICULTURAL AND RURAL DEVELOPMENT IN SERBIA: GOVERNANCE, POLICY CYCLE AND COORDINATION – S. BERJAN, H. EL BILALI, M. JUGOVIC, V. MRDALJ, B. SORAJIC, N. DRIOUECH | ASSESSMENT OF BIODIVERSITY OF <i>COLCHICUM</i> L. BELONG TO TURKISH FLORA BY DNA BARCODING – E. Cabuk Sahin, Y. Aydin, E. Kaya, A. Altinkut Uncuoglu | DUAL EXPRESSION OF LABELED RECOMBINANT THERMOSTABLE ALPHA AND BETA AMYLASE ENZYMES – D. ÖZCAN, H. M. SİPAHİOĞLU, F. A. HERRERO | GENETIC ANALYSIS OF SOME DUCK POPULATIONS IN CENTRAL ANATOLIA USING ISSR - Rahan İvgin Tunca, Atilla Taşkın, Mithat Büyük |
| 15 ⁴⁵ - 16 ⁰⁰ | EFFECT OF TYPE OF EXPLANT AND GROWTH HORMONES ON CALLUS INDUCTION AND SOMATIC EMBRYOGENESIS I N <i>CATHARANTHUS ROSEUS</i> L. - BAKIRI N., KHELIFI L., BENYAMMI R. KHELIFI-SLAOUI M. | MANAGING RURAL TOURISM IN VOJVODINA (SERBIA) - Zoran Njegovan, Dunja Demirović, Olgica Bošković, Gordana Radović | A NEW CROP FOR SALT AFFECTED AND DRY AGRICULTURAL AREAS OF TURKEY: QUINOA (<i>Chenopodium quinoa</i> Willd) - Attila YAZAR, Çiğdem İNCE KAYA | DETERMINING THE LEVEL OF FOOD SAFETY CONSCIOUSNESS OF THE HOUSEHOLDS IN GİRESUN PROVINCE OF TURKEY - Duygu Balpetek, Arzu Kan, Ümit Gürbüz | REARING OF AKKARAMAN LAMBS WITH CREEP FEEDING OR TRADITIONAL FEEDING METHOD DURING THE SUCKLING PERIOD – İ. HALICI, B. COŞKUN, A. H. AKTAŞ, E. S. POLAT, H. TOY |

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| 16 ⁰⁰ - 16 ¹⁵ | EFFECTS OF PLANT HORMONES ON GERMINATION PERFORMANCE OF PHACELIA (<i>Phacelia tanacetifolia</i> B.) SEEDS - İskender Tiryaki, Veysel Akkurt | DETERMINATION OF CLASSIFICATION PARAMETERS OF BARLEY SEEDS MIXED WITH WHEAT SEEDS BY USING ANN - Kadir Sabancı, Cevat Aydi | THE JIP TEST: A TOOL TO SCREEN THE ADAPTATION CAPACITY OF QUINOA (<i>CHENOPODIUM QUINOA</i> WILLD) PLANT TO DROUGHT STRESS - Rachid FGHIRE , Fatima ANAYA, Ouafae Benhabib, Said WAHBI | INVESTIGATION OF FOULING MECHANISM OF COMMERCIAL MICROFILTRATION MEMBRANES IN WHEY PROCESSING - İrem Damar, Huner, Hacı Ali Gulec | THE EFFECT OF DIFFERENT INTENSIVE FEEDING DURATION ON FATTENING PERFORMANCE AND CARCASS CHARACTERISTICS OF HONAMLI MALE KIDS – A. H. AKTAŞ, B. GÖK, M. E. TEKİN, İ. HALICI, H. BAŞ, U. DEMİRCİ, H. ERDURAN |
| 16 ¹⁵ - 16 ³⁰ | MULTIDISCIPLINARY APPROACH TO STUDY THE VARIABILITY OF <i>STIPA TENACISSIMA</i> IN ALGERIA - M. Boussaid, K. Taïbi, C. Benito, M. Kaïd Harche | A QUESTIONNAIRE STUDY ON AGRICULTURAL MACHINERY CABIN'S COMFORT – Ö. Acarbaş Baltacı, S. Yapıcı, Ö. F. Erol, Z. Yıldız | ANTIMICROBIAL AND ANTIOXIDANT PROPERTIES OF MEDICINAL AND AROMATIC PLANTS - Ergin ÖZTÜRK | EFFECTS OF USING LIPASE AND CULTURE ON GOAT CHEESE - Hasan UZKUÇ, Onur GÜNEŞER, Yonca KARAGÜL YÜCEER | EFFECTS OF TRITICALE REPLACEMENT WITHOUT ANY ENZYMES ON CARCASS PERFORMANCE OF BROILER CHICKENS - Eyup Başer, Ramazan Yetişir |
| 16 ³⁰ - 16 ⁴⁵ | ECOLOGICAL FACTORS AFFECT ANATOMICAL AND MORPHOLOGICAL CHARACTERISTICS OF <i>CATABROSA</i> P. BEAUV IN IRAN - Maryam Abbasi, Mostafa Assadi | THE QUANTITATIVE STRATEGIC PLANNING MATRIX (QSPM) APPLIED TO AGRITOURISM DEVELOPMENT: A CASE STUDY IN THE COASTAL PROVINCES OF THE CASPIAN SEA IN IRAN - M. Mahmoodi, M. Chizari, K. Kalantari, A. R. Eftekhari | INVESTIGATION OF SOMATIC EMBRYOGENESIS IN SOME CROCUS SPECIES (<i>CROCUS SATIVUS</i> L., <i>CROCUS ANCYRENSIS</i> , <i>CROCUS PALLASII</i> SSP. <i>PALLASII</i>) GROWN NATURALLY IN TURKEY - B. Sevindik, T. İzgü, E. Mohammad, T. Sarıjlı, M. B. Kekil, P. Çürük, G. Şeker, O. Koyuncu, S. Kırıcı, Y. Yalçın Mendi, | DEFINING EFFECTING FACTORS ON PREFERRED PRACTICES INTENDED FOR REDUCTION OF AFLATOXIN OCCURRING IN DRIED FIG FIRMS – B. Sahin, F. Cobanoglu, H. Kocatas, I. Kosoglu, R. Konak | INVESTIGATING PROPER COUNTING NUMBER PER SLIDE FOR DIRECT MICROSCOPIC SOMATIC CELL COUNTING METHOD IN BOVINE MILK - Savaş Ataserver, Hüseyin Erdem |
| 16 ⁴⁵ - 17 ⁰⁰ | ROOT AND SHOOT GROWTH RATIO IN DIFFERENT GROWTH STAGES OF WHEAT AND BARLEY GROWN UNDER GREENHOUSE CONDITIONS – H. AKMAN, A. TOPAL | | EFFECT OF PRE-CHILLING DURATION AND KINETIN ON GERMINATION OF CAPERS (<i>CAPPARIS SPINOSA</i> VAR. <i>SPINOSA</i> AND <i>CAPPARIS OVATA</i> VAR. <i>CANESCENS</i>) SEEDS – T. KAYA, D. A. SÖYLER, S. ÖZCAN | AN ASPECT OF FOOD SAFETY, ENVIRONMENT POLLUTION AND AGRICULTURE CONTAMINATION WITH SUPPLYING ENERGY SOURCES - N. Çağlarırnak | EFFECTS OF DIETARY STARCH AND PROTEIN LEVELS ON MILK PRODUCTION AND COMPOSITION OF DAIRY COWS FED HIGH CONCENTRATE DIET – M. Sucak, U. Serbestler, M. Gorgulu |
| 17 ⁰⁰ - 17 ¹⁵ | DEVELOPMENT OF ROOT LENGTH AND SECONDARY ROOT OF WHEAT AND BARLEY IN DIFFERENT GROWTH STAGES - Hayati AKMAN, Ali TOPAL | | INTRODUCTION OF NEW ANALYTICAL APPROACHES FOR THE PRODUCTION, TRADE AND USE OF MEDICINAL AND AROMATIC PLANTS FOR ECONOMIC DEVELOPMENT OF PAKISTAN - H. Sher | FOOD-BORNE DISEASES AND PREVENTION IN GEORGIA - <i>Kakha NADIRADZE, Nana PHIROSMANASHVILI</i> | EFFECTS OF DIFFERENT WEANING AGE AND HOUSING SYSTEM ON THE GROWTH PERFORMANCES OF HOLSTEIN-FRIESIAN CALVES – Z. Doğan, A. Koç |
| 17 ¹⁵ - 17 ³⁰ | Discussion | Discussion | Discussion | Discussion | Discussion |
| 17 ³⁰ - 18 ³⁰ | Poster Session | Poster Session | Poster Session | Poster Session | Poster Session |
| 19 ⁰⁰ - | Dinner (EKMEKÇİZADE KERVANSARAY) | | | | |

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| | 10.09.2014 WEDNESDAY |
| 09 ⁰⁰ - 10 ³⁰ | 7th Session Chair: PROF DR STEFKA STOYANOVA |
| 09 ⁰⁰ - 09 ¹⁵ | EFFECT OF DIETARY FALSE FLAX (<i>CAMELINA SATIVA L.</i>) MEAL SUPPLEMENTATION ON GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF QUAILS – T. Bülbül, A. Rahman |
| 09 ¹⁵ - 09 ³⁰ | EFFECT OF ROSEHIP (<i>ROSA CANINA</i>) INCLUSION TO THE DIET ON MEAT AND EGG YOLK COLOR IN JAPANESE QUAIL (<i>COTURNIX COTURNIX JAPONICA</i>) – Y. Konca, M. Kaliber, H. H. Uzkülekçi |
| 09 ³⁰ - 09 ⁴⁵ | THE USE OF ANTIBIOTICS IN DAIRY COWS ON KOSOVO FARMS - Valdet Gjinovci, Alush Musaj, Rifat Morina, Festim Rexhepi, Fillojete Rrustemaj |
| 09 ⁴⁵ - 10 ¹⁵ | Discussion |
| 10 ⁰⁰ - 10 ³⁰ | Coffee break |
| 10 ³⁰ - 11 ⁰⁰ | 4th Session Chair: ASSOC PRO DR VALDET GJINOVCI |
| 11 ⁰⁰ - 11 ¹⁵ | HONEYBEE BREEDING ON DISEASE RESISTANCE IN THRACE REGION OF TURKEY – D. Oskay, O. Görkem Akyol, U. Özer, O. B. Kavak, S. Tilki |
| 11 ¹⁵ - 11 ³⁰ | SOME PHENOTYPIC TRAITS OF SHORT HAIR TURKISH CAT RAISED IN PROVINCE OF CANAKKALE – O. Yilmaz, H. I. Akbag, F. Coskun, T. Ozcetin, M. Ertugrul |
| 11 ³⁰ - 11 ⁴⁵ | A RISING OLD TRADITION IN MODERN TURKEY: CAMEL WRESTLING IN CANAKKALE REGION – O. Yilmaz, M. Ertugrul |
| 11 ⁴⁵ - 12 ⁰⁰ | EDUCATING THE NURSERY SCHOOL CHILDREN ABOUT ECOLOGICAL SCIENCES USING INSECTS AND FLOWERS AS TEACHING TOOLS - Baboo ALI , Derya DENİZ , Canan Öztokat KUZUCU, Mert ÇAKILLAR |
| 12 ⁰⁰ - 12 ³⁰ | Discussion |
| | Poster Session |
| 12.30- 13.30 | Lunch |
| 13.30 – 18.30 | EDIRNE EXCURSION |
| 19.00 | GALA DINNER (LALEZAR RESTAURANT) |

BALKAN SEED WORKSHOP

10 SEPTEMBER, 2014, EDIRNE, TURKEY

Trakya University Balkan Congress Center

PROGRAM

September 10th, 2014

08.00-08.45 Registration

08.45-09.20 Opening Ceremony

09.20-10.40 **FIRST SESSION – Session Chair: Dr Vehbi ESER**

09.20-09.40 Seed Sector in Turkey – Yildiray GENCER

09.40-10.00 Seed Sector in Bulgaria - Dr Todor GUBATOV

10.00-10.20 Seed Sector in Greece – Assoc Prof Dr Panagiotis MADESIS

10.20-10.40 Seed Sector in Romania - Dr Maria PACUREANU

10.40-11.00 Seed Sector in Serbia - Dr Vojka BABIC

11.00-11.20 Coffee Break

11.20-12.30 **SECOND SESSION – Session Chair: Asst Prof Dr Necmi BEŞER**

11.20-11.40 **Breeder Seed Management of Elite Cultivars and Propagation of Certified Seed – Prof Dr Ioannis TOKATLIDIS**

11.40-12.00 **Future Directions on Plant Breeding at Molecular Level–Acad. Prof Dr Atanas ATANASSOV**

12.00-12.20 **Plant Breeder Rights, Variety Protection and Implementations in Turkey –Kamil YILMAZ**

12.20-12.30 **The Announcing of Founding Balkan Seed Association**

CLOSING OF WORKSHOP AND CONGRESS

12.30- 13.30 *Lunch*

13.30 – *EDIRNE EXCURSION*

18.30

19.00 *GALA DINNER (LALEZAR RESTAURANT)*

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INVITED SPEAKERS SESSION

CURRENT SITUATION OF DEVELOPMENT IN ALBANIAN AGRICULTURE

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Abstract

The agriculture in Albania is a sector which plays an important role in the economy, providing for about 17.5 % of the total GDP in 2013. The main sectors of Albanian Agriculture are plant and livestock production. In the area of plants production in Albania, the main objective is the gradual approach of the Albanian legislation with that of the Community as well as the development of the strategies for the use of the land, land market, rural development and diversification of farming activities and increasing of competitiveness in agriculture. The overall goal is orienting and ensuring a sustainable development of the agriculture production in order to increase the optimal production to better fulfill the needs of the country, minimizing the import and the increase of export opportunities and the management support of this development. The sector of fruit/vegetables is ranked as one of the priorities of the Sector of Agriculture. In the plants' production sector, it is noticed an increase of production for each crop, where the production growth is more evident in the protected environments (we have an increase of the protected surface with 40 to 50 ha per year and for the year 2010 with 100 ha). The Livestock Production Sector has as the main goal to analyze, identify and compile policies, sector strategies for the development of the livestock, to guide and support at the country and local level the better increase and fulfillment of the requirements and market needs with livestock products through the rational use of the resources and the introduction of new techniques and technologies in the production. The current policies of the Livestock Production Sector are focused mainly on the increase of the number of animals within the livestock farm aiming the consolidation and orientation of these farms towards the market. Within the framework of the Albanian agriculture, even aquaculture is a relatively new activity. Before the years of 90 it has been based mainly on land based systems that cultivated only cyprinids. Currently there are 3 tendencies. The first aims the development of mariculture, the second is the repopulation culture which is a continuation of the culture of cyprinids and the third is the trout culture. Regarding the production levels trout culture is prevalent to cypriniculture for the fact that the latter has reduced the amount of fish productions very much for the food market and is focused more on fingerlings production. There is a national strategy for the development of mariculture aiming always that mariculture supports tourism but not to compete it.

Key words: Agriculture, Albania, export/import, plants, livestock, aquaculture

AGRICULTURE AND AGRICULTURAL SCIENCE DEVELOPMENT IN BULGARIA

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Bulgaria is a full member of EU since January 1st, 2007. The CAP policy is one that governs the agricultural policy in the country. This policy is not always relevant to the expectations. The existence of dual agriculture (1570 big farmers and arendators vs 250000 smallholder farmers) is one of the essential reasons for hampering the normal and adequate development of the agriculture in Bulgaria. The potential is not fully exploited. In similar situation is the agriculture R&D. Many challenges are ahead in order Bulgarian agriculture to become again the leading sector of the Bulgarian economy.

Keywords: Agricultural policy, Bulgaria, EU,

THE GENERAL SITUATION AND MEASURES FOR IMPROVEMENT OF AGRICULTURE IN CROATIA

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Abstract

Agriculture in Croatia represents one of the main economy components, which is burdened with many problems and therefore there is need to look for rapid solutions. Consequence of accumulated problems is negative balance in foreign trade exchange of agricultural and food products, which in present time amounts about 1,0 billion USD. Since Croatia has enough potential natural resources for stable, progressive and higher agricultural production there is need for achieving the conditions for establishment of effective agriculture and to orient the existing investment in agriculture towards production of various agricultural products of high quality. In order to achieve this objective, it is essential to implement several measures: build of irrigation systems, enlarge small privatefarmers parcels, introduce more organic production, to have adequate support etc. Defined tasks for higher agricultural production are looking for quick solution from each of us in Croatia.

Key words: agricultural, problems, solutions, Croatia

THE CURRENT STATE OF AGRICULTURE IN SERBIA AND POSSIBILITIES FOR COOPERATION WITH BALKANS COUNTRIES

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Abstract

The Republic of Serbia has 5.05 million hectares of agricultural land, 73% of which is intensively used, while 29% consists of natural grasslands. Crop production, with corn, wheat and fruit being the main products, dominates in value structure of the agricultural production. The share of livestock production in total value of agricultural production is decreasing mainly due to developments in the production of meat. Within crop production, the largest share in the total value belongs to field and vegetable crop production, which takes place on an area of 3.3 million hectares. Corn is the single most important product on Serbian market with an average production of 5.6 million tons and planted area of 1.2 million hectares. Wheat production amounts to about 2 million tons, and sown area is around 500 thousand hectares. Industrial plants are grown in an area of 400-440 thousand hectares, accounting for about 9% of the total value of agricultural production in Serbia. The Republic of Serbia is among the largest producers of oil crops in Europe. Sunflower has the primacy, but the most significant increase was noted in the production of soybeans. Republic of Serbia is the largest regional vegetable producer. Vegetables are grown on an area of about 175 thousand hectares, with circa 80 thousand hectares under potatoes. Fruits are grown in an area of about 190 thousand hectares, almost half of that belongs to plum production, followed by apple, grape, cherry and raspberry production. The share of livestock in the value structure of production is about 30%, which is low share due to the available land areas and their structure. By value of production, the most important is beef production, followed by the pig breeding, poultry farming and sheep breeding. Taking into account the natural resources, favourable soil and climatic conditions, biodiversity and relatively healthy agro-ecosystems, it can be said that there are favourable conditions for the development of integrated and organic production in Serbia. Serbia is a net exporter of agricultural and food products, while agriculture is a sector which significantly contributes to the foreign-trade balance. The share of agriculture in total value of Serbian economy exports is about 22% and it is significantly higher than the share of agricultural imports. The most important trade partners of Serbia are the EU countries (half of exports and 45% of imports of agri-food products). Five major agricultural products which Serbia imports from EU are different food products, fruits, beverages, residues and waste from the food industry and tobacco, which account for about 40% of total imports of agricultural products. Main exports from Serbia to the EU are fruits, grains, sugar, animal and vegetable fats and oils (of which soy and sunflower oil are major export products) - about 70%. As for the Balkans countries, Serbia has more exports than imports in all countries, except for Bulgaria and Greece. Transfer of knowledge in the field of agriculture is conducted through formal education of all levels (from secondary education to doctoral studies), through a variety of trainings organized by educational and research institutions, agricultural advisory technical services, private companies, project units, media, etc. Advisory system encompasses 34 agricultural advisory and technical services. Existing scientific and educational institutions have a relatively good quality of the researchers that have developed a number of results recognized and acknowledged in the world - new varieties, breeds and strains, scientific papers and technological solutions.

Key words: Serbia, agriculture, export, import, education

AGRICULTURE IN GREECE: CURRENT STATUS, EDUCATION, RESEARCH AND PERSPECTIVES

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Abstract

Greece is of the southern countries in the Balkan peninsula, comprising 3,730,000 ha agricultural land. Climate and anaglyph create a wide range of micro-climates ideal for a wide range of cultivated species. The agricultural land is mainly occupied by field crops (54%), followed by fruit trees (27%), grapevine (3%), vegetables (3%), while 12% is lying as fallow. Cultivation of olive trees has been historically a tradition, and thanks to high quality products is at the first place (>600,000 ha). Subsidies provided per cultivated unit area brought durum wheat at the first place among field crops (more than 500,000 ha), while cotton and corn are also major crops. Among the fruit trees oranges occupy the largest area (38,000 ha). A wide range of field and greenhouse vegetables and fruits are also grown with watermelon, tomato, cabbages, melon, green bean, dry onions and lettuce in the foremost rank. Severe problems that the Greek agriculture faces pertain to the small holding size (97% of the farmers possesses less than 20 ha), which along with extreme fragmentation are determinant of high production cost. The Greek agriculture lacks its own cultivars, with majority of cultivated varieties imported. The third also very important problem is inadequacy in crop products of great importance, such as protein sources as food and feed. These problems should be remedied to ensure sustainability in the days ahead. However, products of exceptional quality offer a great advantage, and future's policy ought to emphasize on quality. Indicatively, a wider range of products have been classified as protected "Product Designated of Origin" or "Product of Geographic Indication", according to the EU legislation. Concerning education, there are four public universities offering studies and basic research in the field of Agriculture, i.e. Democritus University of Thrace (Orestiada), Aristotle University of Thessaloniki, University of Thessaly (Volos) and the Agricultural University of Athens, as well as six Technological Institutes. Applied research is carried out by 11 public Institutes under the regulatory framework of the Ministry of Rural Development & Food. They cover mainly the scientific fields of Plant Production and Protection, Animal Production and Protection, Soil and Water, Ichthyology, Food Technology, and Agricultural Economy. Besides, the Benaki Phytopathological Institute in Athens and the Institute of Applied Biosciences in Thessaloniki, are serving in agricultural research. Unfortunately, a dramatic decrease in academic staff of Universities and in researchers of Institutes was the consequence of the last years' financial crisis, an anomaly that should be anticipated immediately. Globally human being is greatly reliant on a sustainable agriculture and food security, thus research in agricultural is a matter of international rather than national collaboration. Therefore, the above universities and institutes along with several national scientific societies offer room for collaboration among Balkan and other countries, an urgent mandate to face the forthcoming challenges.

AGRICULTURE SECTOR IN KOSOVO AND OPPORTUNITIES FOR COOPERATION WITH BALKANS COUNTRIES

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Abstract:

Kosovo has a total land area of 10,908 km², with a total length of 602 km land borders. Kosovo lies in a geographical basin situated at an altitude of about 500 m meters surrounded by mountains and divided by a central north/south ridge in two sub-regions. Kosovo's continental climate is characterized by temperature between -20°C during the winter and + 35°C during the summer. The average rainfall is up to 700 mm. The two main agro-ecological areas are determined by climate, soil and vegetation: the south-west Dukagjini plain with a more Mediterranean climate and the eastern part with a more continental climate. Due to the diverse landscape structure, geographic base, flora, climate and hydrography soils in Kosovo vary with respect to agriculture. It is estimated that 15% of Kosovo's soil is of high quality, 29% is medium and 56% is poor quality. High and medium quality soils are composed of humus soil (11%) that is mostly distributed in the Kosovo plain, grey carbonate land (8.4%), alluvial (7.8%) and other dark and serpentine soils. Kosovo is, for the time being, a great importer of fruits, vegetables and decorative plants starting from the planting material to final products that this sector provides. Kosovo has an increasing growth potential of export of fruits and vegetables in neighboring countries and broader based on these specifics: Grain sector in Kosovo is one of the main sectors. The total area planted with cereals in 2012 was 137,215 ha. Total domestic production was about 350,000 ton which covers 76% of domestic needs and other part is covered by import. The trade balance was negative but the value of wheat imported is 40% lower than in 2011. The total area planted with vegetables in 2012 was 14,557 ha from which about 22% is planted with pepper. Total domestic production was about 51,000 ton which covers 90% of domestic needs and other part is covered by import. Potato covered 22% of total area planted with vegetables. In 2012 from 14,557 ha the production was 33,407 ton. With this quantity of production Kosovo can cover all domestic needs. The highest quantity of potatoes production, about 65% is sold to the market and the other part is used for household needs and processing industry. The other important vegetables growing in Kosovo are: Mushroom, Cucumber, water melon, Melon, Cabbage, and Cauliflower, Onion, Beans (mixed) etc. The livestock sector and especially cattle and milk constitute one of the most important sectors in Kosovo. Total number of cattle in stock in 2012 was 329,213. With this quantity of production self-sufficiency ratio is 73.4% and consumption per capita is 22.6 kg. Area under fruits was increased in 2012 compared with previous year for these fruits: sour-cherry with 84%, apricot with 69%, quince with 37%, plum with 32%, strawberry with 16%, grape by 8% while in three previous years the increase in area was for those fruits: sour-cherry 74%, quince 49%, strawberry 30%, grape 10%. Wine grape in 2012 as compared with last three years was increased by 2%. This sector is dominated by cultivation of apples with 1775 ha. Kosovo in 2012 exported agriculture product in symbolic value of 3.2 mn € and imported from EU countries goods in value of 203 mn € with negative trade balance from 199 mn € or 1.85% lower than in 2011. Import of agriculture product took part with 35.4%.

Key words: Kosovo, agriculture, export, import, production..

AGRICULTURE IN MACEDONIA

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Abstract

The Republic of Macedonia gained its independence from Yugoslavia in 1991. The Republic of Macedonia was officially accepted as a member of the World Trade Organization (WTO) in 2002, becoming a full member in April 2003. The Republic of Macedonia is located in Southeastern Europe, and borders with Albania, Bulgaria, Greece, Kosovo and Serbia. Macedonia has total area of 25,713 sqm, half of this area is agricultural land. There are three basic climate types: Mediterranean in the southern part and along river Vardar, mountainous and continental moderate that covers most of the country. According to 2002 census the country has a total population of 2,022,547 in 564,296 households. The population structure is heterogeneous and consists of the following major ethnic groups: Macedonians(64.18%), Albanians (25.17%), Turks (3.85%), Roma (2.66), and Serbs (1.78%). Agriculture and industry are the two most important sectors in the country's economy. Agriculture has traditionally been one of the most important sectors in the economy. The agriculture sector plays a key role in the successful implementation of structural reforms in the country. Agriculture accounts for 12% of the GDP and Industry accounts for 29.5%. The structure of the agricultural sector is characterized by small-sized family farms, around 80% of agriculture holdings are estimated to be 2.5 - 2.8 ha on average. Stabilization and Association Agreement allows Macedonian agricultural goods to have free access to EU markets. Vegetable and horticultural products make up the largest share of agricultural output (28%). Wine represents about 7% of the agricultural output. Regarding animal production, pork meat contributes more than 40% to total domestic meat production, followed by cattle (38%), sheep and goat. Despite the significance of the agro-food sector, Macedonia is a net-importer. The main food products exported are wine and other beverages, fruits, vegetables and nuts. The main agricultural import products are meat, products of milling industry, cereales, sugar, dairy products and eggs. The competitiveness of the Macedonian agri-food sector is becoming increasingly important with its growing exposure to world (and particularly EU) markets and the changing nature of its domestic markets where the increasing penetration of trans-national and domestic supermarkets, the introduction of international standards and business practices and the consumer's increased demand for quality and safe foods have the potential to marginalize local small producers and processors. The evidence of substantial agricultural exports show that some producers are able to compete in markets abroad. The most market aware farmers currently appear to be drawn to horticultural products (i.e., fruit, berries, mushrooms, flowers and early season vegetables) and may have already developed comparative advantage within this product category. The competitiveness of many agricultural products can also be improved.

FUTURE TRENDS IN GRAIN QUALITY IMPROVEMENT

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Abstract

Beside yield improvement grain quality and technological quality stability plays an important role in our region for both the domestic and the export market demands. Technological quality stability is a particularly critical property in Balkan region and in Eastern Europe because of favourable agroecological conditions wheat with better bread making quality and higher protein content can be grown in this region than in Western Europe. Over the last two decades the stability of grain quality parameters has deteriorated due to the negative effects of reduced fertiliser use, extreme climatic conditions as well as new and unexpected biotic and abiotic stress factors. Endeavours should be made to change the composition of the storage protein for new types of industrial uses rather than increasing the protein content without any limits in the course of new germplasm selection. Concerning new trends of healthy lifestyle emphasis is increasingly being laid on improvements in the bioactive components important for cereal-based diet. This trend suggests that in addition to the amount of protein and its composition, attention should also be paid to selection for the non-protein components of the kernel like dietetic fibre content and modified starch composition. Wheat is also a significant source of macro and micronutrients including B vitamins, minerals and different phytochemicals. Cereal fibre is becoming of increasing importance as having benefits in reducing the risk of cardio-vascular disease and certain types of cancer. Wheat starch is a mixture of amylose and amylopectin which occur in a ratio of 1:3. With the modification of this ratio it is possible to develop different end use quality products. Waxy type genotypes with low amylose content are useful for Asian noodle quality or long shelf life bakery products. Bread made of flour with high amylose content is less readily digested in the gastrointestinal tract and defined as "resistant starch". Grain composition and quality is also important in other end uses of wheat, such as livestock feed, distilling and bioethanol production. Wheat is one of those food components that are responsible for a large amount of food hypersensitivity reactions which are an increasing danger in cereal consumption. The most widespread diseases are wheat flour allergy and coeliac disease triggered by certain proteins and their given short amino acid sequences (epitopes) in wheat. Prevalence of these illnesses is becoming higher all over the world. 15 - 20% of allergic patients are wheat allergic, while the rate of the population affected by celiac disease is about 1%.

BREEDER SEED MANAGEMENT OF ELITE CULTIVARS AND PROPAGATION OF CERTIFIED SEED

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Abstract

Breeding process is a time consuming and costly endeavor, thus, the way 'breeder seed' is treated to maintain cultivar uniformity and avoid degeneration is of paramount importance. Generally, cultivars are considered fairly homogeneous and treated as permanent records with limited or no importance genetic variation. In conservation procedure, only those plants which are obviously of incorrect type are removed, rendering thus the technique more roguing rather than selection process. Contrariwise, the molecular tools revealed evidences that genome undergoes constant remodeling and restructuring, suggesting that it is more flexible and plastic than previously assumed. Latent genetic variation due to relic heterozygosity combined with genetic and epigenetic mechanisms (i.e., intragenic recombination, unequal crossing over, DNA methylation, excision or insertion of transposable elements, and gene duplication) that generate de novo variation may result in considerable intra-cultivar variation. In sequence, cultivars adopted and widely grown by farmers may lose their identity and healthiness in the long-term. Further, contaminating and degrading forces such as out-crossing, volunteer plants, physical admixture, natural selection, mutation and seed-borne diseases, all will change the cultivar gene pool for the worse. Thus, an appropriate non-stop intra-cultivar selection appears to be a viable option aiming beneficial exploitation of the existed and newly developed variation. There is a widespread evidence of negative relationship between genotype yielding and competitive ability. Cultivar propagation at crop densities may favour accumulation of mutations that enhance competitive ability at the expense of yielding ability that might lead to gradual deterioration over the years. Consequently, in order to treat the 'breeder seed' in an effective and sustainable manner, conditions that allow recognition and removal of the undesirable mutations is an imperative need. Ultra-low density that excludes plant-to-plant interference for resources (i.e., absence of competition) satisfies such a prerequisite for two reasons. Firstly, it boosts the phenotypic expression of the limited intra-cultivar genetic variation. Secondly, it erases the confounding effects of the above relationship on the recognition of the desirable and undesirable genotypes so as to select the first and eliminate the latter. So far relevant research in various crops (maize, wheat, cotton and soybean) is encouraging that intra-cultivar selection may prove to be a useful technique either to upgrade or to avoid gradual degradation of genetic background, to maintain uniformity, and secure optimal quality of 'breeder seed' over longer periods of time. A similar process within a lentil local variety was found exceptionally useful to improve its healthiness through drastic reduction of the load of seed-borne viruses. The final proposal is perpetual selection within 'breeder seed' to ensure its sanitary status, and propagation at dense stand at the following stages to succeed the demanded amounts of certified seed.

Key words: Absence of Competition, Competitive Ability, Intra-cultivar Variation

VAVILOV' S COLLECTION OF CULTIVATED PLANTS AS A STRATEGIC BASIS FOR FOOD SECURITY

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Abstract

Nikolai Vavilov was the first scientist to recognize the utmost importance for the humanity and potential value of world-wide collecting of crop seed, including crop wild relatives, and their conservation in viable conditions. Later his views were shaped into an international scientific concept, while his activities in building up seed collections served as a model. It was Vavilov who showed to the world's scientific community that the vast diversity of genes in populations of wild and weedy species, landraces and improved cultivars is a treasury of promising breeding sources. By 1901, the collection of cultivated plants in Russia consisted of 301 accessions; in 2012, it has grown to more than 324,000. In the past 90 years, the Vavilov Institute organized and implemented 1558 collecting missions over the ex-USSR territories and 282 to foreign countries. At present, there are 1750 plant gene banks over the world. Their holdings amount to 7.3 million plant accessions (FAO, 2010), with more than 1.84 million (24.7%) in the five leading national gene banks (USA, China, India, Russia and Japan). The modern algorithm of crop collecting management comprises the following key components: analysis and assessment of the global plant genetic diversity in nature and in gene banks; systematic inventoring (revision) and assessment of the collected genetic diversity in a national gene bank; identification of "gaps" in the gene bank's holdings; systematic analysis of national breeding programmes, identification and prognostication of their demands for genetic sources; evaluation of genetic erosion and genetic vulnerability of the accessions for economically important crops and their wild relatives. The ongoing globalization and international integration processes, rapid development of science and technology, introduction of novel technologies, acceleration of genetic erosion, climate change, and escalation of inter-country competition on the world market call for the need to solve common global problems by cooperative and most effective efforts. The main strategic task for the future is to work out governmental and non-governmental measures aimed at abating negative tendencies and securing the most optimal conditions for safe *ex situ* and *in situ* conservation of plant genetic resources, promotion of fundamental and applied research in the sphere of agricultural biodiversity, avoidance of duplication in such activities, increasing the capacity in collecting valuable genetic diversity, and enrichment of national germplasm holdings through targeted collecting missions all over the world.

Key words: N.I.Vavilov, Plant Genetic Resources, Food Security

STATUS AND PROSPECTS OF BREEDING AND SEED PRODUCTION OF AGRICULTURAL PLANTS IN SERBIA

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Abstract

Serbia is a country with favorable agro-ecological conditions for agricultural production, especially for maize, sunflower, soya bean and small grain cereals. Significant areas are used for seed production, and the five year average areas for wheat, maize, soya bean and sunflower are 23,304 ha, 9,526 ha, 8,176 ha and 1,200 ha, respectively. The tradition of successful seed production and breeding, primarily related to field crops, include Serbia in countries with significant potential for the seed industry. International sanctions and war events during the 1990s, along with the exclusion of our country from important international associations, depleted the national seed industry concerning material resources and the status. A significant part of the EU market was lost, while our seed processing capacities remained insufficiently used, without necessary technical and technological improvements. The events that followed brought a series of changes in all activities including ownership, technology, commerce and the market. Currently, a large number of international and national private seed companies compete on the Serbian market. In spite to all negative trends mentioned, two important issues could not be neglected: 1. Our country is still one of the leading European producers of cereals, but also of other plant species; 2. Our country is still one the few European countries whose results in plant breeding are competitive with the world's leading companies. With certain improvements that are intensively applied and are related to harmonisation of the national legislation with the EU's, as well as with the modernisation of existing seed processing capacities, Serbia can become an even better place for the seed industry. At the same time, we must not ignore the role of the public sector in the conservation of natural and technological resources, as well as development in breeding and seed sciences of our country.

Key words: breeding, private sector, public sector, seed industry, Serbia

FUTURE DIRECTIONS IN PLANT BREEDING AT MOLECULAR LEVEL

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Feeding ever-increased population is the main challenge faced by the agriculture scientists. Thus plant geneticists and breeders have to put continuous efforts to develop new crop varieties on fast track basis. Plant biotechnology and genetics are approaches which offer a number of opportunities for genetic improvement of plants. It is expected they to increase the efficiency of plant breeding by affecting the speed and accuracy of the selection. However until complex traits can be fully dissected, the application of the modern technologies will be limited to genes of moderate effect. In the future chip-based high-throughput genotyping platforms and the introduction of genomic selection will reduce the current problems of integrating modern tools in practical breeding programs and will open new avenues to the improvement of the molecular-based breeding efficiency.

Key words: plant biotechnology, breeding, molecular tools,

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6. THE NUTRITIONAL VALUE OF WALNUT - S. Mehmet Şen, Turan Karadeniz
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9. DETERMINATION OF PERFORMANCES OF DOMESTIC WALNUT VARIETIES OBTAINED BY SELECTION AND INTERNATIONAL COMMERCIAL VARIETIES IN GAZIANTEP REGION - Sibel AKTUĞ TAHTACI, Kamil SARP KAYA, Hatice GÖZEL, Yaşar AKÇA, Yeşim OKAY, Menşure ÇELİK
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15. THE EFFECTS OF EXOGENOUS GIBBERELLIN ON SEED GERMINATION OF THE FRUIT SPECIES - Aysun CAVUSOĞLU, Melekber SULUSOĞLU
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18. COMPARISON OF AMPELOGRAPHIC CHARACTERISTICS OF SOME IMPORTANT GRAPE VARIETIES ARE GROWN IN THE AEGEAN REGION, ROOTSTOCK AND CLONES - Yıldız Dilli, Akay Ünal, Metin Kesgin, M. Sacit İnan, Gökhan Söylemezoğlu
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20. PHYTOCHEMICAL PROPERTIES OF *PISTIA STRATIOTES* - Khan Bahadar Marwat

21. RESISTANT LINE DEVELOPMENT MARKER ASSISTED SELECTION AND DOUBLED HAPLOIDY IN PEPPER (*CAPSICUM ANNUUM*) - Canseri Bozkus, Nedim MUTLU,
22. *IN VITRO* POLLEN VIABILITY AND POLLEN GERMINATION OF SERVICE TREE (*SORBUS DOMESTICA* L.) - Melekber SULUSOGLU, Aysun CAVUSOGLU
23. PRESELECTION IN *VACCARIA HISPANICA* (MILL.) RAUSCHERT FOR ORNAMENTAL PLANT BREEDING - Esin ARI, Selcen YILDIRIM, Hilal BEDİR, Merve BANKOĞLU, Ümmü GÖKMEN, İlker GENÇ, İ.Gökhan DENİZ, Nedim MUTLU, Yaşar İŞBİLEN, Nihal KULA
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SOIL SCIENCE

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2. THERMODYNAMICS AND SORPTION CHARACTERISTICS OF ZN⁺ ONTO NATURAL AND CHEMICALLY MODIFIED ZEOLITES - Kadir Saltalı, Mustafa Kaya
3. EFFECT OF MICROBIAL FERTILIZER ON SOYBEAN YIELD IN ORGANIC AND CONVENTIONAL PRODUCTION - Dozet Gordana, Cvijanović Gorica, Đukić Vojin, Cvijanović Drago, Kostadinović Ljiljana
4. ORGANIC AMENDMENT AND CHEMICAL FERTILIZATION IMPACTS ON CARBON MANAGEMENT TO EVALUATE SOIL QUALITY - Derya Yücel, Celal Yücel, I. Ortas, K. R. Islam
5. CADMIUM AND ZINC ACCUMULATION IN MAIZE INFLUENCED BY ZINC FERTILIZER IN CADMIUM POLLUTED SOIL - Bahar SOZUBEK, Korkmaz BELLITURK, M. Turgut SAGLAM
6. DETERMINATION OF THE INFLUENCE OF SOME SOIL PROPERTIES ON AGGREGATE STABILITY IN WHEAT CULTIVATED AREAS - İ. Gümüş, C. Şeker, H. H. Özaytekin, Hamza Negiş, E. Karaarslan, Ü. Karaca
7. ADJUSTING SPI FOR CROP SPECIFIC AGRICULTURAL DROUGHT - Kasirga Yildirak, Sevtap Kestel
8. PHOTOSYNTHETIC RESPONSE OF POTATO PLANTS TO SOIL SALINITY - Berkant ÖDEMİŞ, Mehmet Emin ÇALIŞKAN, Dursun BUYUKTAS
9. THE PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES OF BROAD BEAN (*VICIA FABA* L.) TO SALT STRESS AND SALICYLIC ACID TREATMENT - Fatima ANAYA, Rachid FGHIRE, Said WAHBI, Kenza LOUFI
10. MANAGEMENT SYSTEMS IMPACT ON SOIL AGGREGATE PROTECTED CARBON AND NITROGEN SEQUESTRATION - Celal Yücel, Derya Yücel, I. Ortas, K. R. Islam

11. SOIL HEALTH RESPONSE TO CONTINUOUS NO-TILL AND COVER CROPS - Derya Yücel, Celal Yücel, I. Ortas, K. R. Islam
12. EFFECT OF SAKARYA AKGÖL ORGANIC SOIL ON THE QUALITY PARAMETERS OF TOMATO – N. Çiçek Atikmen, C. Kütük
13. SPATIAL AUTOCORRELATION OF SOLUTE TRANSPORT ATTRIBUTES IN A COMPOSITION OF TYPIC HAPLUSTEPS, MOLLIC USTIFLUVENTS, AND LITHIC USTIPSAMMENTS - Sabit Erşahin, Tayfun Aşkın, Ceyhan Tarakçıoğlu, Damla B. Özenç, Kürşat Korkmaz, Turgut Kutlu, Seval Sünal
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15. APPLICATION OF THE INTERO MODEL FOR THE ASSESMENT OF THE SOIL EROSION INTENSITY AND RUNOFF OF THE RIVER BASIN DRAGOVO VRELO, MONTENEGRO - Velibor SPALEVIC, Milic CUROVIC, Vjekoslav TANASKOVIĆ, Nevenka DJUROVIĆ, Tom LENAERTS, Jan NYSSSEN
16. AN EVALUATION OF SOME PHYSICAL PROPERTIES ARISED FROM SOIL COMPACTION IN ÇUMRA PLAIN - Hamza Negiş, İ. Gümüş, C. Şeker, H. H. Özaytekin
17. USING RENEWABLE ENERGY SOURCES FOR AGRICULTURAL IRRIGATION - Emrah AYDIN, Görkem ŞEN, Yusuf AVŞAR, Aydın GÜLLÜ, M. Ozan AKI
18. THE EFFECTS OF IRRIGATION MANagements ON SOIL SALINITY IN TWO DIFFERENT IRRIGATION DISTRICT - Harun KAMAN, Mahmut Çetin, Cevat KIRDA
19. THE EFFECT OF DRIP IRRIGATION AND TRADITIONAL MANAGEMENT ON THE DISTRIBUTION OF WATER LOSS BY EVAPOTRANSPIRATION FROM AN AREA ASSIGNED TO PISTACHIO TREE - Selçuk Özmen, Rıza Kanber, Pasquale Steduto, Mustafa Ünlü, Yusuf Aydın, Kenan Diker
20. WATER PRODUCTION FUNCTIONS OF WHEAT IRRIGATED WITH SALINE WATER USING LINE SOURCE SPRINKLER SYSTEM UNDER THE MEDITERRANEAN TYPE CLIMATE - Servet Tekin, S. Metin Sezen, Sedat Boyacı, Mehmet Yıldız
21. DEVELOPING AN INTELLIGENT DECISION SUPPORT SYSTEM FOR ENVIRONMENTALLY OPTIMIZED IRRIGATION MANAGEMENT USING SENSORS, REMOTE SENSING AND METEOROLOGICAL FORECAST – THE ENORASIS PROJECT - Tekes S., Symeonidis P., Simeonidou M., Syropoulou P.
22. SPATIAL AND TEMPORAL DISTRIBUTION OF PESTICIDE RESIDUES IN SURFACE- AND GROUND-WATER IN NORTH-EASTERN GREECE - Zisis Vryzas, Emmanuel N. Papadakis, Christos Alexoudis, George Vassiliou, Euphemia Papadopoulou-Mourkidou
23. FACTORS AFFECTING ADOPTION OF IRRIGATION WATER SAVING TECHNOLOGIES AND PRACTICES IN SAUDI ARABIA - Khodran H. Al-Zahrani, Siddig E. Muneer
24. STUDY ON PREDICTION OF THE AMOUNT OF RECLAMATION WATER REQUIREMENT FOR SALT LEACHING OF SALINE AND SODIC SOILS USING EMPIRICAL SIMULATION MODELS (CASE STUDY LOCATED IN KHUZİSTAN PROVINCE – IRAN) - Amirpouya Sarraf, Golaleh Mostafavi

25.COMPARATIVE ANALYSIS OF SOME IRRIGATION COOPERATIVES AND ACTIVITIES OF IRRIGATION UNIONS (Edirne, Kırklareli, Tekirdağ, Çanakkale provinces sampled) - Erol ÖZKAN, Başak AYDIN, Erkan AKTAŞ, Harun HURMA

AGRICULTURAL ECONOMY

1. WHICH TYPES OF FARMING ACTIVITY DEVELOP FASTEST THANKS TO THE CAP FUNDS IN POLAND?
- Barbara Wieliczko
2. AGRI-FOOD INTERNATIONAL TRADE STRUCTURE AND EXCHANGE RATES - Cezary Klimkowski
3. FINANCING AGRICULTURE: TRENDS AND ISSUES, EVIDENCE FROM TURKEY - Celal TAŞCI
4. STRUCTURAL CONDITION AND PRODUCTIVITY OF AGRICULTURE IN TURKEY ON THE WAY TOWARDS EU MEMBERSHIP - Gülfinaz Özoğul
5. TOMATO TRADE BETWEEN MACEDONIA AND THE BALKAN REGION - Ilaz Ameti, Oriola Vukaj, Besim Idrizi, Elizabeta Krsteska
6. EFFECTS OF MARKETING COMMUNICATIONS TOOLS UPON THE PURCHASE BEHAVIOR OF FOOD PRODUCTS CONSUMERS - Nermin Bahsi, Dilek Bostan Budak
7. AGRICULTURAL AND RURAL DEVELOPMENT IN SERBIA: GOVERNANCE, POLICY CYCLE AND COORDINATION – Sinisa BERJAN, Hamid EL BILALI, Milan JUGOVIC, Vesna MRDALJ, Borko SORAJIC, Nouredin DRIOUECH
8. AGRICULTURAL SECTOR PROFILE OF TURKEY IN THE WORLD - Yeşim AYTÖP, Muhammed ÇUKADAR, Ahmet ŞAHİN
9. AGRIFOOD PRODUCTS' COMPETITIVENES IN BALKAN REGION-STUDY ON ROMANIAN AGRIFOOD TRADE - Dan-Marius VOICILAS
10. STUDY OF PROJECT'S LAUNCHING "ARTISANAL COUSCOUS ENRICHED WITH LOCAL SPIRULINA", ENVIRONMENTAL ANALYSIS AND DEFINITION OF A STRATEGY - Soumeya Doumandji, Amel Doumandji
11. MANAGING RURAL TOURISM IN VOJVODINA (SERBIA) - Zoran Njegovan, Dunja Demirović, Olgica Bošković, Gordana Radović
12. THE QUANTITATIVE STRATEGIC PLANNING MATRIX (QSPM) APPLIED TO AGRITOURISM DEVELOPMENT: A CASE STUDY IN THE COASTAL PROVINCES OF THE CASPIAN SEA IN IRAN - Maryam Mahmoodi, Mohammad Chizari, Khalil Kalantari, Abdolreza Rokneddin Eftekhari
13. DETERMINATION OF CLASSIFICATION PARAMETERS OF BARLEY SEEDS MIXED WITH WHEAT SEEDS BY USING ANN - Kadir Sabancı, Cevat Aydın
14. A QUESTIONNAIRE STUDY ON AGRICULTURAL MACHINERY CABIN'S COMFORT - Özge Acarbaş Baltacı, Savaş Yapıcı, Ömer Faruk Erol, Prof. Dr. Zeki Yıldız

ORAL SESSION

1- ANIMAL SCIENCE

INVESTIGATING PROPER COUNTING NUMBER PER SLIDE FOR DIRECT MICROSCOPIC SOMATIC CELL COUNTING METHOD IN BOVINE MILK

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Abstract

The aim of this investigation was to determine the proper counting number per slide (CN) for direct microscopic somatic cell count (SCC) of bovine milk. For each counting group (20, 30, 50 and 75 visual counting groups), fifty samples were prepared using methylene blue dye solution. Calculated mean SCC of raw milk samples (547478 ± 190507 cells/ml) was found as higher than limit for acceptable milk consumption threshold by EU directives. While no statistically significant difference was found among CN groups by SCC in log₁₀ base, significant ($P < 0.01$) correlation ($r = 0.983$) was estimated between CN1 and CN2 groups. The results of the study showed that higher than 30 counting per slide is not advised for obtaining proper SCC records by direct microscopy in cow milk.

Key words: Milk quality, Somatic cell count, Direct microscopy, Cow milk

EFFECTS OF DIFFERENT WEANING AGE AND HOUSING SYSTEM ON THE GROWTH PERFORMANCES OF HOLSTEIN-FRIESIAN CALVES

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Abstract

Early life of the cattle is very critical; they require intensive care and this period is probably the most expensive period in their life. By understanding the principles of growth, nutrition, health and behavior, farmers can develop successful calf rearing system on their farms. In this study, different weaning age (5 weeks and 8 weeks) and housing systems (individual calf hutch, group barn and combination of these two systems) of Holstein-Friesian calves were investigated. The study repeated twice in winter calving and summer calving and totally 36 calves were used in the study. During and after calving, some behaviors of cows and calves were observed in addition to the quality of the colostrums produced by cows. The body weight of the calves at birth and weakly ages up to the weaning were determined. After the weaning the measurements were conducted monthly up to the 6 months of calves' age. The averages of colostrum quality, standing up time of calf from birth, separation of calf from the cow after birth and time of placenta drop from birth were found to be 95.44 ± 3.74 mg/L, 101.3 ± 10.30 min, 170.56 ± 8.57 min and 345.3 ± 75.60 min, respectively. The average birth weight of calves for the 5th and 8th weeks weaning groups were 43.14 ± 0.90 kg and 41.75 ± 0.91 kg ($P > 0.05$), and the body weight at the 6th month of age were found to be 108.99 ± 2.14 kg and 106.60 ± 1.89 kg ($P > 0.05$), respectively. The average calf birth weight in winter calving is 3.09 kg higher than that of spring calving ($P < 0.05$), but the body weight at the 6th month of age in winter calving group was 15.93 kg lower than that of spring calving group ($P < 0.01$). The statistically significant birth weight differences among the housing groups were disappeared at the second month of age and the average body weights at the 6th month of age were found to be 105.77 ± 2.35 kg, 107.94 ± 2.56 kg and 109.69 ± 2.52 kg ($P > 0.05$), respectively. In conclusion it was determined that the quality of the colostrums varies significantly, therefore before feeding the calves with colostrums, the quality of it should be determined. Early weaning (5 weeks) of the calves did not have significant effects on the later performances of the calves. For animal welfare concern, instead of housing the calves in individual calf hutch, the combined system could be an important practice for dairy farms.

Key words: Early Weaning, Colostrum Quality, Calf Housing, Birth Weight, Weight Gain

MARKET ANALYSIS of THE RED MEAT SECTOR in TURKEY

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Abstract

As it is in the whole world, livestock farming has an important role because of its use as an industrial raw material in the adequate and balanced nutrition of the increasing population and many fields in Turkey. Additionally, it offers solutions to the economy and social problems of the country. Livestock farming takes social functions such as decreasing unemployment in rural areas, reducing unplanned urbanization and population pressure experienced in cities by preventing migration from country to town. Its economical functions include contributing to the balanced growth, increasing the national income and providing raw materials to many sectors (meat, milk, leather, cosmetics and medicine). Red meat, which is one of the basic elements of nutrition in Turkey and has the most qualified protein source, is also necessary for the food culture of the society. Although nutritional habit changes by countries and cultures, countries accord in their wish for supplying their needs for food by not being dependent on outside sources. Despite the significant progress in agricultural development has been achieved in developing countries in recent years, the undernourishing population of the world is still increasing. Therefore, it is necessary to step up the food production of animal origin in order to meet the requirements of the increasing world population. Today the countries having developed technology obtain more than half of their total agricultural income from animals and animal products. Although these countries possess 30-40% of animal existence in the world, they retain 75-80 % of the total animal production in the world. Less developed countries including Turkey and developing countries possess 60-70% of world animal existence but however they retain 20-30% of the production of animal products in the world. These numbers form a criterion about the situation of production and consumption of animal products in these countries. Agricultural sector in Turkey is considered to be an important sector as it is the source of income for the majority of the population and it provides raw materials for food industry. The Central Anatolia Region, which has the largest agricultural land of our country, has a high potential of agricultural production (vegetative and animal production) due to the structure of its geographical formations and its climatic conditions and appropriate geography. Adequate and balanced nutrition; minimizing the food losses can be possible by processing animal and vegetative foods, which are the basic consumption products, through appropriate technological methods. However, serious problems emerge because of inadequate water sources and the use of limited sources. Animal production in Turkey occurs with vegetative production and takes part as the secondary activity. The importance of animal origin-food within adequate and balanced nutrition results from including proteins at a high rate and the high digestibility rate of the proteins that they contain. In this study, the current situation of Turkish livestock farming and the developmental aspects of red meat production, the animal existence in recent years, the supply and demand situation depending on red meat production, the amount of stock, the amount of import and export, the factors affecting red meat prices were studied accordingly.

Key Words: Red meat, animal production, market analysis, Turkey

EFFECTS OF TRITICALE REPLACEMENT WITHOUT ANY ENZYMES ON CARCASS PERFORMANCE OF BROILER CHICKENS

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Abstract

A 42-day feeding trial involving 960 day old Ross-308 broilers with 48 group's four replicates for 3 feed sources in 4 rooms was carried out in a completely randomized design to evaluate the carcass yield. Starter (23% CP and 3000 kcal ME/kg of feed), grower (21% CP and 3175kcal ME/kg of feed), and finisher diets (20 CP and 3225 kcal ME/kg of feed) were provided from 0 to 11, from 12 to 28, from 29-42 days of age respectively. Diets containing either maize (as a control group-M) or triticale grain as the sole source (T) and Maize+Triticale mix (MT) were used. Triticale was provided % 50, 55 and %58 in starter, grower and finisher diets totally in M and T groups and MT group percentage was 25%, 27.5, and 29% in periods respectively. No enzyme added to diets phytase included. At 42 d, 6 bird (3 male and 3 female) per pen in total 288 birds were carried to Research Institute's processing plant. The plucked, eviscerated carcasses were evaluated for carcass traits. Overall, eviscerated carcass, thigh, drum and pectoralis minor as a percentage of carcass weight were lower in T and MT groups 36 and 6% than control group respectively. Abdominal fat yield in T and MT groups were also lower 9 and 38% than those of M group. Final BW and carcass weight and slaughter outputs were affected similar percentage that fed broiler chicken with the sole source of triticale's without any enzyme added to diets phytase included.

Key words: broilers, maize, triticale, enzyme, carcass performance

A RISING OLD TRADITION in MODERN TURKEY: CAMEL WRESTLING in CANAKKALE REGION

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Abstract

In this study camel wrestling events were searched in Canakkale region including some counties. During thousands of years of Turkish History, camels were always important in their life. In the past camels were used as transport, pack, ride, war, food, and sport animal by Turks. After industrialization and modernization since 20th century, camel lost their importance and nowadays they are only a sport and tourism tool and the camel population in Turkey decreased in number of about 2.000s recently. The camel population is mostly used for camel wrestling events in Regions of Aegean and partially in Marmara and Mediterranean. During winter season the camel wrestling events are organized about in 10 places in Canakkale region annually. Wrestling events are on Sundays and followed by not only men spectators but also women and children. Although camel wrestling equipments, accessories, ornaments, wages of takecarers, transport for wrestling from city to city, accommadation, catering are quite expensive, camel owners are not so rich people, but low or middle income people. Hence, those organizations and camel owners should be supported more by the state and local municipalities in order to survive this traditional event.

Key Words: *Camelus dromedary*, *Camelus bactrianus*, genetic resource, native breed, sport.

EFFECTS OF DIETARY STARCH AND PROTEIN LEVELS ON MILK PRODUCTION AND COMPOSITION OF DAIRY COWS FED HIGH CONCENTRATE DIET

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Abstract

Twenty eight Holstein cows (averaged 41.0±31.5 days in milk, 30.4±3.49 kg/d milk yield) were fed a high concentrate diet (70:30 concentrate to forage) to examine effects on milk production and composition. The cows were randomly assigned to receive four dietary treatments according to a 2 x 2 factorial arrangement. Factors were starch (14% and 22%) and protein (15% and 18%). Wheat straw was used as forage source. The study lasted 6 weeks. Dry matter intake was not affected ($P > 0.05$) by the dietary treatments in the study. Milk yield increased with increased dietary protein level ($P < 0.01$). Milk urea nitrogen concentrations were affected by dietary protein and starch levels, but there was no interaction effect. Nitrogen efficiency (Milk N/N intake) was decreased by increasing in dietary protein level ($P < 0.01$). In conclusion, the cows fed TMR containing low level of wheat straw responded better when dietary protein increased. But, efficiency of N use and N excretion to the environment were worsened.

Key words: Starch, protein, wheat straw, milk composition, dairy cattle

NEW DEVELOPMENTS PREVENTING SUBACUTE RUMINAL ACIDOSIS AND ITS INFLAMMATORY RESPONSE

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Abstract

High energy diets are used in the feeding of high dairy cows. These types of diets generally consist of high starch and low neutral detergent fiber. Rumen degradable starch leads to rapid production of volatile fatty acids. When neutralization and absorption of volatile fatty acids in the rumen is disrupted, subacute ruminal acidosis (SARA) occurs. Dairy cattle in early lactation, mid lactation and transition period have been considered to be more prone to developing SARA. Subacute ruminal acidosis causes impaired digestion, lowered nutrient utilization and milk fat content, and high incidence of metabolic diseases. The purpose of this review is to summarize the present knowledge on relationships between SARA and diseases in dairy cattle, and especially focus on new treatments such as grain processing technology, direct feed microbials, and amount of peNDF in ration for preventing SARA.

Key words: Subacute ruminal acidosis, SARA, Disease, Grain processing technology

SUSTAINABLE USE OF TURKISH GREY CATTLE, ONE OF DOMESTIC ANIMAL SPECIES IN TURKEY, IN ORGANIC ANIMAL PRODUCTION

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Abstract:

Residuals of animal feeds and feed additives used in industrial animal production, in animal products cause important health problems for consumers. Organic animal production suggested as an alternative based on natural pastures and feeds that are produced without any chemical is a more effective production system which is less harmful to environment. The project carried out in villages of Ayvacık county of Çanakkale province, an important production area of domestic species due to the uneconomical production of culture species, is one of the initial samples of organic meat production in Turkey. Turkish grey cattle, ranging in the bush-covered pastures, are organically produced and protected in these villages. The sustainability of animal gene protection efforts can only be achieved with the economic success of their products. The sustainable production of Turkish grey cattle has become possible with the emergence of its extra benefits. In this study, the opportunities for sustainable and organic production of Turkish grey cattle and the case study of Ayvacık Organic Red Meat Production Project are investigated. Animal material of the search will consist of 40 Gray Cattle which were raised by the members of the Union and sent to slaughtering. The carcass and meat quality characteristics of these cattle will be determined and compared with the carcass and meat quality values of cattle which were raised conventionally. Thus, the carcass and meat quality differences between conventionally raised cattle and organically raised cattle will be studied.

Key words: Organic agriculture, organic animal production, Turkish grey cattle, genetic source of domestic animal, red meat production

APPLICATION OF REPRODUCTIVE BIOTECHNOLOGY ON ANIMAL REPRODUCTION AND CONSERVATION OF GENETIC RESOURCES

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Abstract

Dramatic changes of environmental conditions including global warming and environmental pollution have irreversibly affected the world's flora and fauna. As in other countries, several endemic domestic animals have been totally lost or under danger in Turkey. Domestic animal breeds are becoming extinct due to a lack of market advantage when compared with productive dairy and beef breeds. This alarming situation has galvanized the relevant organization, Global Action Plan on the protection of animal genetic resources was published by the World Food and Agriculture Organization (FAO, 2007), and asked the member states to make a run in this direction. Conservation of animal genetic resources are protected using *in-situ* and *ex-situ* methods. In-situ method is to protect the animals live in natural environment. Ex-situ method is kept animals outside in their natural environment on a farm or in a zoo (*ex-situ in vivo*), or as cryopreserved biological materials (*ex-situ in vitro*) form. Cryopreservation defined as living materials stored for prolonged periods, is to used based on freezing of various biological materials. The cryopreservation of embryos and gametes (oocytes and sperm) from genetically valuable animals is the basis of biological banks. Nuclear transfer (NT) technology is being used to clone desirable adult genotypes and phenotypes for animal husbandry and biomedical applications. After the successful studies of many different types of cloning, somatic cell nuclear transfer (NT) is proposed as an alternative method for the protection of endangered species, therefore, for conservation programs not only inclusion gametes and / or embryos, but also taking other biological sources, such as somatic cells, into biobank is recommended. In this context, the first animal gene bank including frozen gametes, embryos, cells, and DNA from 30 breeds of native livestock was established by the year 2013 in Turkey, and 5 Anatolian Grey Cattle were cloned by using frozen cells from this bank. These clones are 5 and 4.5 years of old, and three female and one male clones gave birth to four healthy calves.

Key words: Cryopreservation, animal genetic resources, cloning, embryo, sperm

POLIMORPHISM IN MHC (MAJOR HISTOCOMPATIBILITY COMPLEX) GENE REGION IN SOME TURKISH SHEEP BREEDS

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Abstract

The major histocompatibility complex (MHC) in sheep, Ovar-Mhc, is poorly characterised, when compared to other domestic animals. However, its basic structure is similar to other mammals, comprising class I, II and III regions. In this study, the Ovine MHC class II DRB1 and DRB3 genes were amplified by Polymerase Chain Reaction (PCR) in eight sheep breeds (White Karaman, Dağlıç, Awassi, Sakız, Kıvırcık, Karayaka, Malya, Morkaraman) that are reared in Turkey. Informative Restriction Fragment Length Polymorphism (RFLP)'s were obtained with five restriction enzymes (*NciI*, *SacI*, *SacII*, *Hin1I* and *DdeI*) for DRB1 gene and with two restriction enzymes (*NdeI* and *BsaI*) for DRB3 gene. The digestion of exon 2 of DRB1 gene with *NciI*, *SacI*, *SacII*, *Hin1I* each resulted 3 genotypes, and two alleles viz., a and b with frequency range of 0.70 and 0.30; 0.63 and 0.37; 0.79 and 0.21; 0.55 and 0.45, respectively. The digestion of exon 2 of DRB1 gene with *DdeI* resulted 5 genotypes, and 3 alleles viz., a, b and c with frequency range 0.62, 0.28 and 0.10 respectively. On the other hand the digestion of exon 2 of DRB3 gene with *NdeI*, *BsaI* each resulted 3 genotypes, and two alleles viz., a and b with frequency range 0.72 and 0.28; 0.96 and 0.04 respectively. This study presents the genetic profile of MHC gene region of exon 2 of DRB1 and DRB3 genes in native Turkish sheep breeds and should be extended by DNA sequencing methods or with other MHC loci.

Key words: MHC (Major Histocompatibility Complex), DRB1, DRB3, Restriction Fragment Length Polymorphism (RFLP), Native Turkish Sheep

REPRODUCTIVE AND GESTATION LENGTH OF HAIR (KIL) GOATS AND THE GROWTH CHARACTERISTICS OF PURE KIL, SAANEN X HAIR AND ALPINE X HAIR CROSSBRED KIDS UNDER MOUNTAINOUS CONDITIONS IN KONYA PROVINCE

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Abstract

This study was carried out to determine fertility, gestation length of Hair (Kil) goat and growth characteristics of pure Hair (K), Saanen x Hair (F₁) (SKF₁) and Alpine x Hair (F₁) (AKF₁) crossbred kids under the mountainous conditions in Ulumuhsine Village, Selçuklu, Konya. The survey was carried out on 28 Pure Hair Goat kids, 64 (SKF₁) and 58 (AKF₁) crossbred kids born in March and April, obtained from 144 head of Hair Goats. The averages of reproductive traits of Hair goat such as infertility, kidding rate, twin rates, aborted, fecundity and litter size were 1.39%, 80.81%, 20%, 10.40%, 1.04 and 1.20 respectively. The average live weights of (SKF₁), (AKF₁) and (K) birth weights were found 3.04±0.05, 3.16±0.05 and 2.90±0.07 kg, weaning weights of (third month) 16.19±0.42, 16.68±0.39 and 14.99±0.56 kg, sixth month 22.89±0.53, 23.96±0.47 and 22.03±0.71 kg respectively. The average daily live weight gains of SKF₁, AKF₁ and K kids from birth to 6 months of age were 0.109±0.003, 0.116±0.003 and 0.105±0.004 kg, respectively. Survival rates of SKF₁, AKF₁ and K kids at the third months were found 81.3%, 91.4% and 78.6% respectively. Effects of maternal age, genotype, birth type and sex on the birth weight were found statistically significant (P<0.001). Effects of maternal age, genotype and sex on the daily live weight gains, weaning weights and sixth month were found statistically significant (P<0.01, P<0.05). Effects of maternal age, birth type and sex on the gestation length were found statistically significant (P<0.01).

Key words: Hair, saanen, alpine, reproductive yield, gestation length, growth performance

THE EFFECT OF DIFFERENT INTENSIVE FEEDING DURATION ON FATTENING PERFORMANCE AND CARCASS CHARACTERISTICS OF HONAMLI MALE KIDS

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Abstract

The aim of this study was to investigate the effect of different intensive feeding durations on fattening performance and carcass characteristics of Honamlı male kids. In the study, 30 Honamlı singleton male kids (weaned at day 75) were fed ad libitum as groups with concentrate ration (15.1% CP-2640 kcal ME) and dry alfalfa hay during the 60, 80 and 100 days. Initial live weight and live weights at days 60, 80 and 100 of Honamlı kids were found as 17.5, 28.6, 33.5, 39.2 kg, respectively. And average daily live weight gains (ADWG) of Honamlı kids between 0-60, 0-80 and 0-100 days were 185, 200 and 217 g, respectively. There were no significant differences between the different fattening durations with regard to ADWG. Feed conversion ratios of Honamlı male kids between 0-60, 0-80 and 0-100 days were 5.09, 5.26 and 5.42. Pre-slaughter weights and the dressing percentages of the hot and cold carcass, the ratios of the omental-mesenteric fat, kidney–pelvic fat, lean, bone and total fat at days 60, 80 and 100 were found as 25.9 kg, %44.3, 43.2, 0.90, 1.03, 55.2, 34.0, 8.8; 33.6 kg, %47.0, 45.9, 1.03, 1.46, 56.7, 29.7, 11.7; 38.8 kg, %49.6, 48.2, 1.81, 2.13, 57.9, 28.0, 12.4, respectively. The differences observed between the different fattening durations for the pre-slaughter weights, the dressing percentages of the hot and cold carcass, the ratios of the omental-mesenteric fat, kidney–pelvic fats, bone and total fat were statistically significant ($P<0.05$). But, the percentages of the leg, rack-loin and lean were insignificant ($P>0.05$). With increased intensive feeding duration, lean and fat ratios increased, but bone ratio decreased. As a result of this study, it can be said that the growth performance of Honamlı male kids is high and carcass characteristics is in satisfactory level under intensive fattening condition.

Key Words: Honamlı Goat, kid, intensive fattening, carcass traits

INVESTIGATION OF ACCELERATED LAMBING POSSIBILITY OF ANATOLIAN MERINO SHEEP

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Abstract

Investigation of the possibilities to increase the number of lamb gained in a year via using the accelerated lambing method and, the profitability of a farm related to this is aimed with this study. As material, 525 Anatolian Merino ewes and 40 rams, aged at 2-4, in field conditions, and 199 ewes and 15 rams at Bahri Dağdaş International Agricultural Research Institute were used. Ewes in the field condition and at the Institute were divided in to two groups as accelerated lambing and control and, 200 ewes in the field condition and 75 ewes at the Institute were remained as control to get one lamb per year while 325 in the field condition and 124 at the Institute were formed treatment group. The control ewes were bred in August and September, the traditional breeding season, in a 12 month interval while 3 lambings in 2 years were applied to the ewes in the treatment group and they were bred for one month again following the period of 5 months of pregnancy, 40 days of lactation and 20 days of weaning. Ram effect, ram effect + flushing and some different protocols were used for induction and synchronization of estrus for accelerated lambing in the treatment group. As a result, more fecundity and lamb productivity achieved by accelerated lambing than once a year lambing. Synchronization methods were found to be effective on fecundity and lamb productivity in accelerated lambing applications. However, lamb yield obtained by synchronization methods used in this study were not profitable.

Key words: *Anatolian Merino, Accelerated lambing, Sheep, Lamb productivity, Economic analysis*

REARING OF AKKARAMAN LAMBS WITH CREEP FEEDING OR TRADITIONAL FEEDING METHOD DURING THE SUCKLING PERIOD

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Abstract

This study was conducted to investigate the effect of the lamb rearing methods (creep feeding or conventional) on the growth performance of Akkaraman (White Karaman) lambs during the suckling period. The study was performed in Akkaraman flocks from the project entitled “The Improvement of White Karaman Sheep in Breeder Conditions” carried out in Aksaray Province, under the control of Food, Agriculture and Livestock Ministry. In this 112-day study, beside conventional feeding method, a supplementary feeding program (creep feeding) was implemented for feeding of the lambs during the suckling period. For this purpose, in 3 different farms, 96 head lambs (singleton 48, twin 48) in creep feeding group and 96 head lambs (singleton 48, twin 48) in conventional (control) group were used. In the control (conventional) group, the lambs suckled their mothers twice a day and concentrate feed was not given to lambs during the trial. In the study, live weight (LW), average daily weight gain (ADWG) and feed consumption of lambs were determined at intervals of 14 days. The birth weight and LWs at days 28, 56, 84, 112 and ADWGs of lambs in creep feeding and control group were found as 3.98, 4.51 kg; 11.8, 11.1 kg; 20.2, 19.8 kg; 27.9, 26.5 kg; 35.4, 31.3 kg; 281, 239 g, respectively. And the LWs (except LW at day 56) and ADWG of lambs in the creep feeding group were significantly higher than the LWs and ADWG of lambs in the control group ($P < 0.001$). In the creep feeding group, daily concentrate feed consumption amount and feed conversion ratio of the lambs were found as 633 g and 2.23. On the other hand, ADWGs of the singleton and twin lambs in the creep feeding and control groups were determined as 291, 272 g and 255, 221 g, respectively. It was also detected that the ADWGs of the twin born lambs in the creep feeding group were significantly higher ($P < 0.01$) than the ADWGs of the singleton and twin born lambs in control group. As a result of this study, it can be said that feeding of Akkaraman lambs during the suckling period with creep feeding is more effective on the growth of lambs than the traditional method of feeding. In other words, we can say that Akkaraman lambs fed with creep feeding method grow faster than the lambs fed with traditional methods. However, these two feeding methods should also be compared in economic aspects.

Key Words: Creep Feeding, Traditional Feeding, Akkaraman, Suckling Period

A PREDICTIVE MODEL FOR ESTIMATING SEASONAL DIETARY CHOICES OF GOATS IN A MEDITERRANEAN OAK-JUNIPER RANGELAND

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Abstract

Oak woodlands and shrub lands are important forage sources for grazing animals and particularly for goats in the Mediterranean basin. Goats are classified as selective feeders due to their specific feeding behavior and study of their seasonal preferences is of great interest. The current research was conducted in Megalo Dereio region, which is located in Evros prefecture, northeastern Greece and is grazed mainly by a flock of 750 local goats. In order to estimate the dietary choices of goats, a method of direct observation was used. Grazing behavior data as the number of bites per plant species were recorded in late spring (May), middle of summer (July) and late autumn (November) of 2010 and 2011. Statistical analysis was conducted to test for the observed seasonal preferences on the base of plant group species. According to the results, herbaceous vegetation was preferred by the goats during spring. However, goats grazed mainly the woody species of the region (e.g. *Juniperus oxycedrus*, *Quercus frainetto*, *Cistus creticus*) during summer and late autumn. Additionally, a multinomial response logistic regression model was fitted by adopting the Bayesian paradigm to estimate the seasonal dietary choices accounting for year effects. The estimates were compared with the observed values of the dietary choices of goats in order to assess the model's predictive accuracy. According to the above comparison, the model has mainly a descriptive character, but could be a useful tool to estimate the seasonal changes of dietary choices.

Key words: Diet selection, prediction model, direct observation, grazing behavior

SOME PHENOTYPIC TRAIS of SHORT HAIR TURKISH CAT RAISED in PROVINCE of CANAKKALE

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This was the first study about Short Hair Turkish Native Cats. Apart from cat breeds of Angora and Van there are short hair cats in almost all part of Turkey which have known but never searched before yet. A project was prepared in Canakkale Onsekiz Mart University supporting by Scientific Research Projects Program in 2013. In the project survey works were started in December 2013 and all of counties of Canakkale were visited and searched on native cats. City centre of Bozcaada and some villages including in Canakkale central district, Ayvacik, Bayramic, Can, Yenice, Lapseki, Biga, Eceabat, Gelibolu, Ezine, and Gokceada counties were visited several times. During survey works a total of 84 cats were studied and some morphological traits were detected mentioned below by using ImgProPlus6 program. At the end observed data were analyzed by using ANOVA statistical program. As a result the traits of height at shoulder, body length, chest depth, tail length and cannon circumferences were found as 22.33 ± 0.225 , 26.90 ± 0.335 , 10.76 ± 0.698 , 30.20 ± 0.278 ve 5.87 ± 0.792 cm respectively. It is hoped that this study will be an example in the future for further investigations about this native breed.

Key words: Genetic resource, native breed, morphologic trait, domestic animal

GENETIC ANALYSIS OF SOME DUCK POPULATIONS IN CENTRAL ANATOLIA USING ISSR

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The aim of this study is to investigate the genetic structure of the some duck populations in Kırşehir (3) and Yozgat (1) regions. Venous blood samples from 76 ducks were collected from the *Venae cutenea ulnaris*. Eleven out of fifteen primers produced 73 reproducible and bright bands. The number of polymorphic loci was to be 72 and the percentage of polymorphic loci was 98.6%. Gene diversity (H_T) in total population and magnitude of differentiation among populations (G_{ST}) was 0.195 and 0.183, respectively. The genetic distance between regions was found to be between 0.114 and 0.021. Cluster analysis revealed two main branches, one leading to duck populations in Kırşehir, the other one including Yozgat region. Shannon's Information index (I) value was 0.33. The gene flow among populations was analyzed and Nm value was estimated as 2.23. Hence there is little differentiation among populations. The current results may also be useful for future breeding programs.

Key words: ISSR, duck, genetic distance, Anatolia

EFFECT OF DIETARY FALSE FLAX (*CAMELINA SATIVA L.*) MEAL SUPPLEMENTATION ON GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF QUAILS

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This research was conducted to determine the effects of false flax (*Camelina sativa L.*) meal supplementation in quail diets on growth performance and some carcass characteristics. A total of 300 Japanese quails (*Coturnix coturnix japonica*), five days old, including both males and females were randomly allocated into one control group and four experimental groups. The control group was fed a basal diet without the addition of false flax meal, whereas the experimental groups were fed on the basal diets with a supplementation of 5% (FM5), 10% (FM10), 15% (FM15) and 20% (FM20) false flax meal. The results of the study showed that there were no changes in experimental groups in terms of body weight, body weight gain, feed intake as well as hot and cold carcass weights and relative weight of liver, heart, spleen, gizzard and proventriculus ($p>0.05$). Nevertheless, feed conversion ratio increased in the FM15 and FM20 groups compared with the control and FM5 groups during the entire research period ($p<0,01$). In conclusion, it could be considered that false flax meal supplementation in the quails' diets had no any adverse effect on growth and carcass characteristics, whereas the supplementation of false flax meal up to 15% to quail diets might be more effective on feed conversion ratio.

Key words: False Flax Meal, Performance, Carcass, Quail

EFFECT OF ROSEHIP (*ROSA CANINA*) INCLUSION TO THE DIET ON MEAT AND EGG YOLK COLOR IN JAPANESE QUAIL (*COTURNIX COTURNIX JAPONICA*)

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Abstract

Meat and egg yolk color may affect consumer preferences when they decide to buy poultry products. Some plants' leaves, roots, flowers, and fruits have long been used to obtain natural food colorants. This study was conducted to determine the effect of rosehip (RS, *Rosa canina L.*) supplementation on the egg yolk pigmentation of laying quail. A total of 120 10-week-old laying quail were divided into 5 treatment groups with 8 replicates. The treatments were as follows: 1: control group (C, no addition), groups 2, 3, 4, and 5 had diets 2.5, 5, 10 and 15% RS included in their diets, respectively. The egg yolk color (L*, a* and b*) were determined at 14, 28, 42 and 56 days of experiment. Meat color was determined end of the experiment at 56 d. Rosehip supplementation caused a decrease in L* values in egg yolk. The RS supplementation increased redness value (a*) of yolk (p<0.001). In general, in the RS supplemented groups yellowness (b*) of yolk was slightly higher than that of the C group. The meat color of the breast meat was not statistically influenced by RS supplementation. In conclusion, rosehip as a feed ingredient in quail diets can be suggested as a potential feed source and egg yolk colorant for laying quails.

Key words: rosehip, quail, meat and egg yolk color

THE USE OF ANTIBIOTICS IN DAIRY COWS ON KOSOVO FARMS

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Antibiotics used on cattle medicine practices in local dairy farmers were unavoidable. These practices allow the antibiotic residues still left on milk. Even the concentrations were low, antibiotic residue consumed can cause health problems for consumers and for food safety such as allergy, intoxication and antibiotic resistance. Besides that, milk with antibiotic residues cannot be treated with using microorganisms' starter. Antibiotic residues-free milk would increase consumer safety and competitiveness on trade. In this paper are include samples of 2013 and the first six months of 2014. Samples which have been tested raw milk samples to our farms, and are tested with test called Delvotest SP-Nt and ELISA method. During the 2013 a total of 44 milk samples were tested - none of which has given a positive result 2014 (first six months) a total of 70 samples were tested and one of three samples have a positive result. In this paper are included in total 114 samples of which have resulted in three positive samples or 2.63 %. The objective of this study is to have a real input of the use of antibiotics in dairy cows in the territory of Kosovo and to assess whether regulations are being implemented with regard to this issue in Kosovo.

Key words: Milk. Antibiotics, Antibiotic residues, Antibiotic resistance.

HONEYBEE BREEDING ON DISEASE RESISTANCE IN THRACE REGION OF TURKEY

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Honeybees play a vital role in pollinating wild and cultured plants, with substantial implications for our economy and food supply, as well as for natural ecosystems. Honeybee disease agents have become resistant to the commonly used and previously effective treatment chemicals. Antibiotic treatment of diseases in beehives means that sustained reliance on chemical control measures is not a tenable approach. Different studies have shown that honeybees have genetically determined mechanisms for disease resistance such as hygienic behavior. Hygienic bees uncap and remove infected brood from the nest. In our project 200 Thrace bee (*A. m. carnica*) colonies collected from Kırklareli province isolated area. Colonies were evaluated for hygienic behavior as the number of cells of dead brood that were removed in 24 hours by the honeybees divided by the total number of cells of brood killed. The colonies showing hygienic behavior over %95 in at least two measurements were selected and used as breeder colonies for queen production. Daughter queens instrumentally inseminated. We use "Closed Population" breeding program. We will continue breeding project at 2014 and 2015. Our goal is to breed Thrace Hygienic bees, resistant to disease agents especially American foulbrood to reduce the amount of antibiotics used to treat American foulbrood and ensure that our breeding methods and stock are accessible by beekeepers in Thrace region. This project was supported by the T.S.T.R.I. (Turkish Scientific and Technical Research Institute)

Key words: Honeybees, Genetics, Resistance, Hygienic Behavior, Breeding, Thrace

2- PLANT PROTECTION

OCCURRENCE OF ANGULAR LEAF SPOT CAUSED BY *PSEUDOCERCOSPORA GRISEOLA*, ON COMMON BEANS IN WESTERN BLACK SEA REGION OF TURKEY

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ABSTRACT

Angular leaf spot caused by *Pseudocercospora griseola* is a newly recorded disease of beans grown in greenhouses in Western Black Sea Region of Turkey. The disease affects all the grown cultivars in the region and present in all the greenhouses. Occurrence and prevalence of the disease was studied in bean production areas of Zonguldak, Bartın and Karabük provinces in the region during 2009-2010 growing season. The pathogen was identified based on the symptoms observed on the leaves and the fungal morphological and cultural aspects. The disease was almost found in all the greenhouses and the disease prevalence and intensity were 100% and 100% and 100% and 86% for Zonguldak and Bartın provinces respectively. The disease was found only at one garden in Karabük province. The disease was mostly observed in the greenhouses but in some cases at outdoors especially on the cv. Gina. Aggressiveness of the isolates and reactions of the locally grown bean cultivars was also determined. The most widely grown local cultivars, Şeker Ayşe and Barbunya were found highly susceptible against fifteen isolates of the pathogen randomly selected out of 140 isolates. Reactions of 17 commercial cultivars against 10 randomly selected isolates were also determined. Susceptibility of the cultivars varied according to the isolates and some cultivars such as Selvi, Fabio and Burayşe were completely resistant against 10 of the isolates tested. This shows that various pathotypes are present in this region.

Key words: *Pseudocercospora griseola*, isolation, prevalence, bean, greenhouse

INTEGRATED APPROACH FOR THE MANAGEMENT OF NEW THREAT *STEMPHYLIUM BOTRYOSUM* WALR CAUSING BLIGHT OF LENTIL (*LENS CULINARIS* MEDIK)

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ABSTRACT

Efforts were made to study integrated disease management for lentil stemphylium blight caused by *Stemphylium botryosum* Walr at GLRP, Rampur, Chitwan, Nepal during 2011/12 and 2012/13 using CRD in laboratory (in-vitro), RCBD in field (in-vivo) and screening host resistance genotypes. Over years, botanicals *Acorus calamus* L. and *Zanthoxylum armatum* DC, fungicides Mancozeb and Krilaxyl and antagonist *Trichoderma viridae* were effective for disease control and yield increment. *Acorus calamus* L. at higher dose (8% W/V) and Krilaxyl even at lower (500 ppm) on potato dextrose agar (PDA) checked the pathogen growth completely in-vitro. On 5th day of incubation period, mycelium growth of the pathogen was collapsed by fungal antagonist *T. viridae*. The mycelial growth inhibition percent of *Z. armatum* DC (8% W/V) and Mancozeb (2000 ppm) on PDA was 31.17 and 55.94 respectively. In field, botanicals were sparingly effective for a short period. The percent disease control (PDC) was higher in *Z. armatum* DC (31.60%) and *A. calamaus* L. (28.69%) compared to unsprayed plot. The higher percent yield increase (PYI) was obtained from Mancozeb (40.20%) and Krilaxyl (22.46%) @2 gm/litre of water over control. The lower Percent Disease Index (PDI) was observed in Krilaxyl (36.00%) and Mancozeb (37.35%). The PDC and PYI were higher in *T. viridae* (PPD isolate) i.e. 42.14% and 58.80% respectively. Out of 58 genotypes, in screening nursery, RL-28, ILL 10134, RL-44, FLIP 2008-7L, NR-2001-71-3, NR-2001-71-4, ILL 7657, ILL 2437, ILL 7349, RL 23, RL 25, RL 47, RL 62, ILL 10856 were found resistant to the disease.

Key words: Lentil, *Stemphylium botryosum*, botanicals, fungicides, antagonist, resistant genotypes

APPLICATION OF MEADOWFOAM (*LIMNANTHES ALBA*) SEED MEAL AS A SOIL AMENDMENT FOR MANAGEMENT OF *PYTHIUM IRREGULARE*

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Abstract

Meadow foam (*Limnanthes alba* Hartw. exBenth.) is a member of the order Brassicales and has been grown as a commercial oil seed annual crop in the Willamette Valley of Oregon since the 1980's. After harvest, the seed is pressed to yield oil containing unique long chain fatty acids (20:1 and 22:1) of high quality and commercial value in cosmetics and lubricants, making meadow foam a high-value oil seed crop. After the oil has been extracted from seed, the remaining seed meal contains the glucosinolate glucolimnanthin. When plant cells containing glucolimnanthin are physically damaged and exposed to moisture and the enzyme myrosinase, this secondary plant metabolite degrades into toxic breakdown products. In a previous study, we demonstrated the toxicity of the glucolimnanthin degradation products nitrile, thioamide, and isothiocyanate (ITC) to the plant pathogen *Pythium irregulare*. The ITC was the most toxic to both organisms while glucolimnanthin and its degradation product acetamide were not toxic to either organism. This research demonstrated the potential to utilize meadow foam seed meal (MSM) as a soil amendment to manage this soil-borne pathogen.

DEVELOPMENT AND SURVIVAL OF *CHRYSOPERLA CARNEA* ON TWO DIFFERENT PREYS

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In this study, development periods and survivals of *Chrysoperla carnea* larvae fed on *Aphis fabae* and *Aspidiotus nerii* were investigated in climate cabinets with 26 °C temperature and 60% humidity conditions. Results were statistically evaluated by SPSS 21.0 and Curve Expert Pro package program. As a result of the study, average periods of egg, 1st instar, 2nd instar, 3rd instar, pupa and total development of *C. carnea* fed on *A. fabae* and *A. nerii* were 3.00-3.00, 2.95-4.77, 2.80-3.77, 4.47-5.36, 6.53-7.10 and 19.62-23.40 days, respectively. Results of the statistical analysis showed that there were significant differences among all biological periods except egg period of *C. carnea*. Weibull distribution was fitted to survival rate of development periods of both *C. carnea* populations which was developed on two preys. Survival curves were fitted to Holling's type III life curves for both populations because of the high mortality at the development periods. Parameters of Weibull distribution equation were calculated as $c = 0.55, 0.55$; $b = 64.18, 29.91$ for both populations which were used as prey of *A. fabae* and *A. nerii*, respectively.

Key words: Green lacewing, *Aspidiotus nerii*, *Aphis fabae*, development time, survival, Weibull distribution.

DETERMINING THE TREAT OF SUNN PEST TO WHEAT GRAIN BY ARTIFICIAL NEURAL NETWORKS

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Wheat is a very strategic crop for Turkey as well as many other countries and sunn pest is a major constraint to the production of wheat. Sunn pest negatively affects wheat crops at their vegetative growth, heading and maturity stages. It causes two types of damage on the wheat grain: These are wheat yield loss and grain quality damage. According to the results of some analysis performed by researchers sunn pest damage is the most effective factor and causes a significant decrease in wheat prices in Turkey. In Turkey effects of this damage are observed by experts. However sometimes this damage is visible but sometimes it can't be seen. So the damaged ones may not be so noticeable in undamaged. In this study an automatic system that uses Artificial Neural Networks (ANN) to determine the damaged wheat grains by sunn pest is proposed.

Key words: Treat of Sunn Pest, Wheat Grain, Artificial Neural Networks

**RESPONSE OF DIFFERENT GENOTYPES OF *DATURA* TO HAIRY ROOT INDUCTION BY
*AGROBACTERIUM RHIZOGENES***

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The tropane alkaloids present a great economic value in particular for pharmaceutical industry. The culture of hairy root obtained by inoculation of *Datura spp.* with *Agrobacterium rhizogenes* offers promising prospects for their production. In order to optimize hairy root induction in *Datura spp.* by *Agrobacterium rhizogenes*, the response of different genotypes of *datura* to the infection by *Agrobacterium rhizogenes* strain A4 was tested. Three genotypes were used, *Datura innoxia*, *Datura stramonium* and *Datura tatula*. Infection with *Agrobacterium rhizogenes* strain A4 was made by a simple deposit of the bacterial suspension at the basal section of hypocotyls fragments of *Datura* vitroplants. The response of genotypes to the infection is estimated by measuring the reactivity rate, the induction rate, the mean time of onset of the first root and the average number of roots per explant. Among the three species, *Datura tatula* were the most reactive to the infection by *Agrobacterium rhizogenes* strain A4, with an induction rate of 80% and an average number of root by explant of 7.6, followed by *Datura stramonium* (50%) then *Datura innoxia* (25%) with 2.4 and 1.2 roots by explant respectively. The transformed roots appeared in the site of infection were multiplied. A preliminary observations based on phenotypic characteristics and growth rate, allowed us to select and multiply the most efficient lines.

Key words: *Datura spp.*, *Agrobacterium rhizogenes*, hairy root, tropane alkaloids, root induction.

DETERMINATION OF SOIL-BORNE DISEASE AGENTS IN CARNATION GREENHOUSES IN ANTALYA PROVINCE

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Abstract

Carnation is the most important ornamental plant in Turkey. Soil-borne diseases are the most important limiting factors for yield production in carnation greenhouses. Among carnation producing provinces, Antalya has the highest cut flower production in 4301,25 da corresponding 40.1% of cut flower production. In this study, determination of disease prevalence, isolation frequency, species and pathogenicity of soil-borne fungal disease in carnation greenhouses in Antalya Province were aimed. Total of 29 plant samples showing disease symptoms were collected from the carnation greenhouse in Antalya and isolations were made. According to the results of isolations, identifications were made at the level of genus and species of fungi obtained using macroscopic and microscopic techniques. Pathogenicity of identified species were determined using Turbo carnation variety. The most common genus was *Fusarium* spp and prevalence rates ranged from 39.1 to 72.2% in carnations greenhouses. The other isolated genus were *Pythium* sp, *Rhizoctonia* sp, *Verticillium* sp and *Macrophomina* sp. As a result of the diagnostic studies, species belonging to the genus *Fusarium* were determined as *F. acutatum*, *F. avenaceum*, *F. chlamydosporum*, *F. equiseti*, *F. oxysporum*, *F. poae*, *F. proliferatum*, *F. sambucinum*, *F. solani*, *F. tricinctum*, *F. verticillioides*. The other identified species were; *Macrophomina phaseolina*, *Pythium irregulare*, *Rhizoctonia solani* and *Verticillium tricorpus*. *F. oxysporum* is the most commonly isolated species and frequency of isolation ranged from 17.1 to 67.9%. *F. chlamydosporum* was determined as the least widespread species. According to the pathogenicity test in Turbo carnation variety, the disease severity of *Fusarium* species were changed between 60-88 % and determined that *F. solani* had the highest pathogenicity rates among the others. The disease severity of other species except *Fusarium* were below 60%. Consequently, a total of 15 species have been identified and has been demonstrated that have potential problem in carnation cultivation in greenhouses in Antalya Province.

Key words : Antalya, *Fusarium* spp, isolation, carnation, pathogenicity,

CHITINASES: USEFUL BIOPESTICIDES AND PROMISING ALTERNATIVES FOR SUSTAINABLE AGRICULTURE

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Abstract Chitinases (EC.3.2.1.14) are group of glycosyl hydrolases which catalyze the enzymatic conversion of chitin polymer to low molecular weight products through the hydrolysis of β -1, 4-glycosidic bonds. Chitinases are produced by wide range of organisms including: viruses, bacteria, archaea, actinomycetes, yeasts, fungi, plants, protozoan, and animals. During the last decade, chitinases have received an increased attention due to their wider range of biotechnological applications especially in the biocontrol of fungal phytopathogens and harmful insects and nematodes. Chitinolytic enzymes have been considered important alternative in the biological control of soil borne pathogens because of their ability to degrade fungal cell walls of which a major component is chitin. Many studies reported the biological control of phytopathogens using chitinolytic bacteria or fungi; On the other hand the chitinases can be used directly as purified enzymes or indirectly through gene manipulation particularly when this enzyme is over expressed through genetic engineering. In this review we will discuss the potential agro-applications of chitinases, especially as strong and sustainable bio-pesticide against chitin containing phytopathogens (Fungi, insects and nematodes) as well as in the production of transgenic plants.

Key words: Chitinases, agro-applications, biocontrol, phytopathogens, bio-pesticide

EFFECTS OF GARLIC JUICE AND BLACK SOAP WITH PEPPER ON SPIDER CITRUS MITES

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ABSTRACT

Insecticidal properties of Alliaceae are widely known, they are plant with varied biological properties. Garlic and onion are known for their positive effect on health, including the prevention of cardiovascular disease and some digestive cancers. These health benefits molecules are also responsible for pest potential control of Alliaceae. With these properties, we can consider using Alliaceae as acaricides. The purpose of this study was to compare the effect of chemical and biopesticides on citrus mites, especially *Tetranychus urticae*, *Panonychus citri* and *Eutetranychus orientalis*. Chemical treatment (Fenazaquin) and biopesticides (Black Soap + Pepper + Alcohol, Garlic + Alcohol) applied on this study to control the various stages of mites, have reduced the proliferation of mobile forms and reducing the number of eggs to acceptable levels. The Fenazaquin product is highly toxic against adults and larvae of mites, but with adverse effects on phytoseiid. Garlic juice + alcohol revealed efficiency from 50 to 57.69% against the mobile forms of *T. urticae*, however, it was effective against the motile forms of *P. citri* and *E. orientalis* with an efficiency of 85.71% and 100% respectively, its action has also reduced the number of eggs of *T. urticae* and *E. orientalis* at low levels. Preparation black soap + pepper + alcohol showed efficiency from 84.62 to 100% against mobile forms of *T. urticae* and *E. orientalis* and 75% against *P. citri*. Therefore, these biopesticides are conceivable viewpoint technical and economic as the infestation by mite is low.

Key words : Garlic juice, acaricide, biopesticide, mites, Fenazaquin, black soap, pepper, alcohol, *Tetranychus urticae*, *Panonychus citri*, *Eutetranychus orientalis*.

PALYNOLOGICAL SURVEY OF THE *MINUARTIA* SPECIES (CARYOPHYLLACEAE) IN IRAN

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Abstract

The present study compared pollen micro-morphological characters among 20 Iranian *Minuartia* species. For this purpose, mature pollen grains taken from unopened flowers, were prepared, fixed and exhaustively investigated using Scanning Electron Microscopy (SEM). In order to perform the pollen micro-morphology of *Minuartia*, and to find its significance in taxonomy of the group, qualitative and quantitative variables related to the shape, size, ornamentations and pores were studied. Cluster and PCA analyses of qualitative and quantitative data were performed to demonstrate the pollen grain similarities among the species. According to our results, *Minuartia* species exhibit either sub-spherical or polyhedral pollen shapes. Pollen size also varies among different species. The longest polar axis length (P) belongs to *Minuartia meyeri* Bornm. ($34.3 \pm 0.26 \mu\text{m}$) and the smallest one to *M. montana* L. ($15.8 \pm 0.26 \mu\text{m}$). Pore ornamentations differ from prominent granular to slightly or distinctly sunken granular. The number of pores also varies considerably depending on species. It ranges from 10 (in *M. meyeri* and *M. acuminata* Turrill) to 24 (in *M. subtilis* Hand.-Mazz.) on two pollen hemispheres. The most reliable characters in this study were pore diameter (annulus included) (D), equatorial diameter (E), polar axis length (P), the distance between two pores (d), pollen outline, Pore diameter (annulus excluded) (R), annulus diameter (a), P/E ratio, Puncta diameter and Echini diameter respectively. Echini vs puncta (Ec:Pu) diameter ratio appeared to be crucial for the distinction of some closely related species such as *M. sublineata* Rech.f. and *M. lineata* (Boiss.) Bornm., as well as *M. montana* and *M. sclerantha* (Fisch & C. A. Mey.) Thell. Moreover, three out of the 20 species have D: d ratio (pore diameter: the distance between two pores ratio) only $\geq 1 \mu\text{m}$. According to our results, some differences in quantitative and qualitative palynological characters of similar species were observed that could be useful. Despite the diagnostic value of palynological data at the species rank, it was not useful to circumscribe any taxonomic group at the higher ranks.

Key words: Caryophyllaceae, Iran, micromorphology, *Minuartia*, morphological similarity, palynology, SEM micrographs.

DEVELOPMENT OF AN EARLY DETECTION AND RAPID RESPONSE PROGRAM FOR INVASIVE PLANTS IN TURKEY

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Abstract

Invasive plants pose a serious threat to agriculture and natural resources in Turkey. Invasive plants concept gain more importance in Turkey since these plants cause significant damage to agriculture and natural resources. The high cost of invasive plants is attributed to the lack of an effective means for early detection and control of emerging invasive plants before they are widespread. Therefore, it is critical to develop a systematic approach for detection, reporting, rapid risk assessments and response to new invasive plants. Early detection and rapid response of invasive plants and other organisms is a management approach that focuses on surveying and monitoring at-risk areas to find infestations at their earliest stages of invasion. Along with prevention, this method is the most successful and cost effective means of control. A proposed plan to address the threat of invasive plants in Turkey include develop comprehensive list of current and potentially invasive plants, establish a system to rapidly and accurately identify and report new invasive plants, develop the ability to predict the potential range of invasive plants, develop an Invasive Action Plan that focus on eradication and control, and a countrywide plan for dealing with new incipient invasive plants. To address invasive plants, it is critical to adopt methods that can effectively prevent, eradicate, or control of new incipient or established infestations, providing a clearinghouse for the dissemination of this information, establish strong outreach program, and coordination between governmental agencies as well as universities, local entities, industry and other interested parties.

EDUCATING THE NURSERY SCHOOL CHILDREN ABOUT ECOLOGICAL SCIENCES USING INSECTS AND FLOWERS AS TEACHING TOOLS

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Abstract

This study is a part of the project has been run in the Children's Nursery School and Day Care Home, situated inside the campus of Canakkale Onsekiz Mart University in the year of 2013 in Canakkale city. The main purpose of this project was to educate the children about ecology using the insects and flowers as important tools. With the help of this project, a total of 78 children under the age of 7 years has been educated about the importance of ecology by introducing flowers and insects. Before of this project, most of the children were found to afraid of insects. The majority of children were not aware about the importance of different flowers. Even they didn't know about the word 'Ecology'. Moreover, they were scared of insects, and even were not ready to listen about the word 'Insect' ('Bocek' in Turkish). That is why, such project was in dire needed and later has been conducted there. Through this project, the children were educated about the science of ecology, importance of different flowers and insects, and the differentiation between beneficial and harmful insects by doing different activities like visual presentations, playing games with insect toys, drawing different flowers and insects on their arms and hands using henna, showing short movies related to ecology, flowers and insects, doing insect and flower collections, examine the different parts of insect under microscope and rearing living insects in vials. They were also shown the living beehive and living ant nest into the closed glass jars. According to the obtained results after doing above activities, 90% of the children have got to know about the term 'Ecology'. A curiosity and interest has been developed among children to learn the names of different insects and flowers, to touch the different stages of insects specially the larval and adult stages with their naked hands, and also learn how to rear, protect and care about the beneficial insects and flowers found in our ecosystem. Finally, it was observed in the lights of this project that the insects and flowers are the most effective tools to introduce the children of nursery schools and day care homes to the ecological sciences.

Key words: Children, Insect, Flower, Ecology, Nursery School, Day Care Home, Canakkale.

**A POTENTIAL SPIDER MITE PEST SPECIES ON TOMATO; TETRANYCHUS EVANSI BAKER & PRITC.
(ACARI: TETRANYCHIDAE); DESCRIPTION, DISTRIBUTION AND DAMAGE**

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Abstract

The tomato spider mite, *Tetranychus evansi* Baker & Pritchard (Acari: Tetranychidae), is one of the most important and worldwide known phytophagous pests. This pest is a parenchyma-sucking mite and acquires food by penetrating the plant foliages with their stylets and sucks out the cell contents. It is difficult to control of this pest, because it occurs intensive webs on tomato and several natural enemies does not affect to this spider mite. It has been reported that *T. evansi* was found in the neighbouring countries of Turkey. *T. evansi* has not been detected in Turkey up to now. However, the species can be mixed with other spider mite species which were found in Turkey due to having similar appearance each other. The aim of this presentation is to show the important morphological characteristics (such as dorsal chaetotaxy, setae and pretarsi of legs, shapes of genitalia, aedagus and peritreme) as well as the feeding and webbing patterns of this mite using scanning electron microscopy (SEM). In addition, it can be point out and informed to local institutions and specialists of Turkey as an early warning by given information about the distribution and damages of this plant parasitic mite.

Key words: Key Words: *Tetranychus evansi*, morphology, SEM, identification, distribution, damage

This study is part of FP-7 IRSES 269133 numbered DetanMite project.

INVESTIGATIONS ON THE EFFECTS OF TWO DIFFERENT PLANT EXTRACTS ON THE GREEN PEACE APHID [(*MYZUS PERSICAE* SULZER) (HOMOPTERA: APHIDIDAE)]

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Abstract

Green peach aphid [(*Myzus persicae* Sulzer) (Hom.:Aphididae)] is a very important pest worldwide, causing serious damage to vegetables, flowers and fruit crops. The efficacy of pesticides extracted from two different plants such as *Xanthium strumarium* L. (Solanaceae) and *Tanacetum parthenium* L. (Asteraceae) were tested as alternative insecticides. The effects of extracts with ethanol obtained two different plants on *M. persicae* were investigated. Bioassays to be tested by two different methods determine the effects of varying concentrations. Experiments were performed using 3 cm diameter leaf disk from unsprayed the radish plants [*Raphanus sativus* L. (Brassicaceae)]. All of experiments were repeated 10 times. As a result of the investigation, the extract of *X. strumarium* and *T. parthenium* in nymph stages mortality was 89% and 88% respectively at % 12 concentrations. The mortality of adults at the same concentrations was 82% and 88% respectively. In spraying method, mortality of adults at the same concentrations were *X. strumarium* and *T. parthenium* 84% and 87% respectively. In adult stage, there was a no significant difference on the mortality between leaf dipping and direct leaf spraying method when compared. The research was undertaken at the Plant Protection Central Research Institute in 2010.

Key words: Green peach aphid, *Xanthium strumarium* L., *Tanacetum parthenium* L., extract, insecticidal effect

EFFECTS OF SOME PLANT ESSENTIAL OILS AGAINST *BOTRYTIS CINEREA* AND *TETRANYCHUS URTICAE* ON GRAPEVINE

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The cultivation of grapes in the world in terms of the first-ranked Turkey as well as the appropriate climatic zone, has potential for rich gene and ancient viticulture culture. Grape growers, starting from production until it reaches the consumer are faced with various problems in the process. Plant protection faced in the vineyards of the manufacturers in terms of the most important causes of losses; Downy Mildew (*Plasmopara viticola*), Powdery Mildew (*Uncinula necator*), Gray mold (*Botrytis cinerea*), European Grapevine Moth (*Lobesia botrana*), Spidersmite (*Tetranychus* spp.), Vine weevil (*Otiorhynchus* spp., *Megamecus* spp.). The impact of pests and diseases due to changing climate conditions with increased losses, these factors makes it difficult to control. In order to achieve higher efficiency and quality of synthetic chemicals used in viticulture, many benefits they provide, as well as the nature of the effect is known to be negative. In this sense, the effect of plants compounds on diseases and pests is a prominent work area. In this study, 7 different plant essential oil; Grape Seed (*Vitis vinifera*), Thyme (*Thymus* sp.), Rosemary (*Rosmarinus officinalis*), Ozone Oil (*Olea europaea*), Mint (*Menta piperita oleum*), Basil (*Ocimum basilicum*) and Sage (*Salvia* spp.), were examined on *Botrytis cinerea* and *Tetranychus urticae* which are important in terms of viticulture.

Key words: Essential oil, *Botrytis cinerea*, *Tetranychus urticae*, Grapevine

**EXAMINING OF RESISTANCE MECHANISMS ON APPLE SCAB -*VENTURIA INAEQUALIS* (CKE.)
WINT. IN TERMS OF NUTRIENTS IN SOME LOCAL APPLE TYPES**

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Abstract

In plants, resistance to disease is genetically determined and environmental factors such as nutrients and fertilization decreases or increases it. The ratios between nutrients are more important than the total amount of nutrients in relation to the disease. This study was carried out in 2008-2009 at Fruit Research Station in Eğirdir, Isparta, Turkey. Middle of vegetation, leaf samples were collected from local apple types which are resistant on apple scab -*Venturia inaequalis* (Cke.) Wint.- (14, 52, 188, 219, 252, 328, 329) and susceptible (20, 21, 24, 29, 32, 34, 36, 61). Nitrogen, P, K, Ca, Mg, total Fe, active Fe, Cu, Mn, Zn and B contents of the leaf and ratios among elements were determined and were examined the interactions with the disease. According to the results, resistant was found associated with Ca and resistant types had higher Ca:N and Ca:Mg rations.

Key words: apple, interaction, nutrient, *Venturia inaequalis*

PLANT PARASITIC NEMATODES ASSOCIATED WITH GRAPEVINES, *VITIS VINIFERA*, IN TEKIRDAG

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Nematodes are a serious threat to vineyards worldwide. In addition to direct damage caused by their feeding some of them transmit grapevine viruses. A survey of vineyards in Şarköy, Malkara and Süleymanpaşa, main grape growing areas of Tekirdağ, was conducted between 2013-2014 to determine the association of plant-parasitic nematodes with grapevines. 250 commercial vineyards were selected on a random basis and vines were at least 7 years old. Total of 318 soil samples were collected from the rhizospheres of varieties such as Atasarısı, Erenköy Beyazı, Merlot, Trakya İlkeren, Öküzgözü, İtalia, Alphonse L. and Cabernet Sauvignon. Surveyed vineyard sizes ranged from 1,5 to 25 da, but the majority of vineyards were 3 to 5 da. 1 kg of soil sample were taken from each vineyard from 0-60 cm soil depth. Nematodes were extracted from 200 g soil using methods of decanting-sieving and centrifuge flotation. Plant-parasitic nematodes in each sample were identified to genus level and slides of every individual were prepared by wax-ring method after heat-killing. 14 genera of plant-parasitic nematodes were collected including *Helicotylenchus* spp., *Criconemoides* spp, *Pratylenchus* spp., *Longidorus* spp, *Aphelenchoides* spp., *Aphelenchus* spp, *Ditylenchus* spp., *Filenchus* spp., *Tylenchus* spp, *Rotylenchulus* spp, *Rotylenchus* spp, *Xiphinema* spp, *Tylenchulus* spp., *Paratylenchus* spp., *Merlinius* spp., All individuals were identified to the species level.

Key words: Grapevine, Nematode, Soil

SCREENING MAIZE AND SUNFLOWER HYBRIDS FOR RESISTANCE TO IMIDAZOLINONES (IMAZAMOX)

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Abstract

Imidazolines are a group of herbicides which act as inhibitors of ALS (acetolactate synthase) or AHAS (acetohydroxy acid synthase), an enzyme catalyzing the biosynthesis of branched-chain amino acids. They are used to control grassy and broadleaf weeds, and are also a promising group to control broomrape (*Orobanche* spp.) in sunflower, which causes severe damage and loss to crop farmers worldwide. The purpose of this study was to evaluate the sensitivity of ten sunflower and maize hybrids at five different concentrations of imazamox (1, 2, 4, 8 and 16 times the recommended dose). The resistance of the plants was assessed *in vitro* and *in planta* 12 and 21 days after the application of the herbicide, respectively. Among the sunflower hybrids, five of them showed resistance and two showed sensitivity. Three of the hybrids showed milder symptoms and therefore can be considered as tolerant. The sensitive hybrids showed vulnerability at all concentrations, while no significant differences were found among the resistant ones. In maize, one hybrid showed resistance at all concentrations (*in vitro* test) while two other hybrids had a certain level of tolerance (*in planta* test), as they showed milder symptoms. The other seven hybrids showed vulnerability at almost all concentrations. In conclusion, resistance to imazamox is dose-dependent. Tolerant plants can survive in exposure to doses up to six times higher than the recommended one. Both *in vitro* and *in planta* assays can be used to evaluate the tolerance of the hybrids, but many replications are necessary to obtain definite results. Combination of both methods is recommended to reliably determine the effect of imidazolinones in cultivated plants.

Key words: sunflower, maize, imidazolines, resistance, *in planta*, *in vitro*

THE NEW ERA OF CLEARFIELD® - CLEARFIELD® PLUS

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The Clearfield® Production System combines high-yielding seeds with broad-spectrum herbicides tailored to regional conditions, delivering efficient, long-lasting weed control, crop quality and global market acceptance. In 2003, in cooperation with leading global and regional seed partners, BASF introduced sunflowers into the growing family of successful Clearfield Production System crops that included canola/oilseed rape, maize, rice and wheat. Within a few years, the Clearfield Production System for sunflower had become known as an essential component in hybrid sunflower oil and confectionary production. The original Clearfield trait in sunflowers – the ImiSun trait - is based on a natural acetohydroxy acid synthase (AHAS) mutation discovered in 1996 in a wild sunflower growing in a soybean field in the USA. In 2000, a research and development program was initiated by BASF in partnership with Nidera Semillas S.A. in Argentina to create a more efficient, single-gene breeding system and deliver sunflowers with greater crop tolerance regardless of environmental stresses, improved weed control, oil content and grain yield. By 2006, BASF confirmed the improved trait, which was developed through traditional breeding techniques and resulted in an elite cultivated sunflower line, Clearfield Plus. Launched in Argentina in 2010, and scheduled for registration in countries around the globe as early as 2012, the Clearfield Plus Production System for sunflowers are available in North and South America, Russia, Ukraine, South Africa, Eastern Europe and Western Europe. The trait is developed and sold in partnership with many seed companies worldwide. The Clearfield Plus Production System for sunflowers provides multiple advantages to BASF seed partners, seed breeders and growers.

3 – AROMATIC PLANTS

INTRODUCTION OF NEW ANALYTICAL APPROACHES FOR THE PRODUCTION, TRADE AND USE OF MEDICINAL AND AROMATIC PLANTS FOR ECONOMIC DEVELOPMENT OF PAKISTAN

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Abstract

This study examined opportunities to maximize farm income through introduction of high value medicinal and aromatic plants (MAPs) in the war-stricken district of Swat. The hypothesis is that establishment of ex-situ experimental production plots will lead to the development of skills in horticultural production and marketing among people in the valley and help rebuild commercial connections between this region and the rest of Pakistan. The project involves a substantial agricultural extension component with farmers in three villages. The project has covered a range of interventions such as local awareness campaigns, capacity-building training, and community mobilization for conservation of threatened species, formation of MAPs. Producer Associations who are directly linked to big buyers work to maximize their net income. Moreover, the project has also establish demonstration plots of the selected high value MAPs for economic analysis/feasibility (in terms of cost comparisons/opportunity cost between cultivation of cereal/cash crops and the selected high value MAPs and regular monitoring and evaluation of the adoption by farmers of improved agricultural practices. Additional emphasis has been placed on developing reliable marketing channels. The study has incorporated evaluation of its performance in introducing standardized production technology and appropriate post-harvest management, which represent the prime 'engines of growth' for the local economy. These strategic economic development areas are entirely based upon, and closely interlinked, with the management and conservation practices of high value MAPs, and intact landscapes.

THE JIP TEST: A TOOL TO SCREEN THE ADAPTATION CAPACITY OF QUINOA (*CHENOPODIUM QUINOA* WILLD) PLANT TO DROUGHT STRESS

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Abstract

Water shortage is a critical problem touching plant growth and yield in semi-arid areas, for instance the Mediterranean region. For this reason was studied the physiological basis of drought tolerance of a new, drought tolerant crop quinoa (*Chenopodium quinoa* Willd.) tested in Morocco in two successive seasons, subject to four irrigation treatments (100, 50%ETc, and rainfed). The chlorophyll a fluorescence transients were analyzed by the JIP-test to translate stress-induced damage in these transients to changes in biophysical parameter's allowing quantification of the energy flow through the photosynthetic apparatus. Drought stress induced a significant decrease in the maximum quantum yield of primary photochemistry ($\Phi_{PO} = Fv/Fm$), and the quantum yield of electron transport (Φ_{EO}). The amount of active PSII reaction centers per excited cross section (RC/CS) also decreased when exposed to the highest drought stress. The effective antenna size of active RCs (ABS/RC) increased and the effective dissipation per active reaction centers (DIO/RC) increased by increasing drought stress during the growth season in comparison to the control. However the performance index (PI), was a very sensitive indicator of the physiological status of plants. Leaf area index, leaf water potential and stomatal conductance decreased as the drought increased. These results indicate that, in quinoa leaf, JIP-test can be used as a sensitive method for measuring drought stress effects.

Key words: Quinoa; Drought stress; JIP-Test; Chlorophyll a fluorescence; maximum quantum yield

HYPERACCUMULATION AND HYPERACCUMULATOR PLANTS IN TURKISH FLORA

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Growths of industrialization and population have a big pressure on all ecosystems. Especially heavy metal contamination is getting more and more serious for developed countries. The importance of biodiversity is increasingly considered for cleaning the metal contaminated and polluted ecosystems. Plants that hyperaccumulate metals have tremendous effect on remediation of metal contaminated areas in developed countries. Having a total count of 11 0707 taxa and comprising 3035 endemics, the flora of Turkey has a significant place in the world. Even though our country cradles such vast plant genetic resources we can merely benefit from this abundance. When it is investigated, it can be seen that the flora of Turkey consists of 37 hyperaccumulator plants from different families that are also mentioned in international literature. Some of these have the potential of harm and can pose a risk for public health if used for agricultural purposes. Although the soil of our country can be considered less contaminated when compared to developed countries, heavy metals such as cadmium depositing onto soils can pass through humans via plant or animal produces especially as a result of poor agricultural practices. When we consider our country's flora where a new plant species is identified in every 10 days, hyperaccumulator plants can be used in order to clean up existing contaminated soil. Also, still there are a variety of plants which haven't subjected to such tests. As a result of the factors such as broader, disorganized topics, the scarcity of inventory records and the size of the surface area of the country it is clear how vital is to provide at least an entry level of input on the subject.

Key words: Hyperaccumulation, Heavy Metal

**INVESTIGATION OF SOMATIC EMBRYOGENESIS IN SOME CROCUS SPECIES (*CROCUS SATIVUS* L.,
CROCUS ANCYRENSIS, *CROCUS PALLASII* SSP. *PALLASII*) GROWN NATURALLY IN TURKEY**

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Abstract

The aim of this study was to propagate some *Crocus* species which are cultivated and grown naturally in our country (*Crocus sativus* L., *Crocus ancyrensis*, *Crocus pallasii* ssp. *pallasii*) using somatic embryogenesis technique and to observe the stages of callus growth histologically for only *Crocus sativus* L. species. *In vitro* regeneration experiments were conducted using corm explants belong to different *Crocus* species to search micropropagation possibilities of this plant which is a valuable genetic resource of Turkey. In the experiments, different plant growth regulators; NAA (0, 0.5, 1.0, 2.0 mg L⁻¹), BA (0, 0.5, 1.0, 2.0 mg L⁻¹), 2 iP (0, 0.5, 1.0, 2.0 mg L⁻¹) and 2,4-D (0, 0.5, 1.0, 2.0 mg L⁻¹) combinations and concentrations were used to determine the growth and development of plants. As a result, conversion ratio of explants to the embryogenic callus, conversion ratio of embryogenic callus to embryo, investigation of embryo stages, survival ratio of explants were investigated for all *Crocus* species and the beginning stage of callus formation in *C. sativus* L. was determined via histological analysis.

Key words: *Crocus*, saffron, somatic embryogenesis, genetic resources, callus,

ANTIMICROBIAL AND ANTIOXIDANT PROPERTIES OF MEDICINAL AND AROMATIC PLANTS

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Abstract

Smell and taste properties of the plants which are used as medicine are called as medicinal and aromatic plants. Nowadays, many drugs have been synthesized as the raw material of these plants flavonoids, alkaloids, terpenoids, tannin, berberine, emetine, such as quinine and compounds found in plant essential oil constituents. Antimicrobial, antibacterial, antifungal, antiviral, and antioxidant properties of these plant constituents have been demonstrated in previous studies. In this review, methods of obtaining plant components, the detection of antimicrobial and antioxidant properties, techniques, mechanism of action and possibilities of using these constituents in poultry nutrition were discussed.

Key Words: Aromatic Plants, Essential Oils, Antimicrobial, Antioxidant

ASSESSMENT OF BIODIVERSITY OF *COLCHICUM* L. BELONG TO TURKISH FLORA BY DNA BARCODING

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Abstract

Colchicum L. is a bulbous plant of the Colchicaceae that has 49 taxa and 35 of them are known endemic in Turkey. Aim of this study is to identify 168 *Colchicum* L. populations contain 49 species and 16 new candidate species via diagnostic variation in DNA sequences from universal plastid regions by using DNA barcoding. This method has been suggested as a rapid and practical molecular method which is an aid to taxonomic identification that uses a short, standard DNA region that is universally present in the target lineages and has sufficient sequence variation for species discrimination. *Colchicum* L. populations are being analysed using the following DNA multi-marker universal barcodes: *rbcl*, *matK* and *trnH-psbA* that were proposed by The Consortium for the Barcode of Life (CBOL) Plant Working Group. So far, the PCR products of *rbcl* gene amplified in 168 *Colchicum* L. populations were sequenced. After completing the sequencing of *matK* and *trnH-psbA* genes as well, Neighbor joining method and Kimura two-parameter will be used for obtaining DNA barcode based trees to identify the whole *Colchicum* L. germplasm.

Key words : *Colchicum* L., *rbcl*, *matK*, *trnH-psbA*, DNA barcoding.

EFFECT OF PRE-CHILLING DURATION AND KINETIN ON GERMINATION OF CAPERS (*CAPPARIS SPINOSA* VAR. *SPINOSA* AND *CAPPARIS OVATA* VAR. *CANESCENS*) SEEDS

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Abstract

This study was conducted to determine the effects of pre-chilling and kinetin treatment on germination of *Capparis spinosa* var. *spinosa* and *Capparis ovata* var. *canescens* seeds. Seeds were kept 1, 2, 4, 6, 8 and 12 weeks for pre-chilling at +4 °C. After the prechilling, Seeds were treated with distilled water, 100, 200, 400 and 800 ppm doses of kinetin and 2000 ppm dose of GA3 which was used as positive control for 24 hours at 22 °C. The research was conducted with 4 repetition in filter papers at 20±1 °C in dark germination cabinet. The highest seed germination rate in *C. Ovate* was %6.75 in 6 weeks pre-chilling with 400 ppm kinetin. The highest germination in 2000 ppm GA3 (positive control) was %9 in 6 weeks pre-chilling. The highest seed germination rate in *C. spinosa* was %1.25 that was obtained from no pre-chilling with 800 ppm kinetin. GA3 was less effective than kinetin on germination of *C. spinosa* seeds. Germination of *C. spinosa* seeds was low and the highest seed germination in *C. spinosa* was %1 in 8 weeks pre-chilling with GA3 treatment. It was observed that GA3 increased the seed germination.

Key Words: *Capparis spinosa* var. *spinosa*, *Capparis ovata* var. *canescens*, Prechilling, Kinetin, Germination

4 – FIELD CROPS

CLUSTER ANALYSIS IN COMMON BEAN GENOTYPES (*PHASEOLUS VULGARIS* L.)

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Phenotypic observations in the real farm conditions have importance for the plant breeding programs. In the present study, the common bean genotypes that are widely grown in Turkey were subjected to cluster analysis according to their phenotypic evaluations. Cluster analysis for the field performance of 35 promising common bean genotypes showed 3 main groups. Distance was ranged from 0.99 to 9.05 values. Hierarchical cluster analysis is a useful guide to evaluation of different genotypes. In the present study, analysis to determine distances among the used genotypes clearly separated into the bean groups. A dendrogram obtained which was based on the matrix of relationship between the genotypes. It can be concluded that cluster analyze can be useful to give information about selection of the promising genotypes for breeders.

Key words: Breeding, dry bean, similarity, phenotypic classification, Turkey

THE RESPONSE OF DRY BEAN (*PHASEOLUS VULGARIS* L.) GENOTYPES TO WATER SHORTAGE

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This research was conducted to determine effect of irrigation schedule and frequency on common bean yield in Konya ecological conditions. Field trial was conducted according to "Randomized Complete Blocks Design" with three replications in Selcuk University, Agricultural Faculty, Campus-Konya trial fields during the year of 2009. Sowings were made on 15th of May and harvest was made on September. After sowing, the plots were irrigated by sprinkler for only two hours to provide the emergence. A total of 40 common dry bean genotypes were grown in field conditions with only 2 drip irrigations during the flowering (50th day after sowing) and pod filling (58th day after sowing) periods for 6 hours (from 0am to 6am) per irrigation which was provided enough water to effective root depth. Some agronomical characteristics were determined on behalf of plant response to limited water. According to the results, number of main branch per plant was significant on the level of $P < 0,05$ and, all the other investigated characteristics were significant on the level of $P < 0,01$. Means of the investigated characteristics were ranged as following: number of main branch/plant 3,33-7,33; number of leave/plant 16-108; plant height 45cm-162cm; number of pod/plant 12-26; number of seed/pod 3,0-5,8; first pod height 3,56cm-6,67cm; biologic yield 2120kg ha⁻¹-6040kg ha⁻¹; seed yield 1140kg ha⁻¹-3550kg ha⁻¹; harvest index 46%-90% respectively. The results implicated that all the investigated characteristics were in parallel with previous studies. It can be concluded that the timing and method of irrigation is more effective than making irrigation in a random period and excessive water.

Key words: Arid land agriculture, drought tolerance, water management, Turkey

RELATIONSHIP BETWEEN SALT TOLERANCE AND ABA BIOSYNTHESIS APTITUDE UNDER STRESS OF TWO BEAN GENOTYPES

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Abstract

Salinity affects almost every aspect of the physiology and biochemistry of plants and significantly reduces yield mainly in arid and semi-arid environments. As the plant hormone Abscisic acid (ABA) is involved in responses to salt stress, we tested its putative relationship with the degree of bean (*Phaseolus vulgaris* L.) tolerance to salinity. For this purpose we examined the physiological and the molecular responses of sensitive and tolerant genotypes to NaCl after ABA biosynthesis blockage with or without exogenous ABA supply. Salinity decreased transpiration, stomatal conductance, photosynthetic rate and leaf relative water content relative to the control treatments which leads to growth reduction. However, leaf Na⁺ concentration increased for both genotypes with higher extent in the sensitive genotype. Increased leaf abscisic acid concentration was slightly correlated with Na⁺ amount in the medium. Endogenous leaf ABA content in the sensitive genotype was significantly higher than that in the tolerant one nevertheless, under salinity, ABA increase was much higher in the tolerant one. ABA inhibitor, fluridone, induced higher plants sensitivity to salinity and higher Na⁺ exclusion capacity. Exogenous ABA supply reduced growth, improved water status and endogenous ABA amounts. It seems that bean salt tolerance was related to the rate of endogenous ABA biosynthesis under stress for the tolerant genotype while the valuable effects of exogenous ABA were mainly restricted to the sensitive genotype. Therefore, we point out here the importance of both the aptitude of endogenous ABA biosynthesis under salinity as well as the absolute ABA levels for bean salt tolerance.

Key words

Salinity, abscisic acid, fluridone, *Phaseolus vulgaris*, photosynthesis, transpiration, growth.

EFFECT OF SALICYLIC ACID AND CALCIUM ON SALT TOLERANCE OF TWO BEAN GENOTYPES

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Abstract

Salinity is an important abiotic factor that limits plant growth and productivity. This study aims to characterize the physiological behavior of sensitive and tolerant genotypes of common bean *Phaseolus vulgaris* L. under salinity in response to two signaling molecules applied separately or in combination to counterbalance the harmful effects of salt; salicylic acid and calcium. Calcium supply on salt stressed plants promotes their tolerance to NaCl. However, salicylic acid supply improved more the response of the salt-stressed tolerant genotype through alleviating membrane damage simultaneously with the stimulation of the photosynthetic pigments biosynthesis and potassium accumulation whereas its effect remains insignificant on the sensitive genotype when comparing to the tolerant one. Addition of the two molecules mixed together on salt stressed plants induced a similar effect like that of salicylic acid supply on the tolerant genotype whilst it improved soluble sugars and photosynthetic pigments biosynthesis and counterbalanced the ratio sodium: potassium in leaves for both genotypes. To conclude, salicylic acid can be used as a potential growth regulator to improve the response of the tolerant genotype to salinity although the exogenous supply of calcium seems to be more valuable to improve the salt response of both genotypes even if the best response was obtained after plants treatment by the two molecules mixed together.

Key words: *Phaseolus vulgaris* L., genotype, salinity, salicylic acid, calcium, physiological response.

ASSESSMENT OF PHENOTYPIC DIVERSITY IN BITTER VETCH (*VICIA ERVILIA* L. WILLD) POPULATIONS

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Abstract

Characterization of landraces requires a different approach than that adopted for cultivars. Estimate of variation among and within landraces contributes to the optimization of their description and conservation. The aim of this study was to characterize 49 populations of bitter vetch (*Vicia ervilia* L. Willd.) on the basis of 24 agro-morphological traits and estimate phenotypic diversity within and among populations, as well as its average in each individual population. The collection was characterized by good seedling vigor, presence of seedling stem pigmentation, absence of leaf pigmentation, medium-sized leaflets, semi-upright growth habit, moderate lodging susceptibility, medium height and small number of primary branches. Moreover, the results showed the earliness of flowering and fruit setting, short flowering period and white-purple flower ground color. Pods did not surpass 160 per plant in majority, while showed a modest dehiscence and contained three to four seeds. Seeds were characterized mainly as brown and gray, by absence of pattern of testa and conical shape. Both grain and biomass yield fluctuated at relatively low levels. There was a wide diversity present in the collection for the majority of traits analyzed (mean total phenotypic diversity $H_T = 0.52$). The mean phenotypic diversity among landraces (G_{ST}) was 0.31. Most traits related to reproductive phase had $G_{ST} \geq 0.5$ while for most traits, high intra-population variation (H_S) was detected. No significant differences among populations' mean phenotypic diversity values ($0.27 \leq \bar{H}_p \leq 0.47$) were observed. Principal Component Analysis was used to classify the populations. High phenotypic diversity of populations for the traits analyzed, and the results of the analyses performed, showed that populations of bitter vetch constitute a rich and underutilized gene pool.

Key words: Bitter vetch, Characterization, Morphological traits, Phenotypic diversity, Principal Component Analysis

GENOTYPE X ENVIRONMENTAL INTERACTIONS AND ADAPTATION ABILITIES OF CHICKPEA (*Cicer arietinum* L.) IN ÇUKUROVA CONDITIONS

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ABSTRACT

During the study, at which genotype x environmental interactions and adaptation capacity of 18 chickpea varieties that took place at yield trials conducted in years 2001, 2002 and 2003 at two different locations (Doğankent, Taşçı) in Çukurova region were studied, it has been observed that studied characteristics are significantly affected from trial locations. Chickpea varieties used in the yield trial, demonstrated different adaptation capacities to different environmental conditions in terms of studied characteristics. According to adaptation criteria and results taken according to this criteria, which were based on yields of chickpea varieties FLIP 93-118C, FLIP 82-150C and FLIP 94-88C demonstrated good adaptation to all environmental conditions; FLIP 91-186C, FLIP 92-147C and Aydın-92 demonstrated bad adaptation to all environmental conditions. FLIP 92-142C, FLIP 93-176C and FLIP 82-150C are the varieties which demonstrated special adaptation to good environmental conditions; FLIP 91-186C, FLIP 92-105C and FLIP 91-202C are the varieties which demonstrated special adaptation to bad environmental conditions

Key words: Chickpea, stability, genotype x environmental interaction

EFFECT OF TYPE OF EXPLANT AND GROWTH HORMONES ON CALLUS INDUCTION AND SOMATIC EMBRYOGENESIS IN *CATHARANTHUS ROSEUS* L.

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Abstract:

Catharanthus roseus, plant having many important therapeutic properties. It produces many indole alkaloids, including two antimitotic agents: the Vinblastine and the Vincristine. In our study, we are so interested to regenerate somatic embryos of which the content of interest metabolites would be improved. In order to get this result, a passage by the stage cal is necessary in order to induce genetic variations using variable concentrations of growth hormones and explants of various natures. The results of callogenesis shows that various hormonal treatments used appeared all callogenesis. The highest rate was noted on the level of the treatments (MS+1mg/l 2,4-D) and (MS+1,5mg/l 2,4-D) applied to epicotyls (100%). In addition, the best average surface of cals is obtained with epicotyls fragments in (MS+1mg/l 2,4-D) (81,32mm²). After transfer of induced cals on (MS+1mg/l 2,4-D) and (MS+1mg/l ANA), the two treatments are revealed embryogene. The best rate of embryogenesis is obtained on the level of (MS+1mg/l ANA) (44,17%) for the epicotyls. The growth of these cals was different, thus three groups, according to their answer, were identified during all their embryogenesis somatic phases: necrosed cal, cal with nodular texture and cal with granulous texture. As for the regenerative power of the somatic embryos, the intensity of regeneration varies according to the type of explants, the best rate was noted on the level of epicotyls (36%) on (MS+0,5mg/l BAP).

Key words: *Catharanthus roseus*, callogenesis, somatic embryogenesis, indole alkaloids.

EFFECTS OF PLANT HORMONES ON GERMINATION PERFORMANCE OF PHACELIA (*Phacelia tanacetifolia* B.) SEEDS

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Seeds of *Phacelia tanacetifolia* B. were primed in darkness in 1% KNO₃ at 4 °C for 48 hours containing various concentrations of gibberellic acid (GA₃; 300, 450 or 600µM), methyl jasmonate (MeJA; 0.5, 1.0 or 1.5 µM), indol-3-asetic acid (IAA; 0.5, 1.0 or 1.5 µM), indol-3-butyric acid (IBA; 0.5, 1.0 or 1.5 µM), acetyl salicylic acid (ASA; 75, 150 or 300 µM), 1-aminocyclopropane-1-carboxylic acid (ACC; 0.5, 1.0 or 1.5 µM), 6-benzyladenine (BA; 50, 100 or 150 µM) or benzoic acid (BeA; 50, 100 or 150 µM). Following priming, seeds were germinated in a growth chamber set at 4 °C in darkness. Four replications of 50 seeds were arranged in a completely randomized design. Germination ratio, speed and spread of germination parameters were determined. The results revealed that priming seeds in 1% KNO₃ at 4 °C for 48 hours in the presence of plant hormones significantly improved final germination percentage, germination rate and spread of germination. However, level of improvement significantly affected by the concentration and the type of hormones, suggested that endogenous level of plant hormones in phacelia seeds were not balanced well and germination parameters could be improved by external hormone treatments.

Key words: Phacelia, honeybee, germination, plant hormones,

EFFECT OF DIFFERENT PLANT DENSITIES AND NITROGEN DOSES ON FRESH EAR YIELD AND YIELD COMPONENTS ON SWEET CORN (*Zea Mays Saccharata* Sturt.)

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This study was conducted to investigate the effect of six different sowing densities (50x15, 50x20, 50x25, 70x10, 70x15, 70x20 cm) and five different nitrogen doses (N₅, N₁₀, N₁₅, N₂₀, N₂₅ kg / da) on fresh ear yield and yield components and determine the best suitable sowing density and nitrogen dose for sweet corn in Samsun conditions. According to the results, when sowing densities increasing fresh ear yield, fresh grain yield, grain yield, number of marketable ear, days to tasseling, days to silking, duration of maturity, plant height, ear height and ear tip clearance increased. On the other hand ear length, ear diameter, number of row per ear, number of kernel per ear, one ear weight, a single fresh grain weight per ear, number of ears per plant, total soluble solids content decreased. The effect of sowing density on grain protein and grain oil was statistically found insignificant.

Key words: Sweet corn, sowing density, nitrogen dose, grain protein content and grain oil

**MAIZE BREEDING, SEED PRODUCTION, PROCESSING AND QUALITY CONTROL IN MAIZE RESEARCH
INSTITUTE ZEMUN POLJE-SERBIA**

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The Maize Research Institute Zemun Polje (MRIZP) is focused on development, production and introduction of new high-yielding maize hybrids and to a lower extent soybean and small grain cereal cultivars. Breeding activities of this institution, founded in 1945, resulted in 569 maize hybrids and 7 soybean cultivars on the national and 109 on the international variety catalogues. The breeding program is based on the own germplasm collection maintained in the MRIZP gene bank. Inbreeding-hybridisation, as a concept of the maize breeding programme, is focused on generating high-yielding genotypes resistant on common disease and pests and capable to overcome adverse environmental conditions. Production of seeds, basic and hybrids, is located at experienced producers with irrigation systems and application of optimal growing practices developed by experts from the Institute. In addition to the official control, MRIZP conducts super control of seed production to ensure the highest quality and purity of commercial seed. After harvesting, grains are subjected to recently upgraded drying and different processing methods to gain maximal quality of seed lots. Monitoring of seed quality continuously takes place during processing till packing by the ISTA-accredited laboratory to ensure compliance with domestic and international quality standards.

Key words: Maize Research Institute Zemun Polje, maize breeding, gene bank, seed processing and quality

EVALUATION OF DIFFERENT METHODS FOR DOUBLE HAPLOID PRODUCTION IN MAIZE HAPLOID PLANTS

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ABSTRACT

Doubled haploid lines have major advantages in maize hybrid breeding. Artificial chromosome doubling in haploid plants is a basic step for a commercial scale production of doubled haploids in maize. The purpose of this study was to evaluate different protocols, immersion and injection, with colchicine solution in maize doubled haploid seed production. Haploid seeds were used as genetic material for three field experiments conducted during 2014 growing season. Seedlings, originally grown in incubator, were immersed in colchicine solution at three different concentrations (0.04%, 0.06% and 0.1%). Within each treatment, cuts were applied to coleoptile and/or radicle, under four different sets of temperature conditions. After treatments, seedlings were transplanted into the field. Injections with 0.1% and 0.2% v/v colchicine solution were applied to seedlings, which had either been directly sown in the field or grown in incubator, at the stage of 3 - 4 leaves. Among immersion treatments only 14.13% of the plants survived. In injection protocol treatments, 51.23% from the seedlings directly sown in the field survived, while the respective percentage for transplants was 2.35%. The low survival rate may be due to colchicine toxicity and transplanting stress. Among the directly sown plants, 21.13% of them were able to be self-pollinated, while when transplantation was applied the respective percentages for injected and immersed transplants were 0.78% and 8.33%. Injection with 0.1% colchicine solution after direct sowing in the field seemed to be the most effective method of producing doubled haploid plants. The best immersion result was obtained with the application of 0.04% v/v colchicine solution, at 26°C during and after the treatment. Optimal conditions during both methods and growing period seem to be key components for massive production of maize haploids. Further studies are needed to achieve higher proportions of successful chromosome duplications.

Key words: maize, doubled haploids, colchicine, injection, immersion, corn

IDENTIFICATION, ANALYSIS AND REPORTING OF LOCAL VARIETIES AND HYBRIDS AND INTRODUCED LINES OF CORN ZEIN BY ELECTROPHORESIS METHOD

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Proteins are the primary product of genetic systems of the body, so the protein features give the most accurate information about the genotype than morphological, and are highly reliable and efficient genetic markers. As is well known, and intraspecific and intrapopulation variability is manifested mainly at the level of alleles as a consequence of recombination and gene flow. Inbred lines of maize relate to each other as allelic variants of the original genotype or varietal hybrid population by one, several or a large number of genes. Therefore, identification of varieties, hybrids and lines of maize and other crops as very convenient helpful electrophoresis multiple genetically polymorphic proteins. These proteins are in particular isoenzyme of vegetative organs and seed storage proteins in the case of maize it is the protein zein. First time in Azerbaijan we electrophoresis was used to identify varieties and hybrids of maize lines. In the experiment analyzed 6 landraces, 9 and 52 local hybrids of local and introduced maize lines. To establish the genetic similarity of the analyzed room was made cluster analysis and dendrogram obtained. During analyzes SPSS computer program options were grouped into 14 clusters. Percentage and location of these options include: 36.7% A-, 23,5% B-, 8.8% C-, 7.3% D-, 2,9% E-, 1,4% F-, 2,9% G-, 2.9% H-, 2 9% J-, 1,4% K-, 2,9% L-, 1,4% M-, 1.4% N-and 1,4% O-cluster. Clusters A, B, C, etc. were grouped close together. Only five genotypes clusters F, M, O, N, K were separate and distinct clusters depending on the degree of genetic similarity. During testing it was found in a cluster, A was richer than other genotypes (25 samples) which were different from each other depending on the degree of genetic relatedness. A cluster of samples 16 in localized in cluster C 6 embodiment, the cluster 5 D samples, the remaining samples were arranged in clusters E-, F-, G-, H-, J-, K-, L-, M-, N-and O-. The analysis dendrogram obtained electrophoretic data, we found that among the options selected maize revealed very high genetic diversity and rich polymorphism that is needed to produce new varieties and hybrids of corn.

THE EFFECT OF DIFFERENT SEED DENSITIES ON SOME HYBRID MAIZE TYPE'S YIELD IN ESKIŞEHİR CONDITIONS

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ABSTRACT

In this study the effects of seed density on argonomic characters in Eskişehir that presents west transitional zone of central Anatolia was investigated. It was planted according to split plots in Randomized Complete Blocks with 4 replications. It was seen that yield could get the variety (ADA_9510, ADA_9516, TTM_815 ve BC_6661) and density ("70 x 20", "70 x 15", "60 x 20", "60 x 25" ve "50 x 30") various values. In this one year study 60 x 25 cm and 50 x 30 cm density was given best result.

Key words: Maize, Density, Variety

RICE BREEDING FOR HERBICIDE RESISTANCE IN TURKEY

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The objective of this study was to develop IMI (Imidazolinone) group herbicide resistant rice varieties to control weedy rice (re rice) and the weeds gained resistance against conventional rice herbicides in rice fields. For this, the fourteen cross combinations were done with a IMI resistant rice variety at Trakya Agricultural Research Institute in 2007. Using these crosses, some breeding activities carried out. As results of these studies promising IMI resistant lines were developed and they were tested in the observation nurseries and the yield trials in 2012 and 2013. Also, a backcross program started in 2008, eight backcross combinations were obtained, seven of them reached to BC₆ and one to BC₄ at the end of 2013. As preliminary results, four promising IMI resistant rice lines selected in 2013, and they are being tested in the regional trials in 2014. These lines will be nominated for registration as commercial varieties in 2014.

Key Words: Herbicide resistant, Imidazolinone herbicide, rice (*Oryza sativa* L.), rice breeding.

PRELIMINARY RESULTS OF TURKISH RICE VARIETIES UNDER RICE GROWING CONDITIONS OF MACEDONIA

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ABSTRACT

In order to develop the production and quality of rice in the Republic of Macedonia, a rice yield trial was conducted in 2013 within a joint Turkish-Macedonian project. The performances of fourteen Turkish rice varieties (TR-2121, TR-2024, TR-1981, Paşalı, Çakmak, Kiziltan, Gönen, Kırkpınar, Tunca, Halilbey, Durağan, Gala, Hamzadere and Efe) were investigated under Macedonian rice growing conditions to compare with the prevailing variety San Andrea. In this paper, the results for paddy yield, head rice yield, total milled rice yield, plant height and days to flowering, obtained in randomized blocks trial with four replications during 2013 rice growing seasons will be presented. The rice yield potential of five Turkish varieties was significantly higher than San Andrea, reaching up to 10 525 kg/ha (Tunca). The head rice yield was better in all Turkish varieties, the thirteen varieties had significantly better head rice yield (over 50% in Paşalı, Kiziltan, Gala and Efe), compared to San Andrea (31%). One of the reasons for better quality of investigated Turkish varieties was their earliness, providing early harvesting. Thirteen varieties were characterized with significantly shorter vegetation (expressed as days to flowering) compared to San Andrea. Reduced plant height in comparison with control variety was the characteristic of eleven Turkish varieties, contributing to better lodging resistance. As a conclusion, the preliminary results of the rice yield trial carried out in 2013 showed very good performances of investigated Turkish rice varieties under growing conditions of Macedonia.

Key words: Head rice yield, plant height, rice varieties

EVALUATION OF TWENTY TWO RICE (*Oryza sativa* L.) GENOTYPES FOR YIELD AND YIELD COMPONENTS UNDER DRIP IRRIGATION

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ABSTRACT

This study was carried out at Trakya Agricultural Research Institute during 2007 and 2009 to investigate yield and yield components of 22 direct seeded rice genotypes under drip irrigation. Drip irrigation water was supplied with laterals placed every 80 cm. As a two years mean 1806 mm water was used for flooded conditions (including seasonal rainfall), while 789 mm water was used for drip irrigation treatments (including seasonal rainfall). 56% less water was used for drip irrigated treatments compared to flooded rice irrigation application. According to two year means the highest yield (6.5 t/ha) was obtained with Durağan rice variety, it followed by Osmancık-97, Halilbey and Kızıltan 6.24, 6.23 and 5.98 t/ha yield respectively. The number of fertile panicle per square meter was the highest at cultivar Aromatik-1 (264/ m²) while the lowest number of fertile panicle per square meter was observed at cultivar Negis (173 /m²). Genotype YRF-203 attained highest percentage of sterile spikelet (%37,55) while Akçeltik produced lowest percentage of sterile spikelet (8,83 %). Maximum 1000 kernel weight was obtained from cultivar Gonen while minimum 1000 kernel weight was obtained from genotype Aromatik-1 (21.63 g). The genotype Veneria gained the highest biological yield (1.568 t/ ha) while the lowest biological yield was observed in genotype Yavuz (1.170 kg/ha). Percentage of harvest index was the highest in genotype Kızıltan (47.5 %)d while it was lowest in genotype YRF-203 (21.3%)

Key words: Drip irrigation, rice (*Oryza sativa* L), yield, yield components.

THE DETERMINING YIELD AND OTHER YIELD TRAIT PERFORMANCES OF GENETICALLY RESISTANT SUNFLOWER HYBRIDS AGAINST BROOMRAPE IN TRAKYA REGION

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Abstract

Sunflower is a main oil crop in Balkan region and exists in as a main crop in rotation systems. Sunflower broomrape (*Orobanche cumana* Wallr.) is the most limited factor in sunflower production in Trakya Region which is European part of Turkey. This parasite is also infested to sunflower planted areas not only in this region both also almost all parts of Balkan countries. Broomrape control is only possible in that infested areas with genetically broomrape resistant hybrids or chemical control with post emergence Imidazilonone (IMI) herbicides plus IMI herbicide resistant hybrids as calling Clearfield system. Therefore, for a sustainable and profitable production in these areas, sunflower hybrids should have high yielding potential in addition to broomrape tolerance. Research was covered seed and oil yield and some yield trait performances of sunflower hybrids in 2011-2013 registration trials conducted in broomrape infested areas in Trakya Region. In the experiments, commercial controls planted widely in Turkey and candidate hybrids were existed. Based on the results, Highest seed yields were obtained as 3424 kg ha⁻¹ from XF 4223 control hybrid in 2011, as 2875 kg ha⁻¹ from PR64G46 in 2012 and as 3735 kg ha⁻¹ from P63MM54 in 2013. Highest oil contents were obtained from Ozdemirbey control hybrid as 53,4% in 2011, from 08TR005 candidate hybrid as 54,9% in 2012 and from Batoli candidate hybrid as 53,9%. Based on broomrape resistance evaluations and observations, 08-TR-003, 11TR077 (HO), 12TR54, 09 TR 002, Saray, AGA0910011, Tunca, LG5582, LG5550, LG5507, PR64H37, P64LL05, NX23202, Maxtor (Orka), 64H34 (HO), PR64G46, LG5400 (HO), etc. exhibited good tolerance in trials conducted almost all locations in Turkey for 3 years period. As a result, both highly broomrape tolerant and having also higher seed and oil performance sunflower hybrids are developed and existed in the registration trials in Turkey.

Key Words: Sunflower, Resistance, Broomrape, New Races, Trakya Region, Turkey

EFFECTIVENESS OF DIFFERENT METHODS FOR SCREENING OF SUNFLOWER (*Helianthus Annuus* L.) DROUGHT TOLERANT CULTIVARS

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Abstract

Effectiveness of index versus multivariate based methods compared under drought stress in vegetative, flowering and grain filling stages using 8 sunflower cultivars. Field evaluation was carried out as a strip plot design with three replications at Khoy Agricultural and Natural Resources Research Station in Iran. Flowering stage identified as the most sensitive stage to water deficit with 38% reduction in grain yield compared with normal irrigation. Hybrid Farrokh had the highest seed yield in all irrigation treatments (3686, 2856, 2256 and 2506 Kg/ha in control and water deficit in vegetative, flowering and grain filling stages respectively). The lowest and highest reduction in seed yield was observed in Lakomka and Hysun33 respectively in all drought treatments. According to the stress tolerance and sensitivity indices Farrokh and Hysun33 were the most drought tolerant and sensitive cultivars in all drought treatments. Under drought stress in vegetative stage cluster analysis based on all agronomic measurements differentiated Farrokh from others, however there was no singly differentiated cultivar in flowering and seed filling stages. Principle component analysis (PCA) identified Farrokh as the most drought tolerant while Record as the sensitive cultivars under all drought regimes. Relative water content, head diameter and SPAD value were the main determinant of seed yield under drought stress in vegetative, flowering and seed filling stages respectively. All the methods confirmed Farrokh as the most drought tolerant cultivar. There were no unique results for identifying of drought sensitive cultivar. Regarding seed yield as the final target it is concluded that PCA merging all plant characteristics can be used as an effective differentiator of genotypes under different water regimes.

Key Words: Cluster analysis, Drought stress, Phenological stages, Principle component analysis.

THE EFFECT OF MECHANICAL DAMAGE ON TO EMERGENCE RATE AND EMERGENCE FORCE OF SOME WILD SUNFLOWER (*Helianthus* L. spp.) SEEDS

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Abstract

To investigate the possible use of wild sunflower species (*Helianthus* spp.) with cultural varieties at classical breeding studies and to overcome the seed dormancy and germination problems encountered at germination stage in seed, the effect of mechanical damage to the seed on to emergence rate and emergence force was determined. The study was conducted at Uludağ University, Agricultural Faculty, Field Crops Department, Plant Tissue Culture Laboratory and Green House in 2014. Seeds of wild sunflower genotypes were obtained from 3 different sources (USDA-USA, Germany, Canada). The seeds imbedded in water one day were scratched carefully from embryo sites and then placed into viol containing 1: 1 peat: soil mixture (v/v) at $24 \pm 2^{\circ}\text{C}$ in 16h/8 h (light/dark) in the growth chamber. Emergence rate and emergence force values were taken after 10 and 17 days from seeding. Emergence rate and emergence force values varied from 0 - 100% depended on the genotype. The highest emergence rate values (100%) were obtained from genotypes numbered as 4, 17, 20, 24, 37, 59 while genotypes numbered as 31, 32, 33, 38, 39, 40, 41, 46, 47, 48, 49, 51, 52, 55 did not have emergence rate values (0%). The highest emergence force values (100%) were obtained from genotypes numbered as 4, 17, 19, 20, 24, 37, 59 while genotypes numbered as 31, 32, 33, 38, 39, 40, 46, 48, 49, 51, 52, 55 did not have emergence force values (0%).

Key Words: Sunflower, *Helianthus* spp., wild type genotypes, emergence rate and emergence force

THE LAST BARRIER FOR 00-TYPE INTERSPECIFIC RAPESEED (*BRASSICA NAPUS* L.): GLUCOSINOLATES

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The biggest problem of the use of resynthesized rapeseed forms in quality breeding is their high glucosinolate content arising from the same character originating from the *B. oleracea* parent. Glucosinolates are sulphur- and nitrogen containing plant secondary metabolites common in the Brassicaceae and related plant families. The hydrolyzed products of glucosinolates, namely, isothiocyanates and other sulphur-containing compounds, were shown to interfere with the uptake of iodine by the thyroid gland, contribute to liver disease, and reduce growth and weight gain in animals. Consequently, plant breeders realized that if rapeseed (*Brassica napus* L.) meal was to be used in animal feed, the glucosinolate content had to be reduced. Up to now, interspecific rapeseed (*Brassica napus* L.) hybrids displaying low erucic quality were developed. But their glucosinolate content are high because of the *B. oleracea* parent. To introduce canola quality in RS-lines crosses with adapted material and subsequent backcrosses to resynthesized material are required, followed by recurrent selection for agronomic performance. A second approach should be the reduction of the glucosinolate content of the *B. oleracea* parent. Possible methods may be the irradiation of *B. oleracea* seeds or interspecific hybridization of *B. oleracea* with related Brassica species, because the selection of cabbage genotypes with low glucosinolate content may be the longer and deficienter way. Another method should be the cultivation of the low erucic acid genotypes in vitro since tissue culture cause as well known somaclonal variation, which may led to the breakdown of the high glucosinolate level.

Key words: rapeseed, interspecific, hybrid, glucosinolates

EFFECTS OF PLANT NUTRITION ON CANOLA (*BRASSICA NAPUS* SSP. *OLEIFERA* L.) GROWTH

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Abstract

Canola (rapeseed) is the important edible oilseed crop in the world and Turkey. It has strong demand as a healthy vegetable oil due to their low level of saturated fats, making it popular as cooking vegetable oil and for use in processed foods. Profitable canola production relies heavily on adequate plant nutrition, which in turn is affected by management of soil fertility. In addition, the nutritional level of the plant will affect the crop response to stress factors such as disease and adverse weather conditions. Nitrogen, phosphorus and potassium (NPK) are few of the major nutrients required to significantly increase canola yield. Fertilizer application rates in canola production vary because of the variable occurrence of NPK in the soil. Balanced fertilization offers a new perspective for fine tuning of genetically fixed quality properties of canola crop by farmers and growers.

Key Words: Canola (*Brassica napus* ssp. *oleifera* L.), nutrient, fertilization.

THE INCOME OF ENERGY CROPS IN GREECE AND THE ROLE OF CAP; A MULTICRITERIA ANALYSIS

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Abstract

Energy crops have become within the last decade a global trend in agriculture. This is a stylized fact also for EU. To this direction has also led the implementation of EU policy. In general the energy crops are considered a non-traditional land use option (i.e. crop farming) and thus it may well be considered as innovation. Energy crops are strongly competed by other, presumably more standard uses of farmland, and consequently if profit is not a motive for individual farmers, they will not be preferred. Thus, the farmers' decisions are a key constraint to potential supply. Barriers to widespread adoption of energy crops may be considered the financial returns, as well as the fact that competing activities were much more rewarding for instance due to the increasing price of an alternative crop (i.e. wheat) the preceded time period. Furthermore, a farmer's decision is also determined by the existence of trusted information spread through differentiated channels involving technical and agronomic aspects of cultivation, as well as economic returns and contract agreements on energy crops. Having in mind the aforementioned issues, the present paper employs a multicriteria analysis for the optimization of agricultural income generated by energy crops. The criteria included in our analysis are the prices of the soybean or the sunflower (proxy for energy crop), the agricultural income of alternative crops, the value of the subsidies as a proxy for EU policy and finally the value of inputs (costs of capital and labour). Three different scenarios will be taken into consideration regarding the implementation of Common Agricultural Policy. The results confirmed that the scenario under which the Common agricultural policy is implemented will result in agricultural income optimization providing a significant motive to the farmers for the adoption of an energy crop instead of alternative conventional crops.

STRATEGIC PRODUCT OF WESTERN THRACE `TOBACCO`

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Abstract

Western Thrace Region, which is located between Nestos and Evros Rivers. The region's most important agricultural product is pressed kind tobacco. Pressed kind of tobacco is well known all over the World. Which is produced by Turkish farmers in the region. This type of tobacco is an extremely important input for cigarette production. Tobacco is providing directly income more than 50.000 people in the region. 50% of Western Thrace Turkish minority living in the region engaged with tobacco production. EU subsidizes tobacco production. After accession of Greece to the EU (EEC) 1981, especially second part of 1990's with the effect of "Common Agricultural Policy" Of EU welfare of Turkish farmers in the region increased as other farmers in the region and all over the country. But recently, new arrangements which are related with the tobacco production within the EU's "Common Agricultural Policy" caused crises in the tobacco production. New arrangements foresaw a high decrease in the tobacco production which also means the end of tobacco production in Europe. In Europe, billions of subsidies have been granted to tobacco production. It is clear that halting tobacco production will cause serious social, economic and demographic problems in the region. Additionally, halting tobacco production in Europe will not affect the consumption of cigarette in Europe. So this new arrangements should be reconsidered and production of tobacco should not be halted without improving new policies and new products in agricultural sector.

Key Words: Western Thrace, Tobacco, Agriculture, Europe

EVALUATING YIELD AND YIELD COMPONENTS OF PURE LINES SELECTED FROM BREAD WHEAT LANDRACES COMPARATIVELY ALONG WITH REGISTERED WHEAT CULTIVARS IN CANAKKALE ECOLOGICAL CONDITIONS

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Abstract

In this study, 49 advanced lines from local bread wheat landraces that are originated from Denizli, Edirne, Kahramanmaraş and Konya regions of Turkey are compared with 7 selected cultivars regarding to their yields and yield components. Trial is analysed according to the incomplete block design lattice with two replications with ANOVA and are conducted at Dardanos Agricultural Facility, Çanakkale Onsekiz Mart University, during 2011-2012 growing season. Means are separated by Duncan's Multiply Range Test and genotype differences are evaluated. Generally and individually, some local bread wheat landrace pure lines are tended to have lesser grain yield, 1000 grain weight, harvest index, weight per spike and grain number per spike comparing to the present cultivars while exceeding them over protein content, plant length, spike length, number of spikets per spike, length of uppermost internode, biomass and spike length. Due to these results, promising wheat landraces that are superior by their grain yield and yield components are chosen as genetic resources to be used in the following bread wheat breeding programs.

Key words: Lines of Bread Wheat Landraces, Çanakkale, Grain Yield, Yield Components

EVALUATION OF SOME QUALITY CHARACTERISTICS, YIELD AND YELLOW RUST DISEASE IN BREAD WHEAT ADVANCED LINES IN BREEDING PROGRAMS OF CENTRAL ANATOLIA REGION

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Abstract

The purpose of studies in bread wheat breeding highly efficient, high-quality, disease, especially the yellow rust resistant, cold-and drought-resistant varieties by developing country farmers and thus contribute to the country's economy. For this purpose, the selected 19 lines and 5 standard types of advanced breeding lines were grown in İkizce, Ulaş, Altınova, Gözlü, Malya locations in Central Anatolia. Material grain yield, thousand kernel weight, flour yield, protein content, zeleny sedimentation and in the terms of yellow rust disease were determined. According to the location average grain yield of 5, 11 lines have above trial average yield, 12 lines has above average yield of standard varieties, too. Depending on the changed locations high grain yield was obtained in Ulaş, while the lowest yield was obtained Altınova location. In terms of grain yield 2, 22, 20, 3, 5, 14, 24 ve 7 numbered lines had the highest values. In terms of grain quality characteristics (thousand grain weight, flour yield, grain protein content, zeleny sedimentation) 2, 3, 23 ve 7 lines, came to the fore. With regards to grain yield, quality characteristics and yellow rust resistance, 2 and 3 lines were found promising.

Key Words: Bread wheat breeding, grain yield, protein content, zeleny sedimentation, yellow rust (*Puccinia striiformis f.sp. tritici*)

BALKAN CEREALS GENETIC RESOURCES HERITAGE IN GLOBAL COLLECTION OF VAVILOV INSTITUTE OF PLANT INDUSTRY (VIR)

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Abstract

Collections of the N.I.Vavilov All-Russian Research Institute of Plant Industry (VIR) number over 325 thousand accessions of plant genetic resources which include both a widest range of cultivated crops and their wild relatives. It is the oldest in the world and the largest in Europe genebank. Since its initiation in 1894 in the form of the Bureau for Applied Botany, VIR has been closely cooperating with all European countries. The first accessions collected on the territory of Balkan countries date from the middle of 1920-s. The passport database of VIR collections (<http://vir.nw.ru/data/dbf.htm>) is available online and offers data on the most historically interesting crop accessions. For instance, collecting of genetic resources of wheat, rye, barley and oat was carried in the first half of the 20th century before WW2 in such Balkan countries as Turkey, Albania, Bulgaria, Greece and all countries from former Yugoslavia. Passport data on each accession contain information about the entity that collected the accession or handed it over to VIR and the time frame. This material is represented by landraces, primitive varieties and improved cultivars collected or created in the first half of the 20th century. All accessions of the above-mentioned crops display wide botanical and genetic diversity that covers a big number of forms possessing special importance for breeding purposes. Thereby this region is characterized as primary and secondary centers of origin and diversity of small cereal crops. Besides, the collections include breeding material from the mentioned countries (most of all from Bulgaria and Serbia, etc.) that was collected or otherwise included in the collections in the 1960's–80's. These accessions are represented by improved cultivars and breeding lines that feature a wide diversity of economically important traits. All accessions from the VIR collections have been studied under conditions of the Russian Federation for main direction of conventional breeding.

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BREAD-MAKING QUALITY POTENTIAL OF WHEAT (*Triticum aestivum* L.) VARIETIES GROWN IN AEGEAN REGION

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Abstract

There is a need for research efforts to study the quality potential of wheat varieties under the Mediterranean climate such as in the Aegean region. Wheat is cultivated about 9 million hectare in Turkey. Despite the extensive wheat cultivation in Turkey the locally produced wheat matches the standards of the food processing industry, thus high quality wheat has to be imported. Very high temperatures and water stress during and especially at the end of the grain filling period may have negative effects on grain quality. Many scenarios were suggested that more extreme temperatures at the end of the grain filling period of wheat will increase. In order to fill this gap, high quality wheat genotypes adapted to Aegean regions climate and soil conditions have to be determined. A major goal should also be a list of the varieties according to quality groups. The varieties can then be grown according the climate and soil characteristics, and after specific quality requirements. In this study we investigated quality parameters such as protein content, sedimentation volume, gluten content, gluten index, falling number, water absorption and amino acid content of different wheat varieties commonly grown in Aegean region to facilitate the selection of wheat varieties for the production of high quality wheat in the region and also to give some impulses to future breeding works.

Key words: wheat, bread-making quality, Mediterranean climate

**GENETIC VARIABILITY OBTAINED FROM MATURE EMBRYOS CULTURE OF DURUM WHEAT
(*TRITICUM DURUM* DESF.) SUBJECTED TO SALT STRESS**

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Abstract

Biotechnological approach and specially vitrovariation is an effective way of creating genetic variability for durum wheat necessary for plant breeding. *In vitro*, variability can be obtained by selection of salt tolerant vitroplantlets, when embryogenic calli are exposed to the pressure of salt stress. In this context, response to salinity was studied in two varieties of durum wheat (Razzek : improved variety and Jenah Khotifa JK : local variety) used in Tunisia. Salt stress was applied to eight weeks on the initiated calli in culture medium without NaCl. Regeneration was obtained in culture media enriched or non-salt (100 mmol l⁻¹NaCl) and was based on various parameters. The results obtained showed that JK variety is distinguished by a stable response for all parameters tested : average weight of callus (368.1 mg for control, 307mg under salt stress), callus regenerated percentage (36.6% for control and 35.7% under salt stress) and green shoots number /callus (17 for control and 17 under salt stress). This response stability of JK proved adaptive capacity of this variety to salinity. In order to fix regenerated JK plantlets in single generation and obtain HDs homozygous stable lines, *in vitro* gynogenesis technical was tested for this genotype. The Evaluation of gynogenetic capacity was focused on about 1200 unfertilized ovaries of JK and was based on its ability to induction, differentiation, development of green shoots, haploid plantlets regeneration and HDs production lines. JK showed a relatively good response to gynogenesis with a rate of regenerated lines HDs / total haploid plantlets of 60%.

GE BILOT ANALYSIS OF SOME LINES OF DURUM WHEAT STABILITY IN ALGERIA

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Abstract

This study evaluates the performance and stability of 17 durum wheat genotypes during three crop under wet conditions in the north (Algiers) and pivot crop cultivation in south (El- Goléa). This study showed very highly significant agro-morphological diversity of genotypes and genotype x environment interaction ($P < 0.001$) for yield. Analysis of coefficients of genetic variation reveals low genetic diversity for grain yield. The different methods used for the analysis of genotype x environment interaction are : study of slopes (b_i), deviation from regression (S^2_{di}), ecovalence (W_i), variance of Shukla (σ^2_i), heterogeneity of variance (% HV), incomplete correlations (%IC) and the GE biplot. Genotypes Ardente/Waha L₂, Ardente, Ardente/Waha L₁ and Saadi/Simeto L₃ have a strong instability (W_i , σ^2_i , % HV and % IC higher). Genotypes Simeto/Vitron L₅, Simeto and Ardente/Vitron L₁ have a high grain yield and average stability (W_i , σ^2_i , % HV and % IC low). The concept of GE biplot allows the decomposition of data matrices and rank genotypes according to their performance in different environments. Significant correlations were found between % HV, b_i , W_i , σ^2_i and %IC implying similarity in genotype and stable detection is equivalent to the extent of stability.

Key words: GEI, GE biplot, stability, *Triticum durum*

GENETIC AND PHENOTYPIC VARIABILITY OF GRAIN MASS PER SPIKE IN WHEAT UNDER DIFFERENT DOSE OF NITROGEN NUTRITION

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Abstract:

Variability of grain mass per spike was investigated in four wheat genotypes: G-3052, G-3625, G-3004 and G-3617, grown under application of four nitrogen nutrition treatments: 0, 30, 60 and 90kg N ha⁻¹ in field experiment during two years. The experiment was designed by randomised block system on plot 5m² in four replications. Obtained results indicate differences in average values of grain mass per spike among tested cultivars were determined in both years and under all variant of nitrogen fertilization. In average for all cultivars grain mass per spike was higher in the first year than in second year of experiment. In average the highest grain mass per spike expressed the wheat genotypes G-3625 in the first year (2.85g) as well as in the second experimental year (2.35g) while the least value of grain mass in the first year had G-3617 (2.20g) and in the second year G-3004 (1.94g). On average, for all genotypes, grain mass per spike increased by increasing nitrogen rate in both years, it mean that variability of grain mass per spike was affected by nitrogen nutrition. The genetic components of variance showed that environmental factor had the higher influence than genetic factor on the expression the grain mass per spike.

Key words: wheat, spike, grain mass, variability, nitrogen.

EFFECTS OF HARVESTING TIME ON NUTRITIONAL VALUE OF HYDROPONIC BARLEY PRODUCTION

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Abstract

In this study aimed that the effects of different harvesting times on the nutritional value of barley fodder producing in hydroponic system. Barley fodders were harvested on the 4th, 7th, 10th and 13th days following sowing date. Analysis performed for determining the chemical composition and organic matter digestibility (OMD) and ME content with *in vitro* gas production technique. It was determined that the DM content was decreased, the CP content was not changed significantly, cell wall contents (NDF, ADF, ADL) and ash content were increased by the maturation of the sprouts. In this study DM, ADF and ash contents were changed significantly ($P<0.05$). It was obtained that 96 hours cumulative gas production, OMD and ME contents were decreased by the increasing number of harvesting time but the variations were not significant ($P>0.05$). According to the results, suitable harvesting date was 7th day following the sowing in term of nutritional value of the fodder.

Key words: barley, hydroponics, *in vitro* gas production, harvest time

**EFFECT OF SOME CULTURAL TECHNIQUES ON DURUM WHEAT (*TRITICUM DURUM* DESF.)
YIELD AND ITS COMPONENTS IN SEMI-ARID HIGH ALTITUDE OF SETIF (ALGERIA).**

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Abstract

Three methods of installation of wheat (*Triticum durum* Desf) were studied. These methods are conventional tillage, minimum tillage and direct seeding. The try was installed at Dahel Nouari farm in Setif (Algeria). The durum wheat variety Bousselam was used. The experiment was conducted in a randomized complete block design with four replications. The variety was seeded in fifty row plots 20 m long with row spacing of 0.19 m within the plot. The seeding rate was 155 kg/ha. The results showed the superiority of conventional tillage for plants/m² (p<0.05), number of tillers/m² (p<0.01), number of ears/m² at heading (p<0.001), number of ears/m² at harvest (p<0.001), grain yield (p<0.01) and harvest index (p<0.05). Although the senescence of leaves is slower at the direct seeding, this trait was not sufficient to influence the grain filling.

DURUM WHEAT QUALITY EVALUATION ACCORDING TO REGIONS OF TURKEY

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ABSTRACT

The aim of this study was to assess the quality of durum wheat harvested in 2014 according to the regions of Turkey. Central Anatolia Region, Southeast Anatolia Region and Aegean Region cultivars were used as plant material in the study. Physical, chemical and rheological analyses were conducted. Quality determinations consisted of test weight (TW), thousand-grain weight (TKW), vitreousness, damaged kernels, suni-bug damaged kernels, protein content (%), moisture content (%), gluten quality tests such as wet gluten, gluten index, stretching and elastic properties of wet gluten using with glutograph E. Research was initiated to determine the usefulness of the glutopeak (GPT) as a test for gluten quality of durum wheat. The influence of location and its interaction on each quality test especially gluten quality which is the most important factor in pasta quality were studied. In this study 393 durum wheat samples from Southeast Anatolia Region, 334 durum wheat samples from Central Anatolia Region and 209 durum wheat samples from Aegean Region were evaluated. The average protein contents were measured according to Central Anatolia Region, Southeast Anatolia Region and Aegean Region as 14,74 %; 14,50% and 12,4% respectively, and the average of total gluten amounts were measured as 3,94 g; 3,55 g and 3,27 g respectively, and the average of gluten indexes were measured 16%; 47% and 20% respectively. The data which evaluated will be valuable for pasta producers and wheat breeders for improvements in their future consideration.

Key words: Durum wheat, Pasta, Quality, Gluten Quality, Glutograph E, Plutopeak, Gluten Index,

DEVELOPMENT OF ROOT LENGTH AND SECONDARY ROOT OF WHEAT AND BARLEY IN DIFFERENT GROWTH STAGES

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ABSTRACT

This study was conducted to determine of root length development at beginning of stem elongation (GS 31), anthesis completed (GS 69) and full grain maturity (GS 92) of wheat and barley grown under greenhouse conditions in 2011-1012 growing season. Two bread wheat (Gerek 79 and Konya 2002), two durum wheat (Kundurur 1149 and Çeşit 1252) and two barley (Karatay 94 and Larende) cultivars were used as material. Gerek 79, Kundurur 1149 and Karatay 94 cultivars adapted to dry land, however Konya 2002, Çeşit 1252 and Larende were grown in irrigated land. For this purpose, cylindrical PVC tube (200x12 cm diameter) were used. As root media, tubes were filled with 70% peat and 30% perlite and replaced to 15 cm of row space and intra row space. A plant was grown in each tube and research was designed in completely randomized block design with four replications. Routine agricultural practices were applied to plants. In the study, average root length of genotypes reached up to 216.6 cm for GS 31, 251.1 cm for GS 69 and 256.4 cm for GS 92. Barley had the highest root length followed by bread wheat and durum wheat at GS 31. Cultivars (Gerek 79, Kundurur 1149 and Karatay 94) bred for dry land, had longer root than those grown in irrigated land, which could be a significant trait for advancing drought tolerance at stem elongation stage. According to previous stage, root length increase was the highest for durum wheat followed by bread wheat and barley. However, root length increase at GS 92 was higher for durum wheat and barley cultivars grown in dry land than those grown in irrigated land. It differed from GS 31 that durum wheat had longest root than bread wheat and barley at GS 92. Average secondary root number increase of genotypes at GS 69 was 48.96% and the highest for barley with 82.95%. Secondary root number of genotypes grown in dry land was higher for bread wheat and barley at GS 31 and for bread wheat and durum wheat at GS 92. This research results showed that there were significant genotypic variations in root length and secondary root number of genotypes depending on different growth stages.

Key words: Wheat, barley, growth stage, root length, secondary root number

ROOT AND SHOOT GROWTH RATIO IN DIFFERENT GROWTH STAGES OF WHEAT AND BARLEY GROWN UNDER GREENHOUSE CONDITIONS

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ABSTRACT

This study was conducted to determine of root and shoot growth ratio at beginning of stem elongation (GS 31) and full grain maturity (GS 92) of wheat and barley grown under greenhouse conditions in 2011-1012 growing season. Two bread wheat (Gerek 79 and Konya 2002), two durum wheat (Kundurur 1149 and eřit 1252) and two barley (Karatay 94 and Larende) cultivars were used as material. Gerek 79, Kundurur 1149 and Karatay 94 cultivars adapted to dry land, however Konya 2002, eřit 1252 and Larende were grown in irrigated land. For this purpose, cylindrical PVC tube (200x12 cm diameter) were used. As root media, tubes were filled with 70% peat and 30% perlite and replaced to 15 cm of row space and intra row space. A plant was grown in each tube and research was designed in randomized complete block design with four replications. Routine agricultural practices were applied to plants. This research results showed that in stem elongation stage, durum wheat cultivar, Kundurur 1149 grown in dryland was found lower growth ratio for investigated all traits out of plant height than eřit 1252, while bread wheat, Gerek 79 grown in dryland was lower growth ratio for root dry weight and shoot dry weight. In the study, barley differed from wheat in terms of growth ratio. Karatay 94 grown in dry land was higher growth ratio for secondary root number, root dry weight and shoot dry weight. Average root and shoot growth ratio of wheat and barley were 47% for plant height, 86% for secondary root number, for 85.4% for root length, 96.5% root dry weight and 34.2% for shoot dry weight at GS 31. In conclusion, significant rate of plant root traits formed in GS 31 however that of shoot traits were between GS 31 and GS 92

Key words: Wheat, barley, growth stage, root, shoot, growth ratio

DURUM WHEAT BREEDING IN BULGARIA – TRADITIONS, ACHIVEMENTS AND CHALLENGES

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Abstract

Recent achievements of durum wheat breeding, conducted in Field Crops Institute (FCI), Chirpan – Bulgaria on the background of a short 90 year historical overview are reported. Genetic progress for yield and yield related traits for 6 contemporary Bulgarian varieties developed in IPK- Chirpan during the last decade in comparison with 6 old varieties, created in periods between 1963 –1998 years were studied during 2011-2013 in a field trial of randomized block design with four replications. The new varieties manifested genetic advance for yield and for nearly all yield related traits. The greatest increase was observed for grain yield (29%), thousand kernel weight (8,5 %), number of spikelets per spike (6,9 %) and kernels weight per spike (5.9 %). The contemporary varieties are characterized with better quality-stronger gluten, higher yellow pigment levels and improved pasta-making quality. Predel is a first variety of IPK – Chirpan possessed the marker gene γ -45 for good pasta quality. A survey of the utilized in the breeding program approaches, methods and techniques for: creation of genetic variation, optimization of the breeding process and evaluation of the breeding materials on biotic- and abiotic stress resistance and grain quality is presented. PC and cluster analysis are used successfully to evaluation of yield stability in different environments. The varieties Predel and Deni and new breeding lines D-7557, D-7877, M-6433, D-7724, M-334, M-398 are the most productive and stable genotypes, created resently. The results from utilizing of molecular and morpho-physiological approaches in durum wheat breeding program in IPK- Chirpan are reported and challenges are discussed. A collection of 12 durum wheat varieties and breeding lines was characterized with genomic microsatellites markers and relatively high level of genetic diversity was found. Thirty-three SSRs markers mapped on the A, B and D genomes and chromosomes of common wheat and three ISSRs markers were used successfully to assign the alien chromosomes introgressed in the durum wheat backcross lines obtained from interspecific hybridization. The unsolved problems and challenges faced by the Bulgarian durum wheat breeding are discussed.

Key words: durum wheat breeding, yield potential and stability, yield related traits, pasta-making quality, genetic diversity, molecular markers

**ECOLOGICAL FACTORS AFFECT ANATOMICAL AND MORPHOLOGICAL CHARACTERISTICS OF
CATABROSA P. BEAUV IN IRAN**

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Abstract

Catabrosa P.Beauv. is a genus of grass in the family Poaceae. There are only two or three species across the world. According to the Flora Iranica and Turkish Flora, *C. aquatica* (L.) P. Beauv and *C. capusii* Franch are known based on panicle width and panicle shape, respectively. During the study of different Flora such as, Flora Iranica, Turkish Flora, Flora of Iraq, Flora of Pakistan and Flora of Palestine it has been observed that what are known as determination key of species are some individual variable traits which are quantitatively and qualitatively variable due to environmental conditions. In addition, in above mentioned Flora, most of traits such as floret length, lemma length, panicle length and panicle width overlap with each other and make identification difficult or impossible. The results of anatomical studies of leaves (Evaluation of the cross sections of leaf) in different populations of each species and microscopic studies using scanning electron microscope and also study on leaf and lemma micrographs gave us some beneficial information and could present some taxonomic answers to resolve the ambiguities in species identification. Moreover, our results indicated that those traits, which are not affected by environmental conditions and exist in all populations permanently, should be considered as identification traits or diagnostic characters.

Key words: Iran, Taxonomy, *C. aquatica* (L.) P. Beauv, *C. capusii* Franch.

PHYSIOLOGICAL CHARACTERIZATION AND PRELIMINARY EVALUATION OF PROGENY OF COCKSFOOT UNDER MEDITERRANEAN CLIMATE

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ABSTRACT

The Mediterranean region is a transition zone between northern Africa and central Europe where the weather is mild and wet during the winter and hot and dry in the summer. For forage plants growing in that areas subject to prolonged and severe summer drought, the most important agronomic characteristic is not the capability of tolerance against drought as known, it is the ability to survive in summer, then to recover in autumn, and then to grow actively during the rainy seasons too. However, one of the strongest drought survival traits is summer dormancy which plants that give either nil or minimal growth after rainfall or irrigation in summer. Summer dormancy is an adaptive response defined as an endogenously controlled and coupled series of processes, dormancy comprises the cessation of leaf growth and senescence of herbage expressed under non limiting water conditions in summer and it is a very effective adaptation to drought which has been observed in cocksfoot. Nevertheless, summer dormancy in cocksfoot is associated with low vegetative productivity. Our study is covered on characterization of progeny generated between a summer dormant genotype from the variety Kasbah (*Dactylis glomerata* ssp *hispanica*) and a summer active genotype from the variety Medly (*Dactylis glomerata* ssp *glomerata*) under Mediterranean climate, aimed to find some hybrids with a good level of production and to range of dormancy.

Key words: Cocksfoot, hybrids, senescence, summer dormancy, plant height, biomass production.

**A NEW CROP FOR SALT AFFECTED AND DRY AGRICULTURAL AREAS OF TURKEY: QUINOA
(*Chenopodium quinoa* Willd)**

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ABSTRACT

Drought and salinity are two widespread environmental problems induced by climate change and improper applications in agriculture and have important adverse effects on agricultural production. To sustain crop production in such areas for food security, cultivating new crops which can growth under these unfavorable conditions is one of the measures. Quinoa (*Chenopodium quinoa* Willd) is an annual grain plant originated from the Andean region of South America. This plant has potential to be an alternative crop for arid and salt affected agricultural lands or poor soils with its ability to tolerate various abiotic stress factors and adaptability to different environmental conditions. Its high gluten free nutritional component is another characteristic that makes quinoa an important crop for human diets. In recent years, many researches on quinoa have been carried out all around the world and also in Turkey. In this study quinoa was introduced as a new crop for Turkey and cultivation possibilities of quinoa in arid and salt affected areas of the country was evaluated in the light of the research carried out in Çukurova University between the years of 2009 and 2012. According to this research results quinoa could cope with high salinity in the root zone up to 40 dS m⁻¹ of electrical conductivity of irrigation water, which many other crops couldn't tolerate this salinity level. In conclusion, quinoa may suggest as an alternative crop for marginal agricultural areas thanks to its stress tolerant characteristic, adaptability to different agro-environmental conditions with its various cultivars can growth from sea level to highlands, nutritional component and economic value.

Key words: Quinoa, drought and salinity stress, irrigation water quality, deficit irrigation.

INTRODUCING NEW SPECIES AND SUB-SPECIES OF SOME GENUS OF GRASS IN POACEAE FAMILY AND VALUATION OF THEIR TAXONOMIC CHANGES

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Abstract

Iran is one of the most important regions for being unique in terms of diversity and speciation process of plants due to different climates. Plants belonging to Poaceae family are spread in Iran and due to the wide diversity and structural complexities make many taxonomic problems. Flora Iranica provides a description of the genera and identification keys for species, however; because of variability of morphological traits and intermediate traits there is some ambiguities in positions of taxa. Therefore, we studied taxonomic changes on some genus in Poaceae family. After sampling, morphological investigations such as anatomical studies of leaves, micro-morphological studies of abaxial surface of leaves, lemma and gluma, abaxial surface of leaves and gluma and lemma were performed. Additionally, inter-species taxonomic distances and inter-genus borders were determined. *Puccinellia* Parl has nine species in Iran. According to the results, a new species namely *P. dolicholepis* (V. Krecz.) V. Krecz is introduced to Flora of Iran. In Flora Iranica, four species of *Colpodium* Trin. genus are named which are reduced to two species in this study. In other words, taxonomic positions of *C. violaceum* (Boiss.) Griseb. and *C. versicolor* (Stev.) Schmalh are preserved whereas *C. parviflorum* Boiss. and *C. humile* (M.B.) Griseb. were transferred to *Catabrosella* Tzvel.(Tzvel.) genus and introduced as *Catabrosella parviflora* (Boiss. and Buhs.) Alex. ex Mill., Comb. Nov species, and *C. humilissubsp. Humilis* sub-species. Furthermore, (Boiss.) Tzvel.*C. humilis* subsp. *Calvertii* sub-species, is reported for the first time in Iran. Thus, *Catabrosella* Tzvel.(Tzvel.) genus has two species and sub-species in Iran.

Key words: Iran, Taxonomy, Morphology, Micro-morphology, Anatomy

MULTIDISCIPLINARY APPROACH TO STUDY THE VARIABILITY OF *STIPA TENACISSIMA* IN ALGERIA

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Abstract

Alfa (*Stipa tenacissima* L.), perennial tussock grass widely distributed in semi-arid ecosystems of the Mediterranean basin, has an important ecological, economical and social roles. Due to the geographic isolation and the fragmented distribution of the populations of this species within its range of distribution, many differences appear at the phenotypic level. The objective of this study is to assess the variability at the morphological, karyological and molecular levels among many populations from different origins in relation to the ecological variables related to their origins. Phenotypic variability analysis conducted on different vegetative and reproductive traits revealed high inter- and intra-population variation. Some traits were most discriminant than others. The karyological study allowed us to identify two groups of populations based on their level of ploidy, the diploid group brings together 14 populations however the second group meets only 03 hexaploid populations. Significant correlation was found between longitude and the ploidy level. Separation among populations assessed at these previous levels was confirmed by the use of ISSR molecular markers which allowed a significant differentiation. The 12 primers used in PCR to amplify the DNA of every individual of all 170 collected were found polymorphic. A total of 214 reproducible bands of which 212 were polymorphic amplified. The use of these ISSR bands in UPGMA statistical analysis showed a wide genetic diversity among and within the studied populations.

Keyword

Stipa tenacissima, trait, phenotype, Karyotype, ISSR, variability, Algeria.

THE CHANGE OF CONTENTS OF SOME MACRO AND MICRONUTRIENTS OF HERBS ON GRAZING AND ABANDONED AND DRIVEN TO ABANDONED NATURAL RANGELANDS

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Abstract

This research was carried out on protected and grazing and driven to abandoned pastures in Karahisar village in the province of Tekirdağ in 2010 and 2011 years. The measurements were taken on four line in each of four designated sampling areas on the pastures. The Herb samples were taken on 16 different points on 16 line between 30 March and 15 July at 15-days intervals. According to average of the two years, during the period of green fodder in the spring, mineral element concentrations (N, P, K, Ca, Mg, Fe, Cu Zn, Mn) were found in herbage samples collected from grasslands as 1.750%, 0,123%, 1,347%, 0.682% , 0,604% , 0,146%,10.93%, 268,04 ppm, 6,77 ppm, 20,76 ppm, 40,01 ppm on protected pastures, 1.510%, 0.115%, 1.337%, 0.604% ve 0.159%, 320,99 ppm, 6,87 ppm, 25,79 ppm, 58,64 ppm on grazing pastures and 1.71%, 0,164%, 1,378%, 0.759% ve 0,161%, 217,87 ppm, 7,39 ppm, 17.0 ppm, 55,59 ppm on driven to abandoned pastures, respectively. The changes of all the elements in sampling time of pastures is a significant (P <0.05). In general on pastures, the changes process of elements in the period of spring forage has been different in each of the pasture.

Key words: Pastures, nutrient contents, ADF ve NDF macronutrient, micronutrient, nonnutrients

USAGE OF FLOW CYTOMETRY IN CHARACTERIZATION OF GRASS GERMPLASM COLLECTIONS

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Abstract

Grass species are very similar to each other morphologically. They may hybridize with each other in the nature and create hybrids. They also show natural variation. Therefore, identification of the grasses and their taxonomy are quite complicated, and need a serious expertise. In addition to this, ploidy is also a well known phenomenon in grasses and chromosome number varies even within the same species due to polyploidy. Therefore, it is necessary to identify species included in the grass germplasm collections and determine their ploidy correctly prior using them in plant genetics and breeding programs. Otherwise, it will cause loss of time, money and energy of researchers due to unexpected results, incompatibility and sterility. In recent years, flow cytometry has become the preferred technique in characterization of both gene bank materials and newly collected germplasm mainly because of its ease, quickness, and accuracy. The presentation will include results of some of our research projects carried out in Namık Kemal University, Tekirdag, Turkey.

Key words: germplasm, flow cytometry, nuclear DNA content, ploidy, taxonomy,

5- FOOD SCIENCE

FOOD-BORNE DISEASES AND PREVENTION IN GEORGIA

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Food-borne diseases have enormous impacts on the health and livelihoods of people in Georgia and are of great concern to consumers, Producer Farmers and policymakers. The most risky food chains are animal source foods and fresh vegetables contaminated with human or animal waste, and these are a major focus of the program. Another focus is the impact of fungal toxins on livestock and on the people who eat livestock products. Mycotoxins are produced by fungi which infest staple crops in tropical countries and which have human health, trade and livestock sector impacts. Mycotoxins, such as aflatoxin, are toxins found in food that can cause illness and be lethal in high doses. Aflatoxin is a type of mycotoxin produced by *Aspergillus* molds. Aflatoxin is probably the most well known mycotoxin, besides trichothecene, and the most researched. This is because aflatoxins are very toxic and highly carcinogenic. There are three main types of aflatoxin mycotoxins: Aflatoxins B: This group includes aflatoxin B1 and B2, Aflatoxin B1 is the most common aflatoxin, as well as the most toxic and carcinogenic, Aflatoxins G: This group includes aflatoxin G1 and aflatoxin G2, Aflatoxins M: This group includes aflatoxins M1 and M2. These aflatoxins are metabolic products which are found in the urine and milk produced by animals which have been given feed with aflatoxins in it. These toxins are formed by strains of moulds that infest susceptible grains such as maize and sorghum. Dairy cows that eat contaminated feed can yield contaminated milk. Aflatoxins are a group of about 20 chemically related toxic chemicals produced primarily by the foodborne mold *Aspergillus flavus* and *A. parasiticus*. Aflatoxins contaminate a variety of staple foods including maize, peanuts, and tree nuts; they cause an array of acute and chronic human health disorders. Aflatoxin B1, the most toxic of the aflatoxins, is a potent liver carcinogen, causing hepatocellular carcinoma (HCC) in humans and a variety of animal species. There is also an increasing body of evidence that aflatoxins modulate the immune system and may lead to stunted growth in children. Aflatoxins have received greater attention than any other mycotoxins because of their demonstrated potent carcinogenic effect in susceptible laboratory animals and their acute toxicological effects in humans. As it is realized that absolute safety is never achieved, many countries have attempted to limit exposure to aflatoxins by imposing regulatory limits on commodities intended for use as food and feed. That mycotoxins suppress the immune system and affect the normal functioning of major organs including the rumen, intestinal tract, liver, kidneys, reproductive system, nervous system, etc. is well documented. Down on the dairy farm, the incidence of diseases such as displaced abomasum, ketosis, retained placenta, metritis, mastitis and fatty livers increases with mycotoxin exposure. Mycotoxin induced diseases seldom respond if at all to veterinary therapy and result in increasing losses if only veterinary solutions are pursued. Furthermore, ration adjustments and management changes (grouping, cow movement, stalls allotment, etc.) are of little value although they may be a factor in predisposition to mycotoxicoses. Initially, mycotoxins, such as aflatoxins and trichothecenes, act on the immune system (number of macrophages, lymphocytes and erythrocytes) reducing the animal's response to challenges. The presence of mycotoxins in feed can hit all animal producers hard. Loss of productivity, and sometimes loss of the finished product can result from feeding grains with high levels of mycotoxins. Among the most affected species are high producing dairy cattle. The importance of quality feedstuffs to producers can mean the difference between profit and loss.

DUAL EXPRESSION OF LABELED RECOMBINANT THERMOSTABLE ALPHA AND BETA AMYLASE ENZYMES

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Abstract

Thermostable α and β amylase enzymes have been used widely in starch industry and other many fields such as feed, food, paper, textile, leather and detergent manufacturing. These enzymes are produced in little amounts for industrial usage by many hyperthermophilic microorganisms. In this study, thermostable α and β amylase genes were transferred to pET-Duet-1 expression vector, having two different cloning sites. Recombinant plasmids were transformed in mesophile *Escherichia coli* BL21 competent cells by electroporation. Genomic DNA of *Bacillus stearothermophilus* DSM 22 strain for α amylase and, *Thermoanaerobacterium (Clostridium) thermosulfurogenes* DSM 2229 strain for β amylase were used as gene sources. Both expressed recombinant enzymes were purified by MagneHis™ Protein Purification System kit and were analyzed by SDS-PAGE and western blot methods. The recombinant α and β amylase enzymes were more produced by IPTG induction and the denaturation temperature of both enzymes were determined. Studies on dual-expression of both enzymes at the same vector are still in progress.

Key Words: α amylase, β amylase, gene transfer, gene expression

DETERMINING THE LEVEL of FOOD SAFETY CONSCIOUSNESS of THE HOUSEHOLDS in GIRESun PROVINCE of TURKEY

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Abstract

Nutrition and healthy life, which are the some of the most basic needs of human beings, are possible with food safety. The emergence of new illnesses in the world emphasizes the importance of food safety. Foodborne illnesses cause negative effects on human health in both developed and developing countries. The objective of food safety in the narrowest sense is to prevent products from giving harm to consumers and giving biological, physical and chemical harm to the environment. Food safety is related to the inclusion of foodborne illnesses in the time of food consumption or use by consumers. In other words, food safety is the conformity of food for consumption and protection of consumers against foodborne health risks. The perspectives on food safety of different genders selected from the households in the city center of Giresun through the appropriate sampling method were included in this study. The socio-demographics and enterprise data were included, membership to European Union, which is an important process for the agriculture sector, was discussed, some basic perceptions of the cases which may threaten food safety were presented. Accordingly, average household size, average duration of education, customers' perceptions of food safety were included. Conventionality in the families participating in the research and what kind of differences are effective on the change of habits were studied. The main purpose of the study is to reveal the level of awareness of the households about food safety and quality and to present their perception of food safety and healthy nutrition as customers. The study includes the results collected from the household from the central district of Giresun Province by conducting a questionnaire.

Key Word: Food Safety, household, nutrition, Giresun

FOOD WASTE POLICY DEVELOPMENT IN SERBIA: PRELIMINARY OBSERVATIONS FROM HOUSEHOLDS ATTITUDE IN VRSAC MUNICIPALITY

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Abstract

Over the past decades the topic of wasted food in European Union (EU) received considerable attention of international organizations, government and non-governmental agencies, academic and other relevant institutions that have been involved in defining the policy and creating the system of successful waste reductions. Current policy actions to encourage the reduction of food waste in households as well as the theoretical and empirical research related to the assessment of the total amount of food waste do not exist in the Republic of Serbia. The paper aims at analysing the social and psychological behavioural determinants, intentions and actions related to food waste management practices in the households, and also at reducing food waste. The paper includes both secondary and primary data. A field research based on a questionnaire survey was carried out in the first half of 2013 with 100 respondents from different socio-economic structures in the municipality of Vrsac. The obtained results indicate different patterns of everyday behaviour of households in the Vrsac municipality. Taking into considerations research results of the households' attitude toward food waste, it is clearly noted that, even in pre-modern societies, the individual is still not ready to make radical changes in their everyday food management. Even if the results of this research, limited to the geographical area of the municipality of Vrsac, indicate the factors of food waste generation in households, these results do not represent the general attitude of the local population.

Key words: *food waste, policy development, household, behaviour, management.*

INVESTIGATION OF FOULING MECHANISM OF COMMERCIAL MICROFILTRATION MEMBRANES IN WHEY PROCESSING

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Abstract

In dairy industry, the membrane separation processes are especially used to avoid environmental problems resulting from removal of whey without any pretreatment. However, the application area of the membrane separation processes is limited due to natural chemical structure of whey that tends to foul the polymeric membrane surfaces during separation processes. It lowers the permeate flux and decreases the efficiency of the membrane. The investigation of fouling characteristics in any processes is a crucial factor for economy. In this study, membrane fouling performance of a polyethersulfone (PES) microfiltration (MF) membrane which is used to separate colloidal particles from whey has been investigated. MF of whey was performed using a laboratory pilot unit equipped with a flat sheet membrane module and the membrane fouling, expressed as a percentage drop in the water permeability, was estimated by measuring the water flux before and after the MF treatment and after the cleaning procedures. Permeate flux was measured in fixed conditions of temperature (25 °C) and axial feed flow rate (210 l/h) at different transmembrane pressures (2.76 bar- 4 bar). The fouling resistance contributes to 88.50% of the total resistance at 2.76 bar, while this ratio reduced 59.9% at 4 bar. A good restore of the hydraulic permeability of the membrane (about 98% of the initial one) was observed after alkaline cleaning at 4 bar. To minimize the fouling resistance could be used different operating conditions (namely transmembrane pressure, fluid velocity and temperature) and alternative methods. Improvement of the performances of the MF processes via gas plasma technology is still under investigation.

Key words: Whey, microfiltration, transmembrane pressure, flux

AN ASPECT OF FOOD SAFETY, ENVIRONMENT POLLUTION AND AGRICULTURE CONTAMINATION WITH SUPPLYING ENERGY SOURCES

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ABSTRACT

The civilization should have been started with exploring agriculture by applying agriculture and establishing villages by living in the same place. Human is the most important factor for every negative effect to nature. The environment pollution occurs in the air, soil and water principally. The human being is the biggest pollutant all over the world. Energy supply especially fossil fuels, some of agricultures practices like using pesticides, unprocessed kinds of wastes, and deficiency in infrastructure etc are the main factors in pollution and when examined in detail, each of pollutant factors affect and impend food safety and human health. On the other hand, developing and increasing numbers of industry investments and kinds of technologies, increasing of world population, destruction of forests and erosion events, create the environment problems. The aim of the article to explain food safety with before described environmental factors. It is well known that air pollution is the very big problems; especially an half burned fossil fuels led to important food safety and health problems. Polycyclic hydrocarbons (PAHs) are almost 104 compounds and important number of them cause to cancer. On The other hand renewable energy sources must be evaluated all over the world, it is known very common idea also all of the development countries must be adapted international agreements and regulations about stopping or decreasing emissions and using fossil fuels. The water pollution is harmful the agricultural products and creates hazard to food safety and human life. It reviewed mentioned topic in detail.

EFFECTS OF USING LIPASE AND CULTURE ON GOAT CHEESE

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Abstract

The objective of this study was to investigate the effects of using lipases and adjunct culture on goat cheese. For this purpose, physico-chemical, sensory properties and volatile compounds of goat cheeses were compared during 90 days at cold storage. Cheese samples were named as Control (K), Capalase® K containing (C), Italase® C containing (I) and adjunct culture added (M). Characteristic sensory descriptors were generated by seven trained panelists by using descriptive sensory analysis. Volatile compounds in the cheeses were analyzed by gas chromatography mass spectrometry during storage. Total acidity (%) and nitrogen fractions increased in the cheeses during storage. Hydrolytic rancidity was higher in enzyme used cheeses than control and cheese with adjunct culture. Total 30 volatile compounds were determined on days 1 and 90 of storage. Ethyl butyrate, ethyl hexanoate, dodecanoic acid and ethyl dodecanoate were determined in the cheese samples on day 90. In addition, 3-methyl butanoic, pentanoic, heptanoic and nonanoic acids were detected in only enzyme used samples on day 90. Cooked, creamy, whey, sulfur, rancid, wet towel/dust/cement and goaty aromas were the characteristic descriptors developed by the trained panelists. Specifically, intensity of rancid aroma was higher in samples C and I than others at the end of storage.

Key words: Goat Cheese, Lipases, Volatile Compound, Descriptive Sensory Evaluation.

DEFINING EFFECTING FACTORS ON PREFERRED PRACTICES INTENDED FOR REDUCTION OF AFLATOXIN OCCURRING IN DRIED FIG FIRMS

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Although Turkey is a major country in dried fig production, and also domestic and foreign marketing in the world, aflatoxin is still one of the most important problems in this sub-sector in the country. 70-75% of Turkey's dried fig products come from Aydin region alone. Thus, data were gathered from 85 dried fig firms' managers via the interviews by using face-to-face questionnaires designed during 2012-2013 period. The nine practices intended for detractive effect on aflatoxin occurring are focused in the firms. These are: i) having quality safety system, ii) establishing a laboratory, iii) be made aflatoxin analysis in the firm, iv) be made moisture analysis in the firm, v) be employed laboratory personnel, vi) establishing UV dark-room, vii) be performed aflatoxin analysis via nail, viii) be paid attention to well-qualified workmanship within UV dark-room, ix) be employed food engineer. These parameters are used as dependent variables in binary and ordered logit models considering some characteristics. And also the firm managers' education level and experience periods, be exported to the European Union (EU) countries, working times in the firms are used as independent variables in the models. According to the binary and ordered logit models in general, while the firm managers' experience and working times in a year in the firms could increase, and also could be developed circumstance exporting facilities to the EU countries, it is defined that the firm managers would prefer to implement much more practices that have reducing effect on aflatoxin formation.

Key words: Aflatoxin, Dried Fig, European Union, Logit Models, Socio-Economic Characteristics

THE USAGE OF SUNFLOWER MEAL AS A PROTEIN SOURCE

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Sunflower is generally used in animal nutrition today. However, oilseed meals include materials as glycosides, which prevent to the absorption of the other nutrients. Thus it has limited usage in feeding for both poultry and ruminants. On the other hand, it is a product that should be evaluated in its entirety because it is an important waste of oil industry, rich protein resource and has high economic value. Besides, the meal does not contain toxic residues and its proteins have high nutritional value. Therefore it is an attractive source for protein supplement can be used for human nutrition. It is known that humans and children are faced with some diseases in undeveloped and underdeveloped regions in the world due to failure to obtain adequate protein. Taken directly protein from natural foods as well as the consumption of protein isolates obtained from various sources is becoming increasingly important in order to overcome the lack of protein and prevent these diseases. Although fish is one of the most widely used source of protein isolate, its fresh consumption is important and has high economic value. Therefore evaluation of alternative vegetable sources has essential importance. Sunflower proteins have balanced amino acid composition and many of them have low lysine content but they are rich in sulphur-containing amino acids of which plant protein sources are often poor. Also, sunflower meal has adequate amount essential amino acids. These properties add value to the protein obtained from sunflower. Another reason for usage of sunflower proteins as protein supplement for human nutrition is due to its digestible nature. The digestion properties of meal proteins positively affected from amino acid and phosphorus but fiber and carbohydrate content are adversely affected. For all these reasons, extraction conditions must be prepared under optimum conditions. In the literature, the main factors affecting these required criteria were defined as pH, concentration, temperature, treatment time and sodium chloride impact.

Key Words: Isolates, meal, protein, sunflower.

SENSORY EVALUATION, PHYSICOCHEMICAL PROPERTIES OF FERMENTED RED GRAPE BEVERAGES, “HARDALIYE”

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“Hardaliye” is a fermented beverage produced by red grapes and it is the most important traditional product in Thrace region. However, there are some questions about processing and quality characteristics of Hardaliye. The objective of this research was determination of some physicochemical properties and the sensory evaluation of “Hardaliye”. For this purpose, Hardaliye was produced by red grapes are called as “papazkarası” from Kırklareli region and it was stored in glass bottle for 2 months at +4 °C and 20 °C. Physicochemical properties (total monomeric anthocyanins, polymeric color content, total polyphenols, antioxidant activity, pH, total acidity, color properties) were determined for each 15 days during storage. Total phenolic content was analyzed by using the Folin-Ciocalteu method, and the amount of total monomeric anthocyanins was determined by using the pH-differential method. Antioxidant activity was analyzed by ABTS method and the results were expressed as “TEAC” (trolox equivalent antioxidant capacity). Color distribution properties were again determined by spectrophotometrically. Besides, sensory evaluation was performed for the first and the last months in storage. Sensory evaluation is a critical process for fermented product quality and consumer research. In Abstract, it was aimed with this project to be carried into the production of a beverage with industrial size and standard quality. Also, it can be served safely domestic and foreign markets are to be achieved.

Key words: Antioxidant, beverage, color, grape, hardaliye, sensory.

6 – HORTICULTURAL SCIENCE

PHYSIOLOGICAL ROLE OF HUMIC ACID AND BORON ON OLIVE FRUIT QUALITY

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ABSTRACT

This research was conducted during 2012 season in a private orchard (22) km, north east Mosul city north of Iraq , to study the effect of adding three concentrations 0 , 2 &4gr./l of humic acid (pow humus) to soil and foliar spray of three concentrations 0 ,40 &80 ml.gr/l of boron element on some quality parameters(F. carbohydrate,F.dry wt.,F. anthocyanin content ,Foil percentage, F. shrivel percentage) of olive fruit (*Olea europaea* L.) Cv. Bashiky, all experimental unit (trees) were selected almost at same size and growth vigor. So the experiment included six treatments with three replicates by using a randomized complete block design .Results obtained indicated that both factors (humic acid and boron element) improve most olive fruit quality parameters. Adding humic acid as pow humus at 4gr./l caused a significant increase in F. carbohydrate and F. dry wt. content, a significant increasment recorded in fruit content of anthocyanine pigment and F. Oil percentage by application of both concentrations of pow humus .Data shows that, only low concentration of boron (40 ml.g./l)caused a significant increasement in F.carbohydrate content while the high concentration of boron significantly increased F. oil percentage which reached to 14.44 .

Key words: Olive, Humic acid, Pow humus, Boron

SITUATION OF OLIVE CULTIVATION IN THE MOTHERLAND

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Abstract

Olive which homeland known as Upper Mesopotamia involving Hatay-Kahramanmaras-Mardin triangle, was began to grown in Anatolia about six thousand years ago, spreaded out from here to other Mediterranean countries and all over the world, have affected all of humanity and was considered sacred to in various religion. About 98% of world olive production is carried out by the Mediterranean countries. Turkey, ranks 4th in the ranking of world production. Cultivation of olive constitutes one of the main sources of income in the Southeastern Anatolia Region. Olive growing which besides being a source of livelihood, has a different importance as a green cover of erosion zones which are pronely and soil depth is less. In this study, current situation of olive growing will be discussed in the Southeastern Anatolia region meets approximately 5% of Turkey's olive production.

Key words: Southeastern Anatolia Region, Olive

ADAPTATION OF OLIVE TREE (*OLEA EUROPEA* L.) IN ALGERIAN SEMI ARID REGION

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Abstract

The olive tree (*Olea europea* L.) is the most important species in Algeria, Its cultivation is concentrated in the mountainous regions and rugged terrain where the climate is favorable to a large production of olives and oil. In 2000, olive tree was introduced largely in semi-arid and arid regions, where the environmental stress (or abiotic), such as drought require the adaptation of plants to these conditions through the development of mechanisms to survival. In this context we tried to study the adaptation of the olive tree to the conditions of the region M'sila and identify phenological characters, morpho-physiological and biochemical involved in tolerance to drought through different ages of the plant. The study was conducted in the region of M'sila. The olive plants used for this study were grown from seeds of the variety Chemlal aged 4, 6, 9 and 14 years, planted in 2009, 2007, 2004 and 1999. Studied growth stages are budding, flowering (% Number of open flowers/Total Number of unbroken buds flowers) and fruit set (% Number of fruit set total number of open flowers x100). Morphological characters are height, perimeter trees and height / diameter ratio. The biochemical and physiological parameters were related to the proline content and soluble sugars and relative water content. The results obtained allowed to deduce that the olives used the same response strategy in the middle but with different frequencies according to age. Morphological adaptation olive considered drought resistant result of an accumulation of solutes (soluble sugars, proline). Young subjects seem to be very sensitive to the environment.

Key words: Olive, age, semi-arid, phenology, soluble sugars, proline, relative water content.

CLADODE BIOCHEMICAL CHARACTERIZATION OF MOROCCAN CACTUS PEAR (*OPUNTIA SPP*) SPECIES

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Abstract

In Morocco, the prickly pear (*Opuntia spp*) has a remarkable phenotypic variability by agro-ecological areas. Different species and accessions of cactus were identified and collected from different geographical areas. This study was conducted to investigate the effects of accession origin and species belonging on some biochemical traits of the cladode such as crude proteins, total sugar and ash contents. A total number of 126 cactus accessions belonging to seven species were sampled from the experimental cactus orchard of INRA (Institut National de la Recherche Agronomique), located in the semi arid area of Chaouia plain of Morocco. After harvesting and 60°C oven drying, we proceeded to biochemical analysis of each sample. The protein content was measured by the Kjeldahl method, the total sugar content measured by the Dubois et al.,(1956) method, and total mineral (ash) content by incineration. Concerning the distribution among ecotypes within species we found that for *O. ficus indica* (86 accessions) CP varied from 4.38 to 14.37%; *O. Megacantha slam dyck* (38 accessions) CP varied from 4.99 to 14.18%; *O. aequatorialis Briton & Rose* ecotype to 9.1%; *O. dillenii* ecotype 7.53%; *O. leucotricha* (4 accessions) 5.78 to 14.37%. In terms of total sugars (TS) content varied between 4.75% for *Opuntia robusta Wendland*, up 8.7% from *Opuntia Inermis*. Concerning *O. ficus indica* TS varied from 2.58 to 14.5%; *O. Megacantha slam dyck* (3.14 to 11.85%); *O. aequatorialis Briton & Rose* ecotype to 3.22%; *O. dillenii* ecotype 5.39 %; *O. leucotricha* (3.55 to 12.51%). As against, the mineral material (MM) to vary in *Opuntia dillenii* ecotype 14.17%, 18.73% up in the species *Opuntia aequatorialis Briton & Rose* ecotype. *Opuntia robusta Wendland* 16.95%; *O. inermis* 16.48%; *O. leucotricha* (13.69 to 20.89 %); *O. ficus indica* 10.59 to 24.11%; *O. Megacantha slam dyck* 12.05 to 23.11%. In conclusion, high variability for measured biochemical traits exist between and within different Moroccan *Opuntia* species confirming therefore the possibilities of their use as a human vegetable food and/or as animal fodder.

Key words: *Opuntia spp*, sugar, protein, mineral, snowshoeing.

CONTRIBUTION TO THE QUANTITATIVE AND QUALITATIVE STUDY OF SEED STORAGE PROTEINS OF *ARGANIA SPINOSA* L. SKEELS

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Abstract

The Argan tree is an endemic species in Algeria, in the south west of the country. The aim of this study is to identify seed storage proteins. This brought on a comparative study between two regions in the north and the south of the country (Mostaganem and Tindouf), a quantitative approach to the measurement of protein content by spectrophotometer and another qualitative technique which is the electrophoresis under denaturing conditions. These techniques allowed us to define that content of total seed protein is 2.96 $\mu\text{g} / \mu\text{l}$ per gr of seed. However, protein content in the seed of Mostaganem is higher than in Tindouf , we noted 6.23 $\mu\text{g} / \mu\text{l}$ against 4.16 $\mu\text{g} / \mu\text{l}$ in endosperm and 6.16 $\mu\text{g} / \mu\text{l}$ against 4.73 $\mu\text{g} / \mu\text{l}$ in the embryo. Results obtained by the SDS PAGE demonstrated the presence of a set of proteins whose molecular weight is 127-114 - 100 - 90-76 - 68-51 - 39-17 and 14 KDa. Thus, we have detected a very significant difference between the profile of the endosperm and the embryo, we noted the presence of two distinct protein bands only in the endosperm at the level of the two stations and absent in the embryo which the molecular weight is 51 and 23.91 kDa. However, no difference was marked between the profile of seeds Mostaganem and Tindouf. These results are a contribution to the detection of the existing variability in this species that can be represented by the seed storage proteins as a source of variability.

Key words: protéines, arganier, grains, embryon, albumen, SDS PAGE.

NUCELLUS DEFORMATION İN SWEET CHERRY PRİMARY OVULES AT ANTHESIS

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Abstract

Low yield is the main problem in many sweet cherry growing areas. Yield occurs with effective fruit set under favourable conditions. Development of floral organs at anthesis must be completed to realize sweet cherry fruit set. Especially, developmental stage of sweet cherry ovules at anthesis is related with fruit set. In this study, nucellus of primary ovules at anthesis was studied for two consecutive years (2009-2010) in '0900 Ziraat' sweet cherry variety and its clones (4503, 4218, 3501, 3503 and 3201) grafted on Gisela 5 and Mazzard seedlings rootstocks. Nucellus not completed in the interior of integuments was observed at anthesis stage. It was found that there was a statistically significant difference between the nucellus deformations of '0900 Ziraat' and that of its clones. In addition, rootstocks were found to be partially effective on nucellus deformations.

Key words: Sweet cherry, primary ovule, nucellus, deformation

THE NUTRITIONAL VALUE OF WALNUT

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Abstract

Walnut is a fruit that keeps the essential foods largely that people need to have healthy nourishment. Because, like other hard shell fruits, walnut, in fact is a seed and all seeds are highly rich with regard to nutrient they contain. Thus, consuming a handful of raw walnut a day largely provides the proteins, fat, antioxidant, some vitamins and minerals that a person needs a day. That's why we have to take into consideration walnut as an enriched food in terms of useful substances for health. Especially, walnut is a rich source in terms of Omega 3 which is useful for a regular health. Walnut contains many healthy food substances, minerals, antioxidants and vitamins. These are essential for our health system.

Key Words: walnut, heart health, vitamin, antioxidant, Omega 3

THE EFFECTS OF CUTTING TIME OF THE ROOTSTOCK'S TOP ON GRAFT SUCCESS IN WALNUT

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Abstract

The biggest problem in walnut production of Turkey is using of unfruitfulness trees. There is an increasing demand on grafting of these unfruitfulness trees to best cultivars. But grafting methods and periods, location, the cutting time of the rootstock's top before grafting and the applications made after grafting affect the graft success on walnut. In this study, the effects the cutting time (60 and 20 days) of the rootstock's top before grafting on graft success and shoot growth were examined. On the other hand rootstocks were divided to the three groups with respect to their thickness. Also the effect of the rootstocks thickness to graft success and shoot growth were examined. The study was carried out in Samsun in 2011-2012. Graft success was determined as sprouting ratio of graft scion two months after grafting. On the other hand, length and diameter of graft scion shoots, number of internodes per shoot, the distances of internodes, sugar, starch and carbohydrate (mg/L) contents of shoots were investigated after vegetation period. The cutting time of the rootstock's top affected the graft success, the distance of internodes, sugar, starch and carbohydrate (mg/L) contents of sprouts statistically. In the study, highest graft sprouting ratio was 92, 7 % on thick rootstocks which cut off in early period (60 days before grafting). Time of cutting the top of the rootstock did not affected the lengths and diameters of graft scion shoots and also number of internodes on shoots. We can advise that bark grafting on walnut should be made on thick rootstocks and rootstock's top should be cut 60 days before grafting.

Key words: Walnut, Top Working Graft, Graft Success, Xylem Exudation, Bark Grafting

THE EFFECTS OF EXOGENOUS GIBBERELLIN ON SEED GERMINATION OF THE FRUIT SPECIES

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Abstract

Gibberellins are diterpenoid, plant growth hormones and regulators, able to control some important processes in plant growing and breeding; including stem elongation, flowering initiation, increasing fruit set and size, improving fruit shapes, induction of seedlessness, retardation or acceleration of senescence, , breaking seed dormancy, increasing in crop metabolic contents, activation preferred gender organs in flowers, pollen development and germination. Some of the chemical substances occur in some parts of plant organisms endogenously. The chemicals are also being produced commercially and commonly used in different aims via exogenous application. One of the usages of these is breaking seed dormancy and activation of seed germination of fruit species. The fruit trees are mostly propagated via grafting on rootstock derived from seed and the known, valuable seeds sometimes can be hard to germinate themselves because of external or internal factors. In the review study, usages and effects of the exogenous gibberellins on germination of some fruit seeds in *in vitro* tissue culture and *ex vivo* nursery germination conditions are presented.

Key words: Gibberellin, fruit species, seed dormancy, seed germination

PISTACHIO AND ALMOND PRODUCTION AT SOUTHEAST ANATOLIA REGION IN TURKEY AND ITS IMPORTANCE

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Pistachio (*Pistacia vera*) and almond (*Amygdalus communis*) are very important crops for Southeast Anatolian region. Because, the ecology is very suitable to grow these tree species. Mainly pistachio is growing hundred years before in this area. Last decades or after starting of irrigation in this area the new fruit species are became popular. But the climate is suitable for pistachios. The almond experiments had been started for twenty years. It was seen that almond is also one of the suitable fruit crops for his area. These two fruit species can be grown under unirrigated or irrigated conditions. But after applying of water the yield and quality are increased. The new some problems are started because of amount of water. The excessive water application created some diseases and physiological problems. In this paper this subject will be discussed.

Key words: Pistachio, Almond, Irrigation, Ecology

INVESTIGATION OF ALTERNATIVE MANAGEMENT METHODS IN ORGANIC VINEYARDS OF THE AEGEAN REGION

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This work was done during 2009-2011 in Manisa. The aim of work was determination of weeds in the organic production in vineyards and determine method of control weeds. The effect of some weed control methods was evaluated in organically grown vineyards. The tested methods in the organic weed control methods included application of textile mulch, straw, sawdust, peanut shells, hairy vetch, flame burning, olive water, tractor hoeing, hand hoeing, barley-vetch mixed cultivation and cabbage residues application. The effect of organic methods on weeds, yield, quality and the physical and chemical properties of soil was determined. The soil analysis of organic treatments indicated that highest phosphorus (P) was noted in olive processing waste application while highest organic matter was recorded in vetch + barley and olive processing waste applications. Highest values for potassium were noted in tractor hoeing and olive processing waste application. High levels of iron (Fe) and manganese (Mn) were recorded with application of cabbage residues application. Additionally, the cost of treatments application was determined. The economical analysis indicated that the most economical treatment was application of barley + vetch (35.5%). This treatment was followed by the other low cost applications including hairy vetch (26.8%), barley + vetch (25.5%), cabbage residues (18.30%), textile mulch (14.38%), tractor hoeing (13.1%) and groundnut shell (9.1%) applications, respectively. The other conventional treatments such as burning, straw, sawdust and hand hoeing were found to be more costly. The results of this work indicates that textile mulch application were the most effective weed control treatments for organic productions systems, respectively. These applications were found to have higher yield than the other applications. The application of textile mulch and mixed cultivation of barley + vetch was economical than the conventional applications and can be recommended for weed control in organic production systems.

Key Words: Vineyards, Grape, Weed, Mulching, Cover crop, Herbicide, Physical control, Mechanical control.

COMPARISON OF AMPELOGRAPHIC CHARACTERISTICS OF SOME IMPORTANT GRAPE VARIETIES ARE GROWN IN THE AEGEAN REGION, ROOTSTOCK AND CLONES

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Viticulture is the oldest culture on earth as a branch of agriculture and conserves its importance and constitutes one of the most common culture areas in the northern and southern hemisphere. Determination of genetic resources or improved them or the definition and classification of new varieties in all of the grape growing countries different methods have been used by different researchers. In this study, importance grape varieties which are grown in Aegean Region and rootstocks and clones selected by Manisa Viticulture Research Station were morphologically characterized and ampelographic differences and similarities among them were investigated. A total of 11 clones of grape cultivars (*Vitis vinifera* L.) and rootstocks belonging to Çal Karası grape variety which was a standart raisin and wine grape variety of Aegean Region in Turkey, Yuvarlak Çekirdeksiz which was one of the most important raisin grape varieties of this region, 41 B, 420 A were examined according to morphological properties. Phenological development and 60 characteristics in Minimal Descriptor List for Grapevine Varieties (TTSM) related to shoot, leaf, inflorescence, bunch, berry and seeds which are present in all kind and clone OIV, UPOV and IBPGR lists, were examined for a period of three years. It was found that there were differences among clones of Çal Karası and Yuvarlak Çekirdeksiz varieties dates of bud burst-veraison with leaf-cluster characteristics. Besides ampelographic differences between clones of 41 B and 420 A were determined.

Key words: *Vitis vinifera* L., Çal Karası, Yuvarlak Çekirdeksiz, Ampelography, Clone

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PHENOLOGICAL CHARACTERIZATION OF CACTUS PEAR SPECIES (OPUNTIA SPP) CULTIVATED IN MOROCCO

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Abstract

Cactus pear (*Opuntia* spp) is currently increasingly cultivated in the dry areas of Morocco. The cultivated area was increased from about 50.000 ha in the late 90's to more than 150.000 ha by the end of 2011, and it is projected to be increased by 50.000 ha in the next 5 years. However, the extended areas are based on cactus germplasm transfer between different regions without any phenological traits consideration. This will affect the end use of the planted cactus orchards especially when the transferred planted material changes its phenological behavior as reported by many investigators. The objective of this study is to characterize the phenological behavior of 126 cactus accessions belonging to seven cultivated species. A total number of 126 cactus accessions belonging to seven species (*Opuntia ficus indica* (L) Mill, *O. megacantha* Salm-Dyck, *O.leucotricha*, *O.aequatorialis* Britton & Rose, *O.dillenii*, *O. robusta* H.L. Wendland, and *O.inermis*) are planted in a three years old experimental cactus orchard of INRA (Institut National de la Recherche Agronomique), located in the semi arid area of Chaouia plain of Morocco. The main phenological traits that were observed are total bud production and vegetative and fruiting buds rates production for each accessions and species. Concerning the distribution among ecotypes within species we found that for *O. ficus indica* (86 accessions) total bud (TB) varied from 0.25 to 15.5; *O.Megacantha slam dyck* (38 accessions) TB varied from 0.25 to 19.75; *O. aequatorialis* Briton & Rose ecotype to 1.5; *O. dillenii* ecotype 9.5; *O.inermis* ecotype to 0.5; *O. leucotricha* (4 accessions) 0 to 0.25. In terms of bud vegetative (BV) rate *O. ficus indica* BV varied from 0.25 to 15.5; *O.Megacantha slam dyck* (0.25 to 19.75); *O. aequatorialis* Briton & Rose ecotype to 1.5; *O. dillenii* ecotype 6.75; *O. leucotricha* 0.25. As against, the bud fruiting (BF) to vary in *Opuntia dillenii* ecotype to 2.75; *O. ficus indica* 0.25 to 1.5; *O.Megacantha slam dyck* 0.5 to 3.5. In conclusion, These species from different geographical origins showed remarkable phenological differences in size and shape of the cladode, the rate of fruiting and fruit color.

Key words: *Opuntia* spp, species, ecotype, fruiting, phenology.

DEVELOPMENT OF MOLECULAR MARKERS BY USING ASSOCIATION MAPPING IN FIG CULTIVARS

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Abstract

Turkey is within the gen-center of fig (*Ficus carica*). This provides rich genetic resources for breeding programs. Breeding programs however, of woody plants such as fig is not an easy method to study due to long generation time and heterozygosity. Molecular markers render breeding process more speedily and precision. For fruit trees, outbreeding, heterozygosity and long juvenile time is limited to produce F2 or backcross population. Association mapping, also known as linkage disequilibrium (LD) mapping, is a population-based survey used to identify trait-marker relationships resulted from LD. Association mapping provides the use of natural population and phylogenic traits which have been collected for years. A study was conducted to identify molecular markers linked to desired characters (male/female tree, fruit color, parthenocarpic/non-parthenocarpic fruits formation) in fig by using association mapping. A natural population of fig located in Aydın province was used as plant material. Molecular markers linked to desired trait were studied by using SRAP, ISSR, RAPD and SSR. This study indicated that association mapping is a promising method for fruit trees to developed molecular markers.

Key words: *Ficus carica*, fig, association mapping, molecular markers

BREEDING OF LATE RIPENING SWEET CHERRY VARIETIES

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Abstract

Turkey holds the first place in the world cherry production with about 400 000 tones, however it can only export %10-15 of this production. '0900 Ziraat' variety constitutes almost all of this cherry export by itself. This high quality variety is known as "Turkish cherry" in the word. Depending on only one variety for export causes gaps in the export, thus leading to profit loses for cherry growers and exporters. Growers wish to produce cherries outside the peak production periods to take advantage of higher market prices. This has been a high priority for many breeding programs and a wider maturity range has supported increased planting of cherries. "Breeding of new sweet cherry varieties" named project was begun at Fruit Research Station in 2007. In this study as method was followed classical crossing breeding method . Sweetheart, Lapins, 0900 Ziraat and Regina were used as parents. The aim of project is to improve late ripening cultivars with high yield and good pomological traits (such as size, firmness, colour and taste). 2000 hybrid genotypes from different crosses were obtained and investigated for field performances and fruit characteristics.

Key words : Breeding, *Prunus avium* L., Fruit quality,

THE EFFECTS OF STRATIFICATION PERIODS AND GA₃ (GIBBERELIC ACID) APPLICATIONS ON GERMINATION OF SEEDS OF SOME GRAPE CULTIVARS

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Abstract

It is necessary to know the effects of some applications on increasing the percentage of seed germination in grapes for assisting the breeding researches. The aim of this research is to determine the effects of different doses of GA₃ (Gibberellic acid) and different cold stratification times on germination abilities of the seeds of Gelin, Razakı and Alphonse Lavallee cv. (*Vitis vinifera* L.). 75 and 90 days stratification periods at +5°C together with 0, 250 and 750 ppm GA₃ doses have been applied in completely randomized design as three replications. Seeds were either dipped in GA₃ solutions or pure water as control for 24 hours. In Razakı cv., after 75 days stratification periods GA₃ doses applications did not affect on the percentages of seed germination while after 90 days stratification periods, 750 ppm GA₃ dose increased the percentage of seed germination. In Gelin cv. after both cold stratification periods, 750 ppm GA₃ dose increased the percentage of seed germination. However, in Alphonse Lavallée cv. after both cold stratification period, GA₃ doses did not affect the percentage of seed germination.

Key words: Seed germination, table grapes, breeding, vitis, cold stratification

THE NUTRITIONAL VALUE OF PEANUT SEEDS GROWN IN WETLANDS VAR . LITTLE KALOISE

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Abstact

Small kaloise is an endemic variety of peanut in El Kala region receding was grown dry around the three lakes (Mellah , obeira , and Tonga) was threatned by extinctions whose study of its nutritional value allows us to initiate its recovery and revive its culture. the results of the study showed that the rate of the mineral is low due to the absence of fertilization , the fat is between (48.79,32.33 and 43.07) % respectively for sites (EL KALA , Frine and TEBOUL OUM). Nitrogen material is of the order of 29.86 %. lignin remains low , the rate is around 3.94 % promoting good digestibility of organic matter.

Key words: digestible, nutritious, little Kaloise, EL KALA

DETERMINATION OF PERFORMANCES OF DOMESTIC WALNUT VARIETIES OBTAINED BY SELECTION AND INTERNATIONAL COMMERCIAL VARIETIES IN GAZIANTEP REGION

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Abstract

This experimental study was conducted to determine the best adaptable walnut varieties to Gaziantep province and to advise growers to grow them, which would be the new ones. Adaptation parcel supported by TÜBİTAK between 2008-2011 was taken place in Ahmet Münir Bilgen experimental area, belonged to Pistachio Research Station, with Bilecik, Chandler, Howard, Maraş-12, Maraş-18, Midland, Serr and Şen-1 walnut varieties, planted 7x7 m distances, with 3 replicates and 3 trees in each replicates, according to randomized block design in the year of 2008. Phenological and pomological evaluating were done and tree vigour and habitus susceptibilities against antrachnose and bacterial blights of varieties were also evaluated. The study has been supported by TAGEM and has still being conducted by Pistachio Research Station management. As a consequence of results, Pedro was middle-late and Chandler was late in leafing time. However, in the view of leaf obsession, Maraş-12 and Maraş-18 were the earliest varieties. Midland had the best tree vigour. Observing the habitual growth of varieties, while Pedro had only spreading, the others had semi-upright growth. In the measuring trunk diameters, Şen-1 and Midland in rootstock thickness and Şen-1, Chandler and Midland in over cultivar thickness had the highest level. Only Howard and Pedro had male catkins. In the viewing of female flowering time, the earliest flowering was in Howard and latest flowering was in Chandler. Pomological analysis didn't obtain in Midland and Pedro due to shortage of obtained fruits. All over the observing years, Antrachnose and bacterial blights didn't damage much more to the varieties, controlled with chemicals easily; thus any susceptibilities weren't observed on those varieties.

Key words: Walnut, Gaziantep, varieties

CURRENT SITUATION OF ALMOND CULTIVATION IN TURKEY AND WORLD

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Abstract:

Although Turkey is the centre of almond gene center, it is the eighth largest almond producer after USA, Spain, Iran, Italy and USA. USA holds seventy one percent of almond export which is totally 3 million dollars per year. On the other hand, Turkey has only one percent of total almond export. In our country although farmers did not attach importance almond production until 1990, the almond cultivation has been increased in recent years due to increased demands in internal and domestic markets. Although almond production was increased in recent years, the production potential of our country cannot be used exactly. While almond is cultivated in Mediterranean and Aegean regions especially in Mersin, Antalya and Muğla cities, also its cultivation in other cities is rapidly spreading. Although establishing of new orchards is carried out with late flowering and imported almond types, because our country has genuine and diversity, the development of new types is very important with reclamation. As a result, Almond cultivation has to be improved to meet the growing demand of inside and outside markets and cultivation areas should be increased rapidly.

Key words: Almond, cultivation, Turkey, World,

PHYTOCHEMICAL PROPERTIES OF *PISTIA STRATIOTES*

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Pistia stratiotes L. belongs to family Araceae and is commonly known as water lettuce. It is used in different medicine to cure different diseases such as eczema, leprosy, ulcers, piles, stomach disorder, throat, and mouth inflammation. This article is a compilation of all the updated information regarding phytochemical, pharmacological and biological activities, medicinal properties, bioremediation potential, allelopathic potential, its uses and proper management of this herb. Information regarding uses and effects of different extract (ethanolic and methanolic) of this plant is also encoded. Studies indicated that *P. stratiotes* possesses different useful activities (diuretic, antidiabetic, antidermatophytic, antifungal, and antimicrobial) properties against harmful diseases. *Pistia* has great potential for accumulation of heavy metals (Fe, Zn, Cu, Cr, and Cd) without the production of any toxicity or reduction in growth and showed a wide range of tolerance to all the selected metals and therefore can be used for the large-scale removal of heavy metals from waste water. It was noted that this plant should be studied more extensively to confirm the reproducibility of the information and also to reveal therapeutic effects its bioremediation and bioaccumulation potential with possible isolation of active biomolecules and their mechanism of action

Key words: Pistia, Weeds, Aquatic weeds, invasive weeds, heavy metals

RESISTANT LINE DEVELOPMENT MARKER ASSISTED SELECTION AND DOUBLED HAPLOIDY IN PEPPER (CAPSICUM ANNUUM)

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Pepper production is hampered by diseases and pathogens. SURDE TARIM is a seed company aiming to develop its own hybrid cultivars. The objective of the study is to develop pepper lines with disease resistance. Plants from segregating F2 populations originated from commercial F1 hybrid cultivars were screened with molecular markers for Bacterial speck disease (Bs2 and Bs3), Tomato spotted wilt virus (Tsw gene), Tobamoviruses resistance (L3, L4 alleles), Root knot nematode resistance (N, Me1, M3/Me7 genes). Single plant selections were made among resistant F2 plants. F2:3 seedlings determined to carry markers for disease resistance are being grown from which double haploid lines will be developed using anther culture. Top crosses will be made among homozygous resistant lines. Multi disease resistant pure pepper lines are expected to yield hybrid candidate cultivars for commercial seed market.

Key words: Pepper, Disease Resistance, Tsw, Hybrid,

IN VITRO POLLEN VIABILITY AND POLLEN GERMINATION OF SERVICE TREE (*SORBUS DOMESTICA* L.)

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Abstract

The service tree (2n=34) belongs to the genus *Sorbus* and the only one species of its subgenus *Cormus*. Service tree (*Sorbus domestica* L.) is one of less known economically valuable forest fruit-bearing species and are traditionally used more than commercial. Freely nature growing populations of service tree are spread on large territory from Black Sea, Caucasus region to Western, Central and Southern Europe, Northwest Africa and Southwest Asia. The study was carried out to determine in vitro pollen viability and germination of wild types of service tree. Pollens were collected in the second week of April from the un-opened balloon stage flowers. Pollens were subjected to TTC (2,3,5-triphenyl tetrazolium chloride) and IKI. IKI test gave more clear results for the viability of pollens. In order to determine the effects of different sucrose concentrations, 0, 5, 10, 15 and 20 g/l sucrose added together with 1 g/l agar into the germination medium. The highest germination rate was taken with 15 g/l sucrose concentration. In the next stage of the study; 0, 5, 10, 25, 50, 75 or 100 g/l boric acid concentrations was added into the media containing 15 g/l sucrose+1 g/l agar and boric acid effects were investigated. With the increasing concentration of boric acid concentration, pollen germination rate was decreased and pollen tube length was reduced. The results are qualities that will contribute to future studies on breeding and fertilization of service tree.

Key words: *Sorbus domestica* L., Service tree, pollen viability, pollen germination, sucrose, boric acid

PRESELECTION IN *VACCARIA HISPANICA* (MILL.) RAUSCHERT FOR ORNAMENTAL PLANT BREEDING

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Abstract:

Domestication and subsequently breeding studies have great importance for the underutilized natural plant species in particular for their conservation and sustainable use. *Vaccaria hispanica* (Mill.) Rauschert (Caryophyllaceae) is an underused natural species in Turkey. However, it has very valuable plant characteristics such as precious starch structure, triterpenoid saponins and cyclopeptides important pharmaceutical industry, as well as potential ornamental value. This work was performed in Antalya in 2013-2014 under the project of TUBITAK-TOVAG-112O136 carried out to lay the foundation for *V.hispanica* breeding to present a new species to Turkish medicinal and floriculture industry. To achieve these goals 66 *V.hispanica* genotypes representing genetic pool available in Turkey were collected according to Davis' grid square system. The seeds of them were subjected to different germination tests, then the seedling were planted for different aims. For each of 66 genotype, 20 seedlings were planted to the soil in outside, while 20 plants were grown in the soil in a glasshouse for the seed production for seed content analysis. Besides, 10 plants were planted to soil and 10 plants were grown into pots in a plastic greenhouse to be the donor plants for haploidy studies. Thus, a total of 3.960 *V.hispanica* plants were grown for the research. High variability was observed among them and some plants exhibited different morphologic and flower characteristics which could be the desired genetic variation for the breeding studies in term of ornamental aim. For the preselection of them, growth habit, flower type and colour and plant size were used as the main visual parameters, as well as the other measured plant characteristics. As a result, a total of 159 *V.hispanica* genotypes were selected in the work. These preselections revealed that they could constitute the enough number of initial material for genetic pool and be used for the breeding studies of *V.hispanica* henceforth for the landscape utilization especially to be perennial bedding and shrub plants.

Key words: Cow cockle, ornamental plant, breeding, selection, floriculture, landscape performance, flower

DROUGHT RESISTANCE OF VEGETATIVE TRIPLOID TURF-TYPE BERMUDAGRASS

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Abstract:

There is an increasing demand on the development of drought resistant plant varieties due to greater frequency of dry periods resulting from climate change. A large genetic variation exists in drought resistance among native bermudagrass [*Cynodon dactylon* (L.) Pers.] germplasm originating from Mediterranean region. The aim of this study was to determine drought resistance of triploid hybrid bermudagrasses developed through interspecific hybridization of drought tolerant tetraploid *C. dactylon* var. *dactylon* genotypes originating from Turkey with a diploid *C. transvaalensis* Burt-Davy (African bermudagrass) from South Africa. Hybrid progenies were vegetatively propagated and transplanted into the field along with commercial bermudagrass cultivars, at Akdeniz University, Antalya in July, 2013. Experimental design was randomized complete block with three replications. One year after establishment, the turfs were subjected to drought stress for 45 days, which was followed by resumption of irrigation for recovery of the turf. Percentage of leaf firing, quality, relative chlorophyll content under drought stress, and post-drought stress shoot recovery were recorded. Significant variations existed for drought resistance among hybrids. Results indicate the presence of transgressive segregants for higher drought resistance, and that new bermudagrass cultivars with qualities comparable to industry standart 'Tifway' can be produced.

Key words: *C.dactylon*, *C.transvaalensis*, interspecific hybrids, turfgrass

PROVENANCE VARIATION IN CONE, SEED AND NEEDLE CHARACTERISTICS OF *CEDRUS ATLANTICA* MANETTI IN ALGERIA

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ABSTRACT

Cedrus atlantica is an endemic species to Algeria and Morocco, where it occupies a highly fragmented geographical area. This species has an undeniable interest though it is subjected to an alarming decline of its range of distribution along with other problems related to germination which requires the urgent need to establish a conceptual approach to the maintain and the conservation of this species. In addition, little information is available about the extent, the distribution and the nature of the variability of this species in Algeria which is crucial for the development of strategies to protect and preserve cedar forests in Algeria. The work focuses on the study of the phenotypic variability among and within four populations of Atlas cedar *Cedrus atlantica* M. from the region of Thniet El Had and Ouarsenis (Algeria). Quantitative and qualitative characterization of vegetative and reproductive traits was assessed on several trees from each population. The studies revealed significant variation in different cone and seed characteristics studied. Significant variability was found between and within each population. Variability of some traits was linked with the environment variables of populations' origins (site exposure and altitude). Seeds traits (number, weight, length, thickness, diameter, shape) were correlated with each other and with cone traits (dimensions, weight, number of seeds). However, no difference among needles and rosettes was reported.

Key words: *Cedrus atlantica* M., cone, seed, needle, variability, Theniat El Had, Ouarsenis, Algeria.

7 – SOIL SCIENCE

STABILITY VALUATION OF SOME MIXTURES BETWEEN FOLIAR FERTILIZERS AND COMBINED HERBICIDES FOR THE GRAIN YIELD OF DURUM WHEAT

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Abstract

The research was conducted during 2010 - 2012 on pellic vertisol soil type. Under investigation was Bulgarian durum wheat cultivar Predel, which belongs to *Triticum durum var. valenciae Desf.* Factor A included years of investigation. Factor B included no treated check and 3 foliar fertilizers - Lactofol O - 8 l ha⁻¹, Terra-sorb - 3 l ha⁻¹, Humustim - 1 l ha⁻¹. Factor C included weeded, no treated check and 3 combined herbicides – Axial one (pinoxaden + florasulam) - 1 l ha⁻¹, Hussar max OD (mesosulfuron + iodosulfuron) – 1 l ha⁻¹, Palace 75 WG (pyroxulam) - 250 g ha⁻¹. Because of the low adhesion of the herbicide Palace it was used in addition with adjuvant Dassoil - 500 ml ha⁻¹. All of foliar fertilizers, herbicides and their tank-mixtures were treated in tillering stage of the durum wheat and are applied in a working solution of 200 l ha⁻¹. Mixing was done in the tank on the sprayer. There is antagonism of combined use by herbicide Hussar max with foliar fertilizers Lactofol and Humustim and by herbicide Palace with foliar fertilizer Lactofol. There is synergism by tank mixtures of herbicide Axial one with the three foliar fertilizers, by tank mixtures of herbicide Palace with foliar fertilizers Lactofol and Humustim, by tank mixtures of herbicide Hussar max with foliar fertilizer Terra-sorb. The highest grain yield is obtained by tank mixture Terra-sorb + Axial one. Tank mixtures of complex fertilizer Lactofol with herbicides Palace and Hussar max and tank mixture of organic fertilizer Humustim with herbicide Hussar max are the most unstable for grain yield. Tank mixtures of foliar fertilizer Terra-sorb with the three herbicides, of foliar fertilizer Humustim with herbicides Axial one and Palace and of foliar fertilizer Lactofol with herbicide Axial one are technological the most valuable. They combine high grain yield with high stability with relation to different years. Self-use of foliar fertilizers Lactofol, Terra-sorb and Humustim without herbicides have low estimate and do not be used in the durum wheat crops.

Key words: durum wheat, foliar fertilizers, herbicides, grain yield, selectivity, stability

THERMODYNAMICS AND SORPTION CHARACTERISTICS OF Zn^{2+} ONTO NATURAL AND CHEMICALLY MODIFIED ZEOLITES

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ABSTRACT

Zeolites with high porous and cation exchange capacity have been widely used for agricultural and environmental purposes. The purpose of this study was to characterize the sorption properties of the natural and chemically modified zeolites for agricultural and environmental quality. The optimum sorption characteristics of the natural (NZ) and chemically modified zeolites (CMZ) were also determined using batch type adsorption experiments. As a first step of the adsorption experiment, optimum sorption conditions such as pH, temperature, size and dosage of adsorbent, and shaking time were determined. Then, the maximum adsorption capacities (q_{max}) of the Langmuir model were calculated as 20.87 and 33.44 mgg^{-1} for the NZ and CMZ, respectively. Dubinin-Redushkevich (D-R) isotherms were used to find out physical or chemical nature of sorption, and the model showed that the chemical adsorption was the main mechanism. The change of Gibbs free energy (ΔG°), a thermodynamic parameter, ranged between -12.43 and -14.93 kJ/mol for the NZ, and between -9.16 and -16.52 kJ/mol for the CMZ for the studied temperatures. These negative values of ΔG° indicate that the sorption of Zn onto the studied adsorbents was feasible and spontaneous. Moreover, it was also found that sorption capacity of zeolitic material, which is used for agricultural and environmental purposes, increases with chemical modification. From the obtained results, it could be concluded that the natural zeolite and especially chemical modified zeolite could be used for the adsorption of Zn^{2+} ion agriculture and environmental treatments.

Key words: Zeolite, zinc, sorption, thermodynamic parameters

EFFECT OF MICROBIAL FERTILIZER ON SOYBEAN YIELD IN ORGANIC AND CONVENTIONAL PRODUCTION

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Abstract

Two-year survey was conducted according to the principles of organic and conventional dryland cropping technologies. Experiment was placed in Backa Topola, on calcareous chernozem with wheat as preceding crop. In ecological production basic soil fertilization was performed with 15 t·ha⁻¹ cowshed manure, and in conventional production as pre-sowing treatment was applied 100 kg N·ha⁻¹. In both years were similar weather conditions. Examination factors were production ways and application of microbial fertilizer. Microbial fertilizer was in liquid state and it contained various types of microorganisms. Data were processed by two-factorial split-plot experiment variance analysis method, and differences between treatments were analyzed by LSD-test. Correlation analysis was conducted. The aim of this work was to determine yield of organic and conventional cropping technologies and correlational dependency between surveyed characteristics. The average yield was statistically very significantly higher ($p < 0.01$), for 24.09% in conventional production compared to ecological production. However, in the world, the average price of organic soybean (<http://www.ams.usda.gov/mnreports/lbnoof.pdf>), is higher in comparison with prices of soybean from conventional production (<http://www.quotesoybeans.com/>). The highest yield was reached in variations with microbial fertilizer soil treatment and in phenophases at the beginning and during the flowering. Number of pods was in a strong ($p < 0.01$) positive correlation with number of grains, and grain weight per plant with yield. Strong negative correlation was found between number of grains and 1000-kernel weight (-0.76). Ecological soybean production, as production system⁴ dr Ljiljana Kostadinovic with respect of environmental principles and standards, as well as specific local agroecological conditions, has its priority.

Key words: price, conventional and organic production, microbial fertilizers, yield, soybean

ORGANIC AMENDMENT AND CHEMICAL FERTILIZATION IMPACTS ON CARBON MANAGEMENT TO EVALUATE SOIL QUALITY

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Soil quality improvement requires integrated management practices. The study objectives were to evaluate the impact of organic amendments as compared with inorganic fertilization on soil quality properties and suitability of using carbon (C) fractions as indicators of soil organic matter (SOM) management in Adana, Turkey. Treatments included control, inorganic fertilization, compost, manure, and mycorrhizal inoculations in randomized complete block design. Soils were collected from corn (*Zea mays* L.)-wheat (*Triticum aestivum* L.) rotation at 0 to 20 cm and 20 to 40 cm and analyzed for microbial biomass (C_{mic}), basal (BR) and specific maintenance respiration (qCO_2), mineralizable C (C_{min}), total organic C (TOC) and nitrogen (TN), oxidizable C (Oxid-C), particulate organic C (POC), N (PON) and phosphorus (POP), soluble C (SC) and extractable C (EC). The C_{mic} , Oxid-C and POC were used to calculate C lability and C management indices (CMIs). Results showed that compost and manure applications, significantly increased C_{mic} , the proportion of TOC as C_{mic} (qR), BR, C_{min} , TOC, TN, Oxid-C, POC, PON, SC, EC and CMI with a decrease in qCO_2 compared with and the control. While the C_{mic} , qR, BR, C_{min} , TOC, Oxid-C, SC, EC, TN, POC, PON, POP, POC:TOC and CMI decreased, the qCO_2 increased with depth. Significant interaction of amendments and depth on C_{mic} , POP, PON:TN, POC:POP, PON:POP, and CMI based on C_{mic} and POC, suggesting that these parameters were stratified by organic amendments. Our results reinforced the suitability of using POC and C_{mic} as labile C fractions, over Oxid-C, to predict management-induced changes in SOM.

**CADMIUM AND ZINC ACCUMULATION IN MAIZE INFLUENCED BY ZINC FERTILIZER IN
CADMIUM POLLUTED SOIL**

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Abstract: Maize (*Zea Mays* L.) which is used in human diet as well as animal feeding and raw material for industry, is in the first rank among World cereal production for more than ten years. In parallel with the environmental pollution, heavy metal accumulation in soil is a serious problem. In this study, cadmium (Cd) is chosen as heavy metal in consequence of chemical similarity with zinc (Zn) which is the element that maize is very sensitive to its deficiency. The soils polluted with Cd in greenhouse conditions were fertilized with Zn. Maize grown in these soils was harvested six weeks after germination and analyzed for Cd and Zn. According to the results of analysis, fertilization with zinc increased cadmium concentrations of maize significantly. Although Zn deficiency in maize is supplied by 20 ppm Zn in soil, the highest Cd concentrations in maize are determined at this dose of Zn fertilizer. Hence, maize growing in Cd polluted soils may cause toxic effects as maize needs Zn fertilization. Another noteworthy result of the study is the accumulation of Zn in the shoots which is higher than the roots while Cd accumulated mainly in the roots. The case may be explained by chemical properties of these ions.

Key words: Cadmium pollution, maize, soil, zinc fertilizer

DETERMINATION OF THE INFLUENCE OF SOME SOIL PROPERTIES ON AGGREGATE STABILITY IN WHEAT CULTIVATED AREAS

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ABSTRACT

Aggregate stability (AS) values can be used as indicators of soil structural quality. Soils show differences in structural formation, and these structural differences are induced by different factors. Soil clay variety and amounts, CaCO₃ contents, cation exchange capacity, colloidal iron and aluminiumoxides, microorganims, wetting-drying, freezing-thawing and soil cultivation are the main factors in the formation of the soil structure. Furthermore effects of these factors on the structural formation of soils are quite different from each other. The objective of this study was to determine the influences of some soil properties on aggregate stability of wheat cultivated areas. This research was conducted in Konya- Çumra plain (Alibey serie) located in Central Anatolia. The stability of aggregates from 27 soils selected from wheat cultivated areas was measured by wet-sieving and results correlated with sand, clay, organic matter, CaCO₃, Ca, Mg, Na and K contents. The results indicated that the percentage of aggregates between 2 and 0.25 mm was soils 5,91% and 39,97% . The textures of the soil samples were found to be C (Clay), CL(Clay Loam), SC (Sandy Clay) and SCL (Sandy Clay Loam). Some statistically significant correlations are found between the values of AS and sand, clay, organic matter, CaCO₃, Ca, Mg, Na. K values obtained.

Key words: Aggregate stability, soil properties, structural stability

ADJUSTING SPI FOR CROP SPECIFIC AGRICULTURAL DROUGHT

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ABSTRACT

Standardized Precipitation Index (SPI) is one of the most used drought monitoring tools. It is easy to compute as it only needs cumulative precipitation amount for an input. However, it is more of a meteorological drought index rather than an agricultural one. In this study, we reconstruct SPI for monitoring a specific crop by calibrating the cut-off values that separates drought classes. For this purpose, two objectives to optimize are obtained: Area Under Receiver Operating Characteristics (ROC) Curve and misclassification rate of a multivariate decision model. By maximizing the area under ROC curve, we are able to calibrate thresholds for the realized states of the drought. By multivariate decision problems, crop and location specific information is used to regulate the size of the classes so that they can reveal agricultural wise meaningful information. Rain-fed wheat monitoring at Polatli station of Turkey is studied for an implementation.

Key words: Agricultural Drought Monitoring, Standardized Precipitation Index, Receiver Operating Characteristics Curve, CART

PHOTOSYNTHETIC RESPONSE OF POTATO PLANTS TO SOIL SALINITY

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Abstract:

In order to determine the potential production, it is important to know the response of crops such as potato (*Solanum Tuberosum L.*) which is one of the important starch crops in human diet under abiotic stress conditions. Salinity is one of the abiotic stress factors for potato limiting crop yield. The aim of this study is to determine the effects of saline water and proline applications on the yield and physiological characteristics of Morfona potato variety grown under cover just for rainfall proof under the Eastern Mediterranean conditions. In the experiment conducted between January-June 2010, foliar applied proline concentrations as much as 10 mM and 20 mM were applied to potato crop irrigated with water having electrical conductivity of 0.19 dS m⁻¹ (T₀), 3.54 dS m⁻¹(T_{3.5}), 7.12 dS m⁻¹ (T₇), 9.57 dS m⁻¹ (T₁₀) and 12.86 dS m⁻¹ (T₁₃). Different levels of saline irrigation water were obtained by adding NaCl into the tap water. Irrigation water requirement, crop water use and water use efficiency were decreased as much as 4.5%-18.9%, 3%-16%, 16.45-19.36%, respectively, as the irrigation water salinity levels increased. The increase in soil salinity caused to decrease in all parameters (total fresh tuber yield, tuber number, tuber dry weight, weight of potato classified as Grade A, biomass and leaf area) except harvest index. Foliar application of proline to diminish the effect of salinity did not affect significantly the most of the yield parameters. The most affected parameter by salinity was found to be stomatal conductance (Sc) among photosynthesis (Pn), transpiration (Tr) and stomatal conductance (Sc). The values of Pn, Tr and Sc increased in T₇ treatment compared to T_{3.5}. Irrigation water salinity affected significantly tuber bulking I and tuber bulking II periods whereas the effect of proline was found to be significant on tuber initiation and tuber bulking II periods (p<0.01). Leaf aging was accelerated in treatments where salinity was higher. Towards the harvest stage, it was observed that Pn, Tr and Sc were not affected by salinity, possibly as a result of leaf aging.

Key word: Potato, Saline irrigation, Proline, Photosynthesis, Transpiration, Stomatal conductance

THE PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES OF BROAD BEAN (*VICIA FABA* L.) TO SALT STRESS AND SALICYLIC ACID TREATMENT

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Abstract

Salinity stress is considered as one of the major abiotic stresses which strongly reduced crop productivity. In order to assess the effect of salinity constraint on some agro-physiological and biochemical traits in broad bean (*vicia faba* L.), two cultivars (Khamassi and Sbai), originated from Morocco, were tested. The experiment was arranged as a split-plot with a randomized complete block design. In this study, the physiological response of varying salt stresses (0 and 120 mM NaCl) on *V. faba* L. and the effect of exogenous salicylic acid (0.05 mM) at 120 mM salt stress were investigated. The irrigation with salt water (120 mM of NaCl) was applied 15 days after sowing and lasted for 21 days. Thereafter, some agro-physiological and biochemical parameters related to salt tolerance, as plant biomass, plant height, root and shoot dry weights, water content, membrane permeability, chlorophyll, and protein, were measured. The Results showed that Irrigation with saline water significantly reduced all plant growth parameters in comparison to the respective control. However the protein and chlorophyll content showed an increasing with salt stress. Alleviation of growth arrest was observed with exogenous applications of salicylic acid (SA) under salt stress conditions. Overall, the positive effect of SA towards resistance to the salinity of *V.faba* L. will provide some practical basis for *V.faba* L cultivation.

Key words: salt stress, broad bean, salicylic acid, crop productivity, yield, water content, membrane permeability, chlorophyll, protein

MANAGEMENT SYSTEMS IMPACT ON SOIL AGGREGATE PROTECTED CARBON AND NITROGEN SEQUESTRATION

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Continuous no-till with cover crops is important to support sustainable agriculture. A field study was established at Piketon, Ohio to determine the long-term effects (2005 to 2013) of tillage and cover crops on soil aggregate size distribution, aggregate stability and C and N protection. Treatments included corn-soybean rotation with conventional tillage (CT-CS), corn-soybean rotation with continuous no-till (NT-CS), and corn-soybean-wheat-cover crop rotation with continuous no-till (NT-CSW-CC) and replicated three times. Composite soil samples were collected from 0 to 90 cm depth at 15 cm increments, processed and analyzed for bulk density, aggregate size distribution from <0.053, 0.053 to 0.125, 0.250, 0.50, 1.0, 2.0 and 5.0 mm, macro- and microaggregate stability, mean weight diameter (MWD), geometric mean diameter (GMD), and total C and N content of various aggregate size distribution. Results showed that NT significantly increased macroaggregates, MWD and GMD, and aggregate stability and decreased bulk density as compared with CT. Likewise, higher content of total C and N was measured in macroaggregates of NT. The effect of NT with cover crops was more pronounced on soil aggregate properties and C and N protection than on CT-CS and NT-CS. Irrespective of treatments, soil aggregate stability and C and N protection decreased with depth.

SOIL HEALTH RESPONSE TO CONTINUOUS NO-TILL AND COVER CROPS

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Conservation management systems impact on soil health is important to evaluate ecosystem services. A field study was established at Piketon, Ohio to determine the long-term effects (2005 to 2013) of tillage and cover crops on soil health. Treatments included corn-soybean rotation with conventional tillage (CT-CS), corn-soybean rotation with continuous no-till (NT-CS), and corn-soybean-wheat-cover crop rotation with continuous no-till (NT-CSW-CC) and replicated three times. Composite soil samples were collected from 0 to 90 cm depth at 15 cm increments, processed and analyzed for microbial biomass, earthworms, biological activity, total, active and particulate organic C and N, pH and buffering capacity, bulk density and porosity, water infiltration, and color. Results showed that NT with and/or without cover crops significantly increased microbial biomass, earthworms, biological activity, total, active and particulate organic C and N, buffering capacity, porosity, aggregate stability and water infiltration and decreased bulk density as compared with CT-CS. The NT-CSW-CC had more pronounced effects on soil health properties than on NT-CS. Irrespective of the experimental treatments, the values of soil properties significantly decreased with depth except earthworms and bulk density. Integration of measured soil properties when expressed into a soil health scale, the results showed that soil health under NT-CSW and NT-CSW-CC have improved over time as compared with CT-CS.

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EFFECT OF SAKARYA AKGÖL ORGANIC SOIL ON THE QUALITY PARAMETERS OF TOMATO

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Tomato ranks first in the greenhouse production both in the world and in our country. For tomato cultivation various media are used in greenhouse. Organic soils are one of the most preferred media especially for their physical properties. In this study, the potential of Akgöl organic soil for tomato cultivation was analyzed. For this reason, five different media including imported moss based organic soil and Akgöl organic soil were prepared and they were examined by tomato (*Lycopersicon esculentum*) cultivation. Testing was conducted five replicates according to Randomized Block Design. The result of the experiment showed that, except for vitamin C, no significant distinction was identified regarding other quality parameters. Total fruit yield and marketable fruit yield figures of tomato grown in different media were found close to each other. Tomato plants were successfully grown in all media. Therefore, it was concluded that Akgöl organic soil can be used as a medium in greenhouse as an alternative to imported moss based organic soil.

Key words: Organic Soil, Tomato, Growth Medium, Quality Parameters

SPATIAL AUTOCORRELATION OF SOLUTE TRANSPORT ATTRIBUTES IN A COMPOSITION OF TYPIC HAPLUSTEPS, MOLLIC USTIFLUVENTS, AND LITHIC USTIPSAMMENTS

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Abstract

Solute transport modeling is an important research area. However, spatial variability is considered rarely in application of laboratory measured attributes to field scale. The main reason is the lack of data to evaluate spatial structure at the relevant scale. We evaluated spatial autocorrelation of laboratory determined solute transport variables of pore-water velocity (v), coefficient of hydrodynamic dispersion (D), dispersivity (λ), and dimensionless Peclet number (P) in a composition of Typic Haplusteps, Mollic Ustifluvents, and Lithic Ustipsamments. Eighty eight geo-referenced undisturbed soil columns (8.4 cm id and varying length) were taken from topsoil. The soil sampling sites were chosen depending on cropping pattern and topography, and soil type. Miscible displacement tests were conducted on 50 of 88 columns. Synchronized disturbed soil samples were taken for analysis of basic soil properties. Retardation coefficient (R) and D were predicted by computer program CXTFIT, and v was measured on soil columns. Weak correlations occurred between solute transport variables and some of the soil properties. A very significant ($R^2 = 0.938$ and $P < 0.001$) quadratic relation occurred between v and D . Spatial structure of solute transport variables were analyzed by correlograms and cross-correlograms. An identical correlation distance of 100-m occurred for v , D , and λ , while no correlation distance occurred for P , and this revealed that values of v , D , and λ can be considered same in any circular correlation zone with 200-m diameter in the study area. Furthermore, a 100-m cross-correlation distance occurred for v vs D , suggesting that results obtained by above stated quadratic function can be considered same in a circular correlation zone with 200-m.

Key words: Spatial variability, solute transport, miscible displacement, correlogram, correlation distance

THE EFFECTS OF BIOGAS DIGESTATE AND CATTLE MANURE ON TOMATO AND PEPPER FERTILIZATION

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Biogas digestate and cattle manure are cheap sources for plant nutrients and can offer some benefits to yield and fruit quality. However, benefits and complications of biogas digestate on soil fertility and plants are not elaborated. In this paper, one growing season of field experiment was conducted to assess the effects of biogas digestate, cattle manure and their mixtures with conventional fertilizers on yield and fruit quality of tomato and pepper. The utilization modes of cattle manure and biogas digestate are, biogas digestate (BD), mixture of biogas digestate + conventional fertilizers (BDCF), cattle manure (CM), mixture of cattle manure + conventional fertilizers (CMCF), conventional fertilizers (CF) and control (C) that no any fertilizer added to soil. The results showed that, both applications increased the soil organic matter content and BD and CM applications increased the fruit weights on tomato. The increase on the fruit weight affected the fruit size of tomato either. On the other hand, fertilization applications affected the fruit quality parameters such as pH, total soluble solid content, vitamin C. Furthermore, biogas digestate and cattle manure applications affected the yield of pepper. For instance, while CMCF application increased the yield, BD decreased the yield drastically. Fruit quality of peppers such as pH, total soluble solid content and color components also affected from fertilization applications. The highest total soluble solid content was determined in Control (C), and lowest was determined in BDCF applications. Biogas digestate (BD) applications gave the highest color quality which is important for pepper paste. As a result, it was determined that biogas digestate and cattle manure can be used in vegetable production exclusively or combined with conventional fertilizers. Biogas digestate and cattle manure applications to soil as an amendment can be recommended as a cheap solution to increase soil organic matter content, which is currently become an incoming problem in soils of South Marmara region.

Key words: Biogas digestate, Cattle manure, Fertilization, Tomato, Pepper.

APPLICATION OF THE INTERO MODEL FOR THE ASSESMENT OF THE SOIL EROSION INTENSITY AND RUNOFF OF THE RIVER BASIN DRAGOVO VRELO, MONTENEGRO

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Abstract

This paper presents the use of IntErO model for prediction of runoff and soil loss in the river basin Dragovo Vrelo of Polimlje, Montenegro. Physical-geographical inputs, which are the basis for calculation of soil erosion intensity, we included in the IntErO model. This allowed the quantification of the environmental effects of soil erosion. Data concerning runoff and sediment yield from the Dragovo Vrelo watershed located in the North-East of Montenegro are reported. The value of the Z coefficient was calculated on 0.393, what categorises the studied river basin in the fourth destruction category out of five. Our results suggest that the calculated maximal outflow from the river basin was $174 \text{ m}^3\text{s}^{-1}$ for the incidence of 100 years and the net soil loss was 3857 m^3 per year, specific $335 \text{ m}^3\text{km}^{-2}$ per year. The strength of the erosion process is low. Because of simple and reliable identification of critical areas of soil erosion the IntErO model may be applied for sediment modelling in other river basins of the Balkan Peninsula.

Key words: IntErO model, soil erosion, sediment yield, runoff, Montenegro

AN EVALUATION OF SOME PHYSICAL PROPERTIES ARISED FROM SOIL COMPACTION IN ÇUMRA PLAIN

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ABSTRACT

Some physical properties arised from soil compaction in Çumra Plain are analyzed. Soil bulk density, total porosity, porosity largeness distribution and texture values in profiles are determined and relationship between these values and compaction are evaluated. The existences of compaction in profiles especially in the depth of 20-40 cm (hard pan) are determined and it is found that there is an increase in the amount of soil bulk density while decrease in macro porosity. Some statistically significant correlations are found between the values obtained.

Key words: Soil compaction, soil bulk density, soil physical properties

USING RENEWABLE ENERGY SOURCES FOR AGRICULTURAL IRRIGATION

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Abstract

Irrigation is important for agricultural productivity. To produce highly efficient and high quality products is possible with a sufficient amount of irrigation. Groundwater, rivers, dams and lakes are used as a source of water. Transportation of water to agricultural lands is often provided with electrical energy. Pumps are used for transportation of water from one place to another place. Operation of the pumps in different power and size is provided with an electric motor. Energy consumption of electrical motor is added to the product cost. Besides electricity consumption, power line must be established for lands located away from residential areas. In some areas, it may be necessary to put additional transformer. These situations increase the cost much more. In this study, wind power is used for operation of a pump. Vertical wind turbine with mechanical energy from wind provides movement of the pump. Generally wind turbines used to generate electricity. But this study, produced wind energy (mechanical energy) with various mechanical transmission components will be used to convey water. In addition, there is no need to electric conversion so costs will be reduced. Designed savonius type turbine is too high wind force is designed so that you can work without the need for. Designed as three floors the turbine overlap each layer is embedded with 120 degree angles. There are two buckets on each floor. In this way can be operated by the wind from any direction. Provided that bucket of each of diameter 75 cm and height 80 cm is designed to be used in a turbine. With reference to the turbine rotor diameter $D=2d=150$ cm, from the rotor would be three floors height $H=3h=240$ cm. For the density of air at sea level density (1.25 kg/m³), the average wind speed of 7m/s is taken as the optimum power of the air passing through the turbine is calculated as approximately 250 W. Kinetic energy from the turbine shaft to the gear unit with the aid was transferred. Gear unit output of the pump is running. So that the mechanical energy derived from wind power and a pump was operated. Applications in computer simulation and analysis of three dimensional drawing programs have been tried.

Key Words: Agricultural Irrigation, Renewable Energy, Wind Turbine

THE EFFECTS OF IRRIGATION MANAGERMENTS ON SOIL SALINITY IN TWO DIFFERENT IRRIGATION DISTRICT

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Abstract

This study was carried out in two different irrigation areas with differing irrigation characteristics in Lower Seyhan Plain (LSP) located to the South of Adana. The study was carried out as a fieldwork in February, April, July, September, and October in 2008. The basic principle of the used fieldwork in this study is to use Electromagnetic Induction Meter (EM38) in determining soil salinity. Therefore, vertical and horizontal measurements were done in the pre-determined points of Akarsu ID and Yemişli ID with the use of EM38. Simultaneously, soil samples were also collected from the above mentioned points. With the use of traditional methods, saturation soil pastes were extracted from the soil samples. Using the saturation extracts, salinity levels of the soil samples were measured (EC_e, dS m⁻¹). EM38 measurements were calibrated using the EC_e (dS m⁻¹) values. It was found that the deeper you got the soil sample in Akarsu ID, the higher the level of salinity was. However, the soil salinity maps demonstrated that Akarsu ID had no salinity problem. Similarly, it was also another finding of this study that Akarsu ID field had also no sodicity problem. In Yemişli ID, average salinity level in July when irrigation is at peak level for 0-1 m soil depth was found to be at the lowest level. In April which is the start of irrigation season, the salinity was found to be in 43% of the field. With regards to soil sodicity, Yemişli ID had significant problems. Yemişli ID was found to be salinity-prone depending on the operating strategies of drainage pumping station in the investigated area and ground water.

Key words: EM38, irrigation, drainage, soil salinity, soil sodicity.

THE EFFECT OF DRIP IRRIGATION AND TRADITIONAL MANAGEMENT ON THE DISTRIBUTION OF WATER LOSS BY EVAPOTRANSPIRATION FROM AN AREA ASSIGNED TO PISTACHIO TREE

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In this study, the effect of drip irrigation and traditional management on the distribution of water loss by evapotranspiration (ET) from an area assigned to pistachio tree was investigated at the experimental orchard of the Pistachio Research Institute, Gaziantep, Turkey. A 10 × 10-m² grid system with PVC pipes placed as 2 m apart (horizontally and vertically) around each tree was used as the experimental design for the investigations of drip irrigation and the traditional management. In this work, water applied every 7 d as irrigation condition. The soil water balance method consisting of soil moisture, precipitation, and irrigation was considered to estimate the water loss by ET. The results of experiments show that total water loss by ET values of 518 mm and 220 mm were found for under drip irrigation and traditional management, respectively. Water loss by ET for the total soil profile and individual layers under traditional management was higher at the 4 outer corners of each 10 × 10-m² grid than under irrigated conditions. Furthermore, the highest value of water loss by ET was obtained at the grid system pipes closest to the 2 laterals under irrigation conditions. In addition, the total percentage of water loss by ET was highest at the 60-80-cm soil layers under drip irrigation while that of traditional management was 20-40-cm. On the other hand, the lowest total percentage of water loss by ET was at the 40-60-cm and 0-20-cm soil layers under drip irrigation and traditional management, respectively.

Key words: Drip irrigation; Traditional management; Root density; Evapotranspiration; Pistachio

WATER PRODUCTION FUNCTIONS OF WHEAT IRRIGATED WITH SALINE WATER USING LINE SOURCE SPRINKLER SYSTEM UNDER THE MEDITERRANEAN TYPE CLIMATE

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ABSTRACT

An experiment was conducted to determine the effect of water-salinity-yield relations of winter wheat and crop salt tolerance level along with salt distribution in the soil profile during the 2009 and 2010 growing seasons under rain-shelter in the Irrigation and Agricultural Structures Department, Faculty of Agriculture at Çukurova University in Adana. A line source sprinkler irrigation system was used to create different salt and water gradients. The results revealed that different irrigation water with different qualities affected grain yield and yield components. As the salinity level of the irrigation water increased crop water use and grain yield decreased. Saline irrigation water resulted in increased soil salinity in the profile and higher salt concentration in the soil affected some physical properties of the soil. Irrigation water use efficiency increased, however water use efficiency decreased as a result of saline irrigation application. Salinity threshold level of 5.107 dS/m was found for winter wheat from two year experimental data. Application of saline water with sprinkler system resulted in yield reduction at relating lower salinity levels and yield response factor (ky) of 1.46 was determined due to weather condition inside rain-shelter and soil salinity.

Key words: Wheat, saline water, rain-shelter, line-source sprinkler system, yield response factor

**DEVELOPING AN INTELLIGENT DECISION SUPPORT SYSTEM FOR ENVIRONMENTALLY OPTIMIZED
IRRIGATION MANAGEMENT USING SENSORS, REMOTE SENSING AND METEOROLOGICAL FORECAST
– THE ENORASIS PROJECT**

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Agriculture wastes 60% or 1,500 trillion litres of the 2,500 trillion litres of water it uses each year, which represents the 70% of the planets accessible freshwater (Stockle, 2001). One of the main culprits is the inefficient water irrigation systems, a fact that poses a huge burden to farmers and has a dramatic influence on the environmental impact of irrigated agriculture. Inefficient irrigation systems can lead to exacerbation of the effects of salinity due to excess irrigation and poor drainage, disturbances of the underground aquifers, water pollution and soil degradation (Millennium Ecosystem Assessment, 2005). On the other hand, water management authorities face lack of a charging – billing system that responds to farmers' needs, while charging procedures are time and money consuming, and inefficient in their application. Within the EU funded project *ENORASIS (FP7-ENV Project, Grant Agreement No 282949)*, an intelligent, integrated Decision Support System for environmentally optimized and, thus, sustainable irrigation management by farmers and irrigation water providers was developed. The main components of the intelligent irrigation management and charging system are: (i) a *weather prediction system that exploits satellite observations*; (ii) *irrigation optimization techniques* and (iii) *wireless sensor networks* (functioning with solar energy) as key enabling technology for field measurements and monitoring conditions. The irrigation management system combines all the above data and provides estimations in optimal irrigation rules (using FAO56 model) that are communicated to farmers and relevant stakeholders via multiple channels (web and mobile interfaces and application). It is believed that the ENORASIS system will motivate irrigation farmers to optimize the use of water, whereas it will also provide to water management organizations intelligent tools to effectively forecast and manage irrigation water resources, cover irrigation demand and charge farmers on the basis of an intelligent system of motives and incentives that exploits irrigation demand side fluctuations.

Key words: Irrigation, irrigation management, remote sensing, sensor, agriculture, water management authorities

SPATIAL AND TEMPORAL DISTRIBUTION OF PESTICIDE RESIDUES IN SURFACE- AND GROUND-WATER IN NORTH-EASTERN GREECE

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A monitoring study of 147 pesticides in surface- and ground-water bodies of northeastern Greece near Greek/Bulgarian/Turkish borders was carried. Eight sampling stations along the rivers Ardas, Evros and Erythrotamos and twelve sampling points along their riparian drainage canal were set up based on agricultural use, covering the distance from the Greek-Bulgarian borders down to the river's discharge in the Greek territory. Thirty seven wells, including irrigation, drinking water and artesian wells were monitored. The presence of pesticide residues was also monitored in the phreatic horizon (shallow groundwater) of four experimental boreholes drilled in the respective margins of four fields. Pesticides were extracted by SPE and analyzed by GC-MS using a multiresidue in-house analytical method including organophosphates, organochlorides and pyrethroids insecticides, triazinic herbicides, and other pesticides belonging to different chemical classes. From the 34 compounds (Pesticides, metabolites and Caffeine) that were detected in surface waters of Northeastern Greece the soil applied pesticides were the most frequently detected. High pesticide concentrations were detected within 2 months of their application. Extreme pesticide concentrations were detected in the beginning of the irrigation season or just after high rainfall events mainly in surface water of the riparian drainage canals. Generally, low levels of pesticide residues were found in the first sampling point (Greek-Bulgarian borders) of all rivers however, o'.p' DDT, o'.p' DDE and c-HCH were mainly detected in this sampling point regarded as cross-boundary pollution. The most commonly encountered compounds in the river waters were atrazine, DEA, alachlor, trifluralin, prometryne monilate carbofuran, carbaryl and diazinon. Increased loading (primary as well as secondary peaks) seemed to be a consequence of application (timing, rate, frequency) and intense rainfall during the application period. Among the compounds found in groundwater bodies' alachlor, metolachlor, atrazine, desethylatrazine (DEA), desisopropylatrazine (DIA) and caffeine were constantly detected.

Key words: Pesticides, Groundwater, Surface Water, Transboundary River, Evros/Maritza/Meric

FACTORS AFFECTING ADOPTION OF IRRIGATION WATER SAVING TECHNOLOGIES AND PRACTICES IN SAUDI ARABIA

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ABSTRACT:

As a result of Agricultural expansion in Saudi Arabia, the Agricultural sector has become the largest water consumer and this requires rationalizing the use of irrigation water. Therefore, the KSA has adopted policies that encourage the use of modern irrigation systems. Thus there is a need to determine the adoption rate of these irrigation systems. This is the main objective of the study. The study revealed that although the level of knowledge of more than half (59.3%) of the respondents about the advantages of new irrigation systems was high, and only 4.2% of them had low level of knowledge yet. The study shows that the rate of adoption of modern irrigation systems is low. The study also revealed that high cost and difficulty of maintenance were the most important obstacles that hinder the adoption of modern irrigation systems. The field evaluation of the irrigation system's performance indicated that most of the studied efficiency indicators were moderate or not acceptable. This necessitate awareness raising campaign and training of farmers about proper operation, management and maintenance of modern irrigation systems so as to play its role in rationalizing the use of irrigation water.

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STUDY ON PREDICTION OF THE AMOUNT OF RECLAMATION WATER REQUIREMENT FOR SALT LEACHING OF SALINE AND SODIC SOILS USING EMPIRICAL SIMULATION MODELS (CASE STUDY LOCATED IN KHUZISTAN PROVINCE – IRAN)

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Abstract

Study area called “Mianab - Shushtar” is located in the middle part of the Khuzistan province, Iran. Soil survey and land evaluation conducted in the area should that from the total area of about 41855 ha, almost over 14100 ha (33.7%) faced with the problem of salinity or salinity and sodicity, with different levels. In order to determine the possibility of their desalination and desodification, 6 experiments of salt leaching with a depth of 1.0 meter in 4 intervals of 0.25 m water application were done in the same area. Soil samples were taken before, during and after each dose of leaching water application. The collected samples sent to the laboratory to be analyzed. The source of applied water was from the Karun River, which can be considered as suitable according to USSL (1954). Data obtained from soil and water analysis in the leaching experiments, were treated by making use of different soft wares such as SPSS and Curve Expert. Results showed that reclamation of the soils of the study area seems to be possible and there is no need to use any chemical amendment in this sense. Also detail studies created a new empirical mathematical relationship for estimating the amount of reclamation water requirement, and prediction of the final soil salt salinity or final soil sodicity (ESP). As a result it was concluded that if some type of drainage system (Open or Subsurface) is installed with optimum distance, depth and also leaching practices with appropriate water depth is carried; there is a good possibility for Physic - Chemical reclamation of the soils in the study area. As there are rich source of natural calcium in the soils and in applied irrigation water, it seems that no special problem is expected.

Key words: Leaching, Saline and Sodic Soils, Khuzistan Province, Soil and land Reclamation

COMPARATIVE ANALYSIS OF SOME IRRIGATION COOPERATIVES AND ACTIVITIES OF IRRIGATION UNIONS (EDİRNE, KIRKLARELİ, TEKİRDAĞ, ÇANAKKALE PROVINCES SAMPLED)

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ABSTRACT

The issues discussed in this bulletin are based on a research project conducted by Kırklareli Atatürk Soil Water and Agricultural Meteorology Research Station with the technical support of Namık Kemal University Faculty of Agriculture Department of Agricultural Economy and Mersin University Faculty of Economics and Administrative Sciences, Department of Economy, with the purpose of elucidating the problems of the administrators and the producers in the operation of irrigation, a critical factor in rural development. The aim of this research project is to present the efficiency indicators of the cooperatives and irrigation unions that have undertaken irrigation operations in Edirne, Kırklareli, Tekirdağ and Çanakkale provinces through various analysis techniques. In the research mentioned above, in relation with the process of the assignment of agricultural irrigation operations to irrigation cooperatives as of 1990s, 9 of the irrigation cooperatives that took over the irrigation operations in Thrace, 1 irrigation cooperative that took over the irrigation operations as well as 4 irrigation unions that operate major irrigation programs in Çanakkale were selected and their efficiency was studied. The data that enabled the assessment of the efficiency for this bulletin were gathered from Edirne Uzunköprü Değirmenciköy Irrigation Cooperative, Edirne Süloğlu Irrigation Cooperative, Edirne Yenikarpuzlu Irrigation Cooperative, Edirne Keşan Kadıköy, Dokuzdere, Mercan Ponds Irrigation Cooperative, Edirne Altinyazı Karasaz Plains Irrigation Cooperative, Tekirdağ Marmara Ereğlisi Irrigation Cooperative, Tekirdağ Malkara Karaidemir Dam Irrigation Cooperative, Kırklareli Kayalıköy Dam Irrigation Cooperative, Kırklareli Kayalıköy Barajı Irrigation Cooperative, Çanakkale Alpagut Irrigation Cooperative, Çanakkale Biga Plain Irrigation Union, Çanakkale Ezine-Bigadiç Plains Irrigation Union, Çanakkale Truva Irrigation Union and Çanakkale Irrigation Union. Face-to-face questionnaires were also applied to the producers and administrators while data were gathered during the research and also some records were received from the administrators with technical and financial scope. Technical efficiency and social efficiency were defined for each irrigation cooperative and irrigation union on year basis with the assessment of the relevant data received for years 2009 and 2010. Changes in the annual efficiency rates were examined and interpreted in terms of rural development, with an effort to bring forward various explanations.

Key words: Technical efficiency, social efficiency, irrigation cooperative, irrigation union, Edirne, Kırklareli, Tekirdağ, Çanakkale.

8 – AGRICULTURAL ECONOMY

WHICH TYPES OF FARMING ACTIVITY DEVELOP FASTEST THANKS TO THE CAP FUNDS IN POLAND?

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In May 2014 Poland celebrated the 10th anniversary of becoming the EU member state. Polish farmers are believed to be the key beneficiaries of the EU accession. The CAP funds directed to Poland led to a significant increase in the income level of Polish farms and the open access to the EU single market allowed Polish food products to reach customers in other EU member states. Despite the fact the CAP direct payments are more and more decoupled from production and that most of the rural development instruments are accessible to farms irrespective of the type of their farming activity there are significant differences not only in the income level but also the level of public support received and the growth rate among different types of farming activity in Poland. The aim of the paper is to verify the hypothesis that there were significant differences in the development rate among Polish farms depending on the type of their farming activity due to the level of public support received during the period 2004-2012. The data used to verify the hypothesis comes from the Polish FADN database. The results show that there is a statistical difference among the types of farms in terms of the level of their development and the EU support received.

Key words: Polish farms, types of farming activity, development of agriculture, CAP.

FINANCING AGRICULTURE: TRENDS AND ISSUES, EVIDENCE FROM TURKEY

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Recent statistics reveal that by 2050 a minimum 70% increase in agricultural production is to be achieved to feed the a steadily growing world population. Climate change, frequent natural disasters, soil degradation and urbanisation reduce cultivable land areas and result in imbalance between supply and demand of food commodities. As a consequence, higher agricultural commodity prices and food shortages have not only put agriculture back on the international agenda but have also changed the governments' perception of the sector to act immediately. There is now broad consensus that the issue of agricultural finance require more support to increase food production and to combat poverty. . Lack of access to finance is a key impediment for the majority of farmers in improving the efficiency of their productions and adopting better technologies. The paper includes a brief literature review describing the issues and trends on financing agricultural activities. Then, current state of turkish system in agricultural finance and challenges are examined. Based on secondary data provided by the Banks Association in Turkey, we analyze historical trend on agricultural credits extended by banking sector. We utilize descriptive statistics to explore and evaluate the information or the quantitative data collected.

Key words: Agricultural sector, Agricultural finance, Financing methods

AGRI-FOOD INTERNATIONAL TRADE STRUCTURE AND EXCHANGE RATES

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The objective of the paper is to examine the relationship between the exchange rate and the structure of agri-food international trade. According to basics of the economics of international trade devaluation or depreciation of domestic currency leads to growth of gross export. However the rise of foreign demand for domestic goods differs according to the type of produces. For example, the gross export growth of goods which are characterized by higher exchange-rate pass-through should be larger. It is also important that the change of cost of production due to exchange rate change depends on the proportion of tradable and non-tradable factors of production used during production process. Taking into account these two effects, depreciation of domestic currency should cause changes in agri-food gross export structure in favor of agricultural commodity export. The potential growth of processed food gross export should be relatively smaller. To evaluate the effect of exchange rate changes on agri-food international trade structure the Eurostat international trade database were used. The analysis is carried out for a set of information about agri-food import and export using Standard International Trade Classification among selected European Union countries and USA, Argentina, Brazil, Switzerland, China and Turkey over 1999 to 2013. Standard econometric correlation techniques as well as Granger's causality tests were employed. The results are ambiguous. The impact of exchange rate change on the structure of agri-food international trade vary among countries and analyzed sectors of agriculture.

Key words: Exchange rate, International trade, Agri-food trade

STRUCTURAL CONDITION AND PRODUCTIVITY OF AGRICULTURE IN TURKEY ON THE WAY TOWARDS EU MEMBERSHIP

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EU stipulates the compliance of Turkish Agricultural Sector with Common Agricultural Policy for full membership. Common Agricultural Policy (CAP), the oldest and the most comprehensive policy of EU, was formed to integrate economies of the member countries in agriculture. Although the share of CAP is only 1,2% in Gross National Product (GNP) of the EU-27, the fact that 40% of the Union Budget belongs to CAP, clearly sets out the importance of the policy. The present agricultural structure of Turkey constitutes an important problem for full membership in negotiations to be held with EU countries. Having a simulation is of great importance in the structural conditions to be able to provide harmony in the application between Turkey and EU. In this study, the analysis of agricultural structure in Turkey and in EU has been done by the dimensions of management structure, production, yield, and self-sufficiency. Existing agricultural mechanization levels of the EU and Turkey. The most important results of the study highlight that although the Turkish agricultural sector has a high potential, it has a poor competitive qualification. Thus, the large potential of management and the large increase level of agricultural mechanization of EU will be the most expected compelling change for Turkey in the process of adaptation.

Key words: Turkish and EU Agriculture, Common Agricultural Policy, Agricultural Machinery, Agricultural in Turkey

TOMATO TRADE BETWEEN MACEDONIA AND THE BALKAN REGION

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Abstract

Macedonian tomatoes are produced on average area from 5.560 ha (2009-2013). Total production with an average yield of 27.332 kg / ha is average 151,966 tons. At a time when the world has a high percentage of hunger and under high competition on markets, reducing to post harvesting losses should be the primary goal of farmers. For easy perishable fruits such as tomatoes, the percentage of loss from farm to store and can reach up to 30%. This applies mainly for exports of fresh tomatoes on more distant destinations. Therefore, Macedonian processors increase production of processed tomatoes. For example, the production of ketchup for a period of five years (2008-2012) is increased by 1.7 times. Concerning fact is that during this period the consumption of fresh tomatoes decreases from 19,7 kg per capita (2009) to 13,4 kg per capita (2013). Macedonia constantly exported and imported fresh tomatoes with an average value of 14.5 million euros. Worryingfact is that the quantity and value of exports decreased. But, however major trading partners are the countries of the region and within it the first ranking is Serbia with about 63% of total exports of tomatoes in the Balkans. Also as the Republic of Macedonia do permanent export state constantly imports fresh tomato, mainly in the winter months. However, the quantity of imports is 24 times less than exports. Studies have shown that the best export prices achieved in exports in Serbia (0,52 EUR / kg), and lowest in Kosovo (0,15 EUR / kg).

Key words: agricultural products, tomato, exports, imports, prices

EFFECTS OF MARKETING COMMUNICATIONS TOOLS UPON THE PURCHASE BEHAVIOR OF FOOD PRODUCTS CONSUMERS'

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In a market environment that is more of variety of products and a lot of brands to a particular product, determining the factors that affecting while consumers purchase goods and services are becoming an important issue in terms to firms. In intense competitive environment, firms use a variety of tools to promote and remind their products to its customers. These tools so-called marketing communication tools (advertising, sales promotion, public relations, sponsorship, direct sales, etc.), consumers are exposed to almost every day or even every environment. The aim of this study is to investigate the effect on purchase food behaviors of customers of these vehicles that firms was used for various purposes and is exposed to on an ongoing basis in their lives in consumers'. To this purpose, from consumers living in urban areas in the province of Adana, data through the survey will be obtained. Results that analyzed with the help of the package program will be offered in the form of frequency distributions and cross-tables, will be given to suggestions. Also, having been made before, it will benefit from similar work.

Key words: marketing communications, food products, purchasing behavior

AGRICULTURAL AND RURAL DEVELOPMENT IN SERBIA: GOVERNANCE, POLICY CYCLE AND COORDINATION

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Abstract

Agriculture plays an important socio-economic role in Serbia in terms of contribution to GDP and employment, especially for almost a half of the population living in rural areas. However, Serbian agriculture and rural areas face many socio-economic, political and governance problems. The paper aims at analyzing governance and coordination of agricultural and rural development (ARD) in Serbia. It is based on an extensive literature review and primary data collected through a questionnaire survey performed in summer 2013 with representatives of 120 public, civil society and international organizations. The survey focused on problems regarding ARD policy cycle (design, implementation, and monitoring & evaluation) and multi-stakeholder and cross-level coordination. The Law on Agriculture and Rural Development sets agricultural policy objectives and provides a general rural policy framework. Many public (national, regional and local), civil society and international organizations are involved in the ARD arena. Lack of appropriate human resources is a problem in all three phases of ARD policy cycle. Coordination is ineffective at central as well as local level due, among others, to inadequate vertical and horizontal cooperation and information dissemination mechanisms. Serbian agricultural and rural policy requires fundamental reforms at all levels and in the whole policy cycle. More attention should be given to rural development. Participation of civil society organizations and the private sector in policy design and evaluation should be enhanced. Building the capacity of human resources dealing with ARD policy is a priority. Improved policy governance and coordination should be operational and is complementarities between stakeholders and administrative levels.

Key words: Rural development, Agriculture, Coordination, Governance, Serbia

AGRICULTURAL SECTOR PROFILE OF TURKEY IN THE WORLD

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Abstract:

Turkey has the 18th largest economy in the world with \$789 billion Gross Domestic Product (GDP). At the same time Turkey's agricultural economy is the 8th largest in the world. The aim of this study is to determine agricultural sector profile of Turkey in the world. The data of the study were obtained from FAO, WBG, Turkish Statistical Institute and Ministry of Food, Agriculture and Livestock. According to the results of this study, about 50.6% of the country consists of agricultural lands and 14.6% forest. The agricultural land is around 38,9 million hectares that consist of 54.9% arable lands and 45.1% permanent lands as per 2012. Agricultural production value of Turkey is about 41 billion \$. In the agricultural sector, the rate of crop production is 71.3%, animal product rate is 28.7%. 23.7% of Turkey's population is employed in agriculture. Turkey's female labour in agriculture is the 3th largest in the world. Turkey is a major producer of wheat, sugar beet, milk, whole fresh cow, tomatoes, barley, potatoes, grapes, maize, watermelons and apple. Apricots, cherries, hazelnuts with shell, figs, quinces and poppy seed are the most produced agricultural commodities by Turkey in the world. Turkey's top three agricultural export products are respectively flour of wheat, tomatoes, lemons and limes. In addition to this, wheat, soybeans and sunflower seed are respectively Turkey's top three agricultural import products. The results of this study will provide important information to Turkey's agricultural sector.

Key words: Turkey, Agriculture, Economy, World

AGRIFOOD PRODUCTS' COMPETITIVENES IN BALKAN REGION-STUDY ON ROMANIAN AGRIFOOD TRADE

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Abstract

The paper presents the competitiveness of the agrifood products in Balkan region by the analysis of the trade flows. We focus on the Romanian trade with agrifood products and the commercial relations with neighbor countries from Balkan area. We compare the evolution of the Romanian agrifood products trade with similar products from Balkan countries, in the last two decades. For this analysis we use data provided by the National Institute of Statistics (INS), EUROSTAT, internet databases and articles periodically published by the institutions specialized in economic analysis, as well as other specialty works, studies and working papers done by different researchers across Europe. Last but not least, we use the partial results from the FP7 Project COMPETE (International comparisons of product supply chains in the agro-food sectors: determinants of their competitiveness and performance on EU and international markets). By present paper we would like to show the effects of EU enlargement and globalization on regional trade, influences on agrifood products' competitiveness, with special attention on the Romanian agrifood trade. We would like to find the Romanian agrifood products which lost the markets and those products which have had a positive evolution in the last twenty five years. In the same time, we intend to identify the agrifood products from Balkan countries with influence on regional market, their origin and level of competitiveness.

STUDY OF PROJECT'S LAUNCHING "ARTISANAL COUSCOUS ENRICHED WITH LOCAL SPIRULINA", ENVIRONMENTAL ANALYSIS AND DEFINITION OF A STRATEGY

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ABSTRACT

In order to innovate on the food market and launch "traditional couscous enriched with spirulina ", unique innovative and very promising product, analysis studies were conducted to target consumers eating habit and reach the high market potential. A very rich in protein cyanobacteria, known as spirulina, was incorporated into the couscous to improve its nutritional quality, the strain used is a local one, and that allowed us to follow all the methods of cultivation and production according to specific conditions and reap a substantial amount of spirulina used in the manufacture of artisanal couscous. Although Spirulina does not replace caloric foods, it remains an ideal ingredient of protein's sauce that not only brings its protein, but many other items very favorable to good health including children's healthy diet. Consumption of couscous in Algeria is very frequent, Couscous is a very balanced natural product , rich, and undeniably part of traditional Algerian and Maghrebian dishes. Associated with artisanal couscous, spirulina has good nutritional, technological and organoleptic qualities to the consumption of a healthy product, beneficial to the human body improving our eating habits to better horizons. This research aims for plan the launch of artisanal couscous enriched by local spirulina isolated in Tamanrasset area, and for study the feasibility of the project by analyzing the potential market diagnosing the opportunities, and define an appropriate strategy to make a mass consumption's product .

Key words: Artisanal Couscous, spirulina, nutritional quality, project, launch, analysis, strategy.

MANAGING RURAL TOURISM IN VOJVODINA (SERBIA)

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Abstract: Due to the potential it possesses and different and specific varieties that are existing and could be developed, rural tourism in Vojvodina should be an important part of economic, social and cultural activity of tourism. But it is still at the beginning, marking the upstream development results. This paper presents the study of the status of rural tourism in Vojvodina and possible ways of prevailing the existing problems and using the opportunities which it has. Rural tourism is recognized as a development factor of Vojvodina which villages are economically and demographically devastated in recent period. Special emphasis are placed on the possibility of better activation of Vojvodina farmsteads (salaš), villages as a tourist product, ethno and eco tourism and different events as development issue. The possible management practices that could be implemented in such circumstances are also discussed and proposed for the development of rural tourism of Vojvodina because they are one of the supplemental sources for revenue of rural household creation. At the end of the paper, the development opportunities of this form of economic activity in rural areas are discussed, with a special emphasis on farmsteads as specific forms of rural way of life and organization of rural tourism.

Key words: rural tourism development, SWOT analysis, rural tourism management, farmsteads.

THE QUANTITATIVE STRATEGIC PLANNING MATRIX (QSPM) APPLIED TO AGRITOURISM DEVELOPMENT: A CASE STUDY IN THE COASTAL PROVINCES OF THE CASPIAN SEA IN IRAN

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Agro-tourism is gradually being adopted in some rural areas of Iran. However, unplanned development of this type of tourism can result in unfavorable and negative results. This article presents the current situation of agro-tourism in the coastal provinces of Iran in terms of strategic management perspective and determines and prioritizes appropriate strategic recommendations using SWOC and QSPM analysis to make this industry to be more developed and effective. Data required for determining the internal and external environment of agro-tourism development were collected using interview with twelve experts in the field of rural tourism and technical experts from the agriculture sector employed by the Ministry of Agriculture of Iran. Two questionnaires were developed using external and internal factors identified, and determined strategies administered to agricultural experts at the Agricultural Organization, and Agricultural Management Center of intended Provinces and experts participated the formal group meeting in order to weight SWOC factors and prioritize the identified strategies, respectively. Results showed that conservative strategies are the suggested strategies for development of agro-tourism in the intended areas of the study emphasizing on; developing an approach for marketing sustainable agro-tourism services, enhancing the quality of infrastructures and increase access to technologies, encouraging local rural communities to participate, and reinforcing them through training regarding entrepreneurship, marketing and management of sustainable agro-tourism, investing in agro-tourism, and encouraging the NGOs and private sector to participate.

Key words: Sustainable agro-tourism, Strategic planning, Coastal Provinces of Caspian Sea, SWOC analysis, QSPM.

DETERMINATION OF CLASSIFICATION PARAMETERS OF BARLEY SEEDS MIXED WITH WHEAT SEEDS BY USING ANN

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One of the basic problems that cause loss of yield in wheat is weed seeds that mixed with wheat seeds. In this study, discrimination of barley seed which mixed with wheat seeds has been realized. Classification of wheat and barley seeds has been achieved by using artificial neural network and image processing techniques. In the study, image processing techniques and the use of artificial neural network have been made possible with Matlab software. By using Otsu method, histogram data of seed images that were taken from web camera was obtained. By using histogram data, with multi-layered artificial neural network model, the system was educated and classification was made. Besides, wheat and barley seeds in the picture info where mixed seeds taken from the web camera exist were counted.

Key words: Wheat, barley, image processing, artificial neural network

A QUESTIONNAIRE STUDY ON AGRICULTURAL MACHINERY CABIN'S COMFORT

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Comfort has a great importance in the interior design of tractor and agricultural machinery cabins. Operators are exposed to musculoskeletal system disorders since they spend long time during the day in these vehicles. There is a few work in the literature that mentioned cabin comfort of these machineries including the operators opinion. In this study a questionnaire was conducted in order to get information about agricultural machinery operators opinion about the comfort of their vehicles. For this study tractor cabins and combine harvester machine cabins were selected. The study was conducted in Eskişehir. Questionnaire was composed of four groups of questions. First group contained demographic questions about the operators including their gender, age, weight and length, years of experience etc. In the second group there were general questions about the machine, like year and model of the machine, engine volume and whether or not the machine is second hand or new. In the third group there were personal evaluation questions about their machines. Five ordered response levels were used in the Likert's scale in this part. In the last group, supplementary open ended questions were asked to operators. After the questionnaire completed, collected datas were classified according to machine type. Frequency tables were used to present the results. This study will support design and development process of new products by including the operators opinion.

Key words: Cabin interior design, Cabin comfort, Tractor cabin, Combine harvester cabin

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AROMATIC PLANTS

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3. ANATOMICAL ADAPTATIONS OF THREE *ASTRAGALUS* SPECIES UNDER SALT STRESS - Fayçal Boughalleb, Mohammed Neffati
4. THE EVOLUTION OF THE ANTI-MICROBIAL ACTIVITY OF THE ESSENTIAL OIL, TANNINS AND ALKALOID OF THE BUIX (*BUXUS SEMPERVIRENS*) - AIT KAKI Sabrina, BENAI Hakim, CHELALI Said, BOUDIAF Amina
5. PHARMACEUTICAL PROPERTIES AND ANTIMICROBIAL ACTIVITIES OF *THYMELAEA HIRSUTA* (THYMELAEACEAE), FROM WESTERN ALGERIAN ARID AREAS: PRELIMINARY STUDY - Meribai, A., Deramchia, N., Diafet, A., Tassoult M., Mouatsem, D., Derdoukh, W., A. Bensoltane
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7. STUDY OF THE ANTIBACTERIAL ACTIVITY OF ESSENTIAL OILS AND MACERATED GINGER: *ZINGIBER OFFICINALE* - Mecheri, R., Smati D., Boutefnouchet A., Lekouaghet, A.
8. EVALUATION OF THE POTENTIAL BIOCIDES AND STUDY OF THE COMPOSITION OF ESSENTIAL OILS OF SOME ALGERIAN PLANTS ON *RHYZOPERTHA DOMINICA* (F.) (COLEOPTERA: BOSTRYCHIDAE) - Wahiba AOUS, Samia SADAoui, Yahia CHERIF
9. DESCRIPTION AND POPULAR USEFUL OF MEDICINAL PLANTS COLLECTED IN RELIZANE - REGION (NORTHERN WEST ALGERIA) - EL-Attafia BENHAMIMED, Fatiha MISSOUN
10. CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITY OF SIX SPECIES OF THE GENUS *THYMUS* OF ALGERIAN FLORA - Y. HADEF, Z. GOUASMI, M.T. BENMOUSSA, S. LAKHEL, H. BENSISAID, A. BOULGAMH, N. KERKOUB, A. DRIDI, M. BELLEILI
11. EVALUATION OF ANTIOXIDANT ACTIVITY AND PHYTOCHEMICAL ANALYSIS OF *OSYRIS QUADRIPARTITA* - Rached Wahiba*, Marouf Abderrazak, Bennaceur Malika.
12. PHENOLOGICAL STAGES OF *TRIBULUS TERRESTRIS* L. (ZYGOPHYLLACEAE R. BR.) DEVELOPMENT UNDER THE CONDITIONS OF THE THRACIAN LOWLAND FLORISTIC REGION OF BULGARIA - Semerdjieva, I., Tahsin, N., Elina Yankova-Tsvetkova
13. ANTICANCER NATURAL DERIVED FROM MEDICINAL HERBS - Wafa SOUDANI, Rachid. DJAFER, Z. FATMA, HADJADJ-AOUL, Mohamed ABDAOUI
14. ANTISTAPHYLOCOCCAL ACTIVITY OF OREGANO - Nora Mahfouf, Samir Gueldasni, Fatma Zohra Guemari Salima Bennadja

15. DETERMINATION OF SOME PESTICIDE RESIDUES IN SEaweEDS OF İSKENDERUN BAY (NORTHEASTERN MEDITERRANEAN) - Abdurahman Polat, Sevim Polat, Ayse Simsek
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21. HERITABILITY AND CORRELATION COEFFICIENT ANALYSIS FOR FRUIT YIELD AND ITS COMPONENTS IN CORIANDER (*CORIANDRUM SATIVUM* L.) - Nikolay Dyulgerov, Boryana Dyulgerova
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23. PHYSICAL PARAMETERS INFLUENCING THE YIELD OF *NIGELLA SATIVA* OIL EXTRACTED BY HYDRAULIC PRESSING - Hadjadj N, Ferradji A.
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25. THE EFFECTS OF DIFFERENT TREATMENTS ON CAROB (*CERATONIA SILIQUA* L.) SEED GERMINATION - Saim Zeki Bostan, Derya Kılıç
26. PRODUCTIVE POTENTIAL AND ADAPTABILITY OF ADVANCED OAT BREEDING LINES (*AVENA SATIVA* L.) - T.Savova, B. Djulgerova, D. Vulcheva
27. THE DETERMINATION OF ANTIOXIDANT ACTIVITY OF SOME SAGE POPULATIONS OF IN THE MARMARA REGION - Sevinç Seçil ERDOĞAN, Ünal KARİK, Kemal Hüsnü Can BAŞER
28. ISOLATION AND DETERMINATION OF BIOLOGICALLY ACTIVE COMPOUNDS OF *LIMONIASTRUM FEEI* (PLUMBAGENACEAE) - Sihem Boudermine , Nicola Malafronte , Nouredine Bghidja ,Fadila Benayech ; Samir Benayech, Nunziatina DE Tommasi.
29. EFFICIENT EMBRYOGENIC CALLUS FROM FILAMENTS WITH ANTHER IN *THERMOPSIS TURCICA* Dilek Tekdal, Selim Cetiner

30. MICROPROPAGATION OF *LAMIUM GARGANICUM* L. SUBSP. *STRIATUM* (SM.) HAYEK VAR. *STRIATUM* ENDEMIC TO TURKEY - Başar Sevindik, Mehmet Tütüncü, Tolga İzgü, Peter Amoako Ofori, Macide Burcu Kekil, Ehsan Mohammad Tagipur Sarijlu, Pembe Çürük, Gamze Şeker, Yeşim Yalçın Mendi,
31. EFFECT OF SOME SEED TREATMENTS ON GERMINATION OF *SIDERITIS PERFOLIATA* L. - Olcay Arabacı, Neval Gül Öğretmen, Uğur Tan, Feride Yaşar
32. THE DETERMINATION OF DIFFERENT GERMINATION APPLICATIONS ON *ONCNICUS BENEDICTUS* L. - Neval Gül Öğretmen, Olcay Arabacı, Uğur Tan, Feride Yaşar
33. STUDY OF THE PROTECTIVE EFFECT OF THE AQUEOUS EXTRACT OF *ARTEMESIA CAMPESTRIS* ON OXIDATIVE STRESS INDUCED IN RATS BY CARBON TETRACHLORIDE (CCL) - Nour el Houda BERROUANE, Ahmed BENCHABANE
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35. VOCATIONAL CURRICULUM OF ORGANIC MEDICINAL AND AROMATIC PLANTS FOR MEDITERRANEAN COUNTRIES - Maria TOADER, Gheorghe Valentin ROMAN, Alina Maria IONESCU, Mircea MIHALACHE, Vassilis PROTONOTARIOS
36. HERBAL MEDICINES: INTEREST, QUALITY AND SAFETY - H. BENCEDIRA, L. MEKAHLIA, N. LATRECHE
37. ESSENTIAL OIL CONTENTS OF SOME SPICES AND SEASONINGS WIDELY TRADED IN NORTEASTERN PART OF TURKEY - Gulsum Yaldiz, Muhittin Kulak
38. A NATURAL SWEETENER: STEVIA (SUGAR LEAF) - Aziz Şatana

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2. THE CONSIDERATION OF SOME CHICKPEA (*Cicer arietinum* L.) VARIETIES AND LINES IN CUKUROVA REGION REGARDING YIELD AND SOME PLANT CHARACTERISTICS - Dürdane MART
3. CHICKPEA (*CICER ARIETINUM* L.) *IN VITRO* MICROPROPAGATION - Ighilhariz Zohra, Kadiri Amina, Halfaoui Yamina
4. THE GROWING AS SECOND CROP SOME CHICKPEA (*Cicer arietinum* L.) VARIETIES IN VAN/GEVAS ECOLOGICAL CONDITIONS - Fatih ERDİN, Haluk KULAZ
5. DETERMINATION OF SOME MORPHOLOGICAL AND PHENOLOGICAL CHARACTERISTICS OF LOCAL DRY BEAN (*PHASEOLUS VULGARIS* L.) GENOTYPES - Ferda Özkorkmaz Atıcı, Nuri Yılmaz, Fatih Öner

6. PHYSIOLOGICAL PERFORMANCE AND YIELD OF DRY BEAN (*PHASEOLUS VULGARIS* L.) GENOTYPES UNDER WATER DEFICIT - Fokion Papathanasiou, Anastasios Barbayiorgis, Vasiliki Papadopoulou, Efthimis Kareklas, Dimitris Galaitis, Fotini Papadopoulou, Efstathios Tamoutsidis, Ioannis Papadopoulos
7. INFLUENCE OF THE DIMENSIONS OF LIFTING BRUSHES ON THE LOSSES AT DIRECT HARVESTING OF STANDING VINE DRY BEAN - Iliya Iliev, Gencho Milev
8. THE DETERMINATION OF YIELD AND YIELD COMPONENTS OF DIFFERENT WINTER LENTIL GENOTYPES (*LENS CULINARIS MEDIC.*) IN KAHRAMANMARAS CONDITIONS - Mustafa Çölkesen, Leyla İdikut, Gülay Zulkadir, Alihan Çokkızgın, Ümit Girgel, Ö. Akın Boylu
9. DETERMINATION OF YIELD AND YIELD COMPONENTS IN SOME DRY BEAN (*PHASEOLUS VULGARIS* L.) CULTIVARS UNDER GİRESUN CONDITIONS - Nuri Yılmaz, Ferda Özkorkmaz Atıcı, Fatih Öner
10. CORELATION AND PATH ANALYSIS OF PHYSICOCHEMICAL PROPERTIES OF PEA GENOTYPES - Reyhan KARAYEL, Hatice BOZOĞLU
11. PHYSIOLOGICAL AND YIELD RESPONSES OF FABA BEAN DROUGHT IN A MEDITERRANEAN-TYPE ENVIRONMENT - Salem S. Alghamdi, Megahed H. Ammar, Hussein M. Migdadi
12. ADAPTATION OF SOME HORSEBEAN (*Vicia faba* L.) GENOTYPES IN ECOLOGY OF ERZURUM - Sibel Kadioğlu, Banu Kadioğlu Gökhan Taşgın
13. EXOGENOUS TREATMENT WITH SALICYLIC ACID UNDER SALT STRESS OF *VICIA FABA* L. ASSESSED BY THE CHLOROPHYLL A FLUORESCENCE TRANSIENT - Fatima ANAYA*, Rachid FGHIRE, Said WAHBI, Kenza LOUTFI
14. IDENTIFICATION OF *I*-GENE FOR BCMV RESISTANCE WITH SCAR MARKER SW IN *PHASEOLUS VULGARIS* L. GENERATIONS, DERIVED FROM THE CROSS (BAT 77 X DOBROUDJANSKI RAN) - Vladimir Krastev, Gancho Passev, Dimitrina Kostova-Protochristova Diana Svetleva
15. INHERITANCE OF THE TRAITS - SEED'S COLOR AND PLANT HABITUS, IN *PHASEOLUS VULGARIS* L. CROSS BAT 77 X DOBROUDJANSKI RAN - Vladimir Krastev, Diana Svetleva, Dimitar Genchev
16. INHERITANCE OF SOME QUANTITATIVE TRAITS IN COMMON BEAN CROSS BAT 77 X DOBRUDJANSKI RAN - Vladimir Krastev, Dotchka Dimova, Diana Svetleva*
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18. AMELIORATION OF THE SANITARY STATUS OF THE SEED STOCK IN LENTIL AT LOW DENSITY - Anastasia Kargiotidou, Aristotelis C. Papageorgiou, Constantinos Tzantarmas, Elissavet Chatzivassiliou, Ioannis Tokatlidis
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20. EFFECTS OF INOCULATION BY *BRADYRHIZOBIUM JAPONICUM* STRAINS ON NODULATION, NITROGEN FIXATION, AND YIELD OF *LABLAB PURPUREUX* IN ALGERIA - BENSELAMA Amel, OUNANE S.Mohamed, BEKKI Abdelkader
21. SKEWNESS AND KURTOSIS VALUES IN Adapop POPULATION - M. Cavit Sezer, Niyazi Akarken, A.Eşref Özbey, Özden Dayı, Ahmet Duman, Mesut Esmeray, Rahime Cengiz
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24. VARIATION OF WINTER WHEAT YIELDS IN CROATIA AND BOSNIA AND HERZEGOVINA AMONG YEARS WITH ASPECT OF CLIMATIC CHANGES - Jasna Sostaric, Sabina Begic, Besim Salkic, Vlado Kovacevic, Monika Markovic
25. DETERMINATION OF SOME AGRONOMICAL CHARACTERISTICS OF LOCAL FLINT CORN (*Zea mays L. indurata*) GENOTYPES IN THE BLACK SEA REGION OF TURKEY - Fatih ÖNER Ali GÜLÜMSER
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28. DETERMINING OF SILAGE PROPERTIES OF DIFFERENT MAIZE VARIETIES UNDER SECOND CROP PRODUCTION IN THE ECOLOGY OF ADANA - Sait AYKANAT, Yasin KORKMAZ, Hatun BARUT, Hüseyin VAROĞLU
29. PLANT YIELD EFFICIENCY IS ESSENTIAL FOR MAIZE HYBRIDS TO COPE WITH DROUGHT - Christina Gaintatzi, Fokion Papathanasiou, Rafael Sandaltzopoulos, Constantinos Tzantarmas, Chrysanthi Pankou, Fotis Gekas, Ioannis Mylonas, Anastasia Kargiotidou, Ekaterini Pechlivanidou, Iosif Sistanis, Jovanka-Katarzyna Petrevska, Elissavet Ninou,, Ioannis Papadopoulos, Anastasios Lithourgidis, Christos Dordas, Ioannis Tokatlidis
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38. POLYPHENOLIC CONTENT AND EVALUATION OF ANTIOXIDANT ACTIVITY OF MOROCCAN SESAME (*SESAMUM INDICUM* L) SEEDS OIL - H. Rizki, M. El harfi, H. Latrache, A. Nabloussi, H. Hanine
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42. APPLICATION OF CLASSICAL METHODS AT SUNFLOWER BREEDING PROGRAM IN DOBROUDJA AGRICULTURAL INSTITUTE-GENERAL TOSHEVO, BULGARIA - Julia ENCHEVA, Galin GEORGIEV, Nina NENOVA, Daniela VALKOVA, Georgi GEORGIEV, Penka PEEVSKA and Valentina ENCHEVA
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POSTER SESSION

AGRICULTURAL ECONOMY

BIOSAFETY CLEARING HOUSE MECHANISM IN TURKEY

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ABSTRACT

The Biosafety Clearing-House in Turkey is a mechanism set up by the Biosafety Law to facilitate the exchange of information on Genetically Modified Organisms (GMOs) and assist the stakeholders to better comply with their obligations under the Biosafety Law. General access to a variety of scientific information and risk assessment, socio economic assessment and risk management and capacity building information is provided at the Biosafety Clearing House in Turkey. The policy of Turkey is to protect its biological diversity, as well as human and animal health, against the possible adverse effects of products developed by using modern biotechnology; however, it is also important to benefit from the current and future advantages of modern biotechnology applications, as long as this is done safely in accordance with national requirements. On the other hand, the Turkish Biosafety Law (Law No. 5977) came into force on 26 September 2010 concurrently with two related Regulations; Regulations on Genetically Modified Organisms and Products Thereof (the 'New GMO Regulations') and the Regulations on the Operating Procedures and Rules for the Biosafety Board and Committees (the 'Biosafety Board Regulations'), both published in the Official Gazette No. 27671, 13 August 2010. There is still Biosafety Board and related scientific sub committees in Turkey to evaluate the risk and potential socio-economic impact of the modified soy and maize. Three soybean GM events and 16 maize events were approved for only feed use in Turkey. The main principles of the regulatory framework are the precautionary principle, case-by-case evaluation and strategic long term risk assessment of GMOs, including their impacts on socio economic structures. Biotechnology also has the potential of creating major advances for agriculture and other related topics. For these reasons, Turkey, which ranks 9th in terms of biodiversity richness, must be sure that all the safety bases are covered. The Biosafety Law is required to make decisions on GMOs for intentional introduction into the Turkey in accordance with scientifically risk assessments. In addition, it is anticipated that the protection of the unity and the validity of contributions to health and scientific, environmental and economic topics will be more effective with public participation. Public education and contribution will provide benefit to continue legal developments and to implement biosafety subjects.

Key words: Biosafety, Turkey, GMO, Regulations

ECONOMETRIC MODEL OF GROWTH AND AGRICULTURAL CREDIT IN TURKEY

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ABSTRACT

In Turkey, Gross Domestic Product (GDP) by production based approach increased by 9.0 percent at 1998 prices and increased by 15.9 percent at current prices in 2010 compared to the previous year. As a result, GDP was realized as 105.738.813 thousand TL at 1998 prices and 1.103.749.801 thousand TL at current prices in 2010. At 1998 prices, agriculture sector value have 9.999.429 thousand TL and current prices value is 92.739.021 thousand TL. Agriculture sector grew 2.4 percent in 2010 comparison to the previous year. Agriculture sector share in GDP is 10.1 percent in 2000 and 8.4 percent in 2010. According to these statistics, the share of agriculture is observed to decline. The objective of this study is to examine whether there is a relationship between the agricultural growth and the economic growth. At the same time, We analyze whether there is a relationship between agricultural credits as an agricultural support and agricultural growth in the long run. In addition, it is aimed to investigate if the agricultural credits is effective on the number of people employed in agriculture. In order to find to relation between agricultural growth, economic growth and agricultural credits, we will try to find the fit econometrics model with related to the relations for the selected indicators.

Key words: Econometric Model, Agricultural Growth, Economic Growth, Agricultural Credits.

ASSOCIATING REVERSE MIGRATION STRATEGY WITH HAZELNUT FARMING POLICY: SUGGESTIONS FOR ORDU METROPOLITAN

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In Turkey the internal migration, in 1950s, the prevailing direction of migration was from rural to urban. Starting with beginnings of the 2000s the number of those moving from rural areas to urban centers started to slightly decrease, conversely the mobility in the opposite direction (from urban to rural) increased. This process that is referred as reverse migration or returning home. While many social problems caused by rural-urban migration like unplanned urbanization, slum housing, increases in crime rate, unemployment, poverty, alienation and cultural conflicts make cities less attractive , some important changes such as advances in technology, investments for rural developments, new employment opportunities in rural areas and sustainable development in agriculture make people to consider rural areas for living. Especially agriculture policies has an important role in reducing rural to urban migration and encouraging reverse migration in the context of objective, scope and tool. Starting from this point, the research deals with presenting a set of suggestions about implementation of agriculture policies to stop rural to urban migration and stimulate reverse migration in Ordu. Ordu is a city which gained metropolitan status recently and it is located in Eastern Black Sea Region. Reasons for choosing the city to research are: Ordu takes 8th place in highest net migration rate in Turkey. Proportion of hazelnut areas to total agriculture land in Ordu is %88, which is significantly high. The number of hazelnut producers whose income depends on only hazelnut is very high. The research is consisted of three main sections. In the first part theoretical information about migration is given. In second part role of agriculture policies in reverse migration process is discussed and in the last part some implications in Turkey and World are examined and comprehensive suggestions about agriculture policies' objective, scope and tools, to encourage reverse migration in Ordu, are developed.

Key words: Urban-Rural Migration, Reverse Migration, Ordu Metropolitan, Agricultural Policies, Hazelnut

**DETERMINATION OF VINE GROWER'S TENDENCY, PROBLEMS AND SOLUTION OFFERS FOR
AGRICULTURAL INSURANCE APPLICATIONS IN VITICULTURE BUSINESS OF EDİRNE, TEKİRDAĞ,
KIRKLARELİ AND ÇANAKKALE CITIES**

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Abstract

This study was carried out to determine grower's awareness and tendencies for agriculture insurance, reasons of taking out or not taking out an insurance policy, determine the problems and solutions and present the data for improving agriculture insurance sector. Questionnaire studies were made with total 289 growers (60 growers with a policy) at three different provinces (Çanakkale, Tekirdağ, Edirne and Kırklareli). Hail and frost are biggest risks in the research area. According to data and observations, covering half of the insurance price by the state is important for increasing of insurance policies. The majority of the growers have expressed that they know content and condition of the agricultural insurance even if they had not attend to promotion meetings. Eighty-eight percent of surveyed growers described agricultural insurance correctly. Insufficient adoption of agricultural insurance by the growers is small sizes of the vineyards. The other causes are insufficient insurance coverage, obstacle for shareholder of the lands to enter farmer registration system and distrust to paid of insurance completely. The problems of insured growers are inaccurate damage assessment process, high deductible for indemnities and disregarding of the growers declaration for the determining yield and price of grapes at the policy making time.

Key Words: Viticulture, Grape Grower, Agriculture Insurance, Farmer Tendency

GREEN ECONOMY - THE DEVELOPMENT OF THE AREA OF SHKODRA LAKE

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The development of green economy, as an essential part of the economic development stability, should lead the economy of this area adapting the philosophy of managing the natural resources on their best interest in solidarity with it. Stable development mean development that helps to meet today's needs without compromises with the ability of the future generations to complete their needs to. The green development , as economic model that respects the environment considering it as development resource take in consideration climate changes, energy resources, efficient usage of the natural resources etc. In that meaning in Albania should be improved urgently the administration of the water resources, forests, lakes, rivers, sea environment, through better legislations and implementation enforcement. Acceptance and implementation of the green economy development it is not imperative only for Shkodra Lake, as well as for the other lakes of Albania, but should be priority for future development for the development of the economy of the two countries that enjoy the pleasure of having this wonderful resource. The strategy of both countries should be integrated in this area taking in considering the development of the economy, ecology as well social development. Immediately both countries should stop uncontrolled activities on the forest, river beds, good usage of the agriculture land, reduction of wastes that goes to the lake, etc.

Key words: environment, economy, agricultural land, lake.

THE AGRICULTURE IN THE NATIONAL ECONOMY OF ALBANIA

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Albania is located on the west of the Balkan Peninsula, between the Northern latitude of 39°60' – 42°34', beside Adriatic and Ionian seaside. The relief of the country is presented with a great variability with plains, hills and mountains; about 30 % of the territory is from 0-300 m above the sea level. In the total surface of 28,748 km² of the country, the agricultural land occupies only 25%, meanwhile is occupied by forests, 15% by meadows and pastures and 24 % by others. With 48% of total labor and 17 % of GDP the agricultural sector continues to be one of the most important sectors of the Albanian economy. More than 50 % of the population lives in rural areas, where agriculture is the main activity. The cultivated area occupies only of 25 % of the total surface. Arable land is 570000 ha; Wheat occupies 32 % of arable land, for cereal crop. Forage to occupy 38-45% and vegetable 12%. Fruit culture occupies 23% of the arable land and provides only 6% of the agricultural production. Fruit culture has been composed by: Fruit trees 36 000 ha with Total production 133,000 tons, Olive trees 58 000 ha with 14000 Ton olive oil. Albania has 11 000 ha of vine grad and realizes 162 000 Ton of grapes. Citrus culture is 1200 ha. Fruitculture considered an important sector both for long-term investments and increasing of farmer. Albania is one country that possesses a small of agriculture land per capita in Europe, with an average of 2200 m². Forestry occupied about 1.051 million ha which represents 36% of the whole territory. The irrigated area is 60 % of arable land.

Key words: agriculture, olive, grape, cereal, vegetable

TOBACCO PRODUCTION IN THE PELAGONIA REGION – REPUBLIC OF MACEDONIA

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Abstract

Analysis of tobacco production (yields and planted area) in the region of Pelagonia will be made in this paper. Pelagonia is traditional and largest producer of high-quality tobacco in the Republic of Macedonia. It is especially known for the production of oriental tobacco, which is the most interesting for the foreign market. In recent years, the production of oriental tobacco in R. Macedonia ranged from 17.056 t in 2008 to 30.283 t in 2010, or in average 24.688,8 t. In the period of investigation (2009-2013), the share of the Pelagonia region in the average tobacco production of R. Macedonia was 14,679 tons. The highest production was recorded in the municipalities of Dolneni (4.034,2 tons) and Prilep (3124 tons). The average yield in Pelagonia region ranged from 1262 kg/ha in 2009 to 1440 kg/ha in 2013. The highest yield was achieved in municipalities Dolneni – 1342 kg/ha, Prilep - 1261 kg/ha and Demir Hisar - 1228 kg/ha, and in the other municipalities the yields were relatively lower. The average area under tobacco in the same period amounted to 9.786,2 ha, the major part of which belonged to the municipalities of Dolneni (3.066,2 ha) and Prilep (2473 ha). In other municipalities the average area under tobacco was smaller and ranged about 1000 hectares.

Key words: tobacco, regions, production, area, yield

GENDER PERSPECTIVE IN AGRICULTURE VALUE CHAIN DEVELOPMENT IN KOSOVO

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Gender equality is a new process in Kosovo and requires stronger commitment of Kosovo society, including government institutions and civil society in particular. Gender equality affects all levels/ fields of society. The food value chain is touched especially. It can and should employ a large number woman. Development of the food value chain can contribute greatly to gender equality. This will be the object of this study and will focuses on the participation of women in the development of food chain. The study was conducted to determine gender based constraints and opportunities for women to participate in the food value chain, analyze the difference in power (positions) in the value chain governance. Main data of the study were obtained by a survey method from powerful persons of 30 different organizations, enterprises (producers, processors and traders). The secondary information consisted of relative statistics and related studies of the subject. From this perspective it is argued that gender inequality has high economic cost and leads to wasting human resources, inefficiencies in the use of labor force and missed opportunities for development within the agriculture value chain. It is important to mention that before the war (1998), the participation of women in the food value chain was considered satisfactory. The change of the economic system and the transition from the centralized system of economy to free trade economy resulted in major changes. It caused greater unemployment especially among women. Hence, as an immediate and urgent task is presented the integration of women in the food value chain. Such development will impact on the economic growth of the country, and the improved position of women

Key words: Food Value chain, gender equality, economic development, agriculture sector.

THE VALUE-ADDED MARKETING – LOCAL PRODUCTS IN CONFORMITY WITH VITAL RURAL AREAS

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Abstract

In the recent years farmers has begun to search for additional on-farm activities in order to satisfy consumer demands, and to increase their incomes. At the same time many alternative forms of tourism have appeared and developed, such as rural tourism, agritourism, cultural tourism, etc. In this sense, the food is supposed to play an essential role in bridging agriculture and tourism, and consequently to reveal an opportunity for SMEs to develop an existing niche market, and to enhance sustainability and vitality of local areas. The survey is a part of FP7 Project, entitled “Farming transitions: Pathways towards regional sustainability of agriculture in Europe” (FarmPath), carried out on the area of the Municipality of Elena, located in the central north part of Bulgaria. This region is typical with its unique local resources, combining the tourism advantages, unique people, and the traditions in agriculture, food and culinary. This case study aims at introducing and disseminating a “new form of local governance”, which will bring some form of health or ethical benefits both for the consumers and the community as a whole, and will promote the people, places, best farming practices, and the cuisine of the area.

DIRECT MARKETING FOR HIGH NATURE VALUE PRODUCTS – THE BULGARIAN APPROACH

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Abstract

The survey is carried out on the example of Bratsigovo Bessarapski Hills in the central south part of Bulgaria. This area is under Natura 2000, designated as Specially Protected Area, and contains entirely a proposed Site of Community Interest. For the purpose of the analysis the regional factors of sustainability are identified. An increasing part of the farms in the region are applying the High Nature Value System. They are predominantly small-sized farms, developing traditional farming, and delivering their products mostly to the local markets. Unfortunately, the market for these value-added products is still not developed, and the farmers cannot get the extra price. The main goal of the paper is to propose a market-delivery system for HNV products with a contribution to the local sustainable development (based on the research findings of the Bulgarian team in the frame of FP7 project entitled “Farming transitions: Pathways towards regional sustainability of agriculture in Europe” (FarmPath)). Such a system will enable farmers to get greater flexibility, a big choice in planning and realizing the sales, as well as reducing their dependence on intermediaries.

THE IMPORTANCE OF GOOD AGRICULTURAL PRACTICES (GAP) IN THE CONTEXT OF QUALITY PRACTICES IN AGRICULTURE

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Abstract

Agricultural sector has an important place in Turkey's economy. By looking over the past years in country's history, as most of the country's exports consist of agricultural products. Therefore, foreign trade of agricultural products is crucially important for Turkey. Major retailer associations (supermarkets and hypermarkets) determined minimum standards by making regulations for agricultural products grown in the EU (European Union) or imported from other countries in order to provide healthy products for consumers. These standards are constituted as a result of entrepreneurs initiatives depends on European retailer working group. In this context, using fewer chemicals in agriculture sector by applying good agricultural practices and hence protecting consumers' health are appropriated. Retailer demand is rapidly growing for GLOBALGAP certificated products in the EU. This is very important because of EU is the target market for Turkey. Majority of fresh fruit and vegetable export is exported EU countries. In the study; information about the state of food standards, food safety issues, food safety management systems in Turkey and European Union are researched. A private firm was analyzed with case study and export success found in the firm which has Globalgap fresh fig and cherry market As a result of the study, firstly certification costs are seen but in the long term firm gains more in the export market.

MONITORING CONDITION OF GROWERS TO ACTIVITIES OF EXTENSION IN SOME SWEET CHERRY EXPORTER PROVINCES

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In this study, it was put forth monitoring conditions of growers to extension activities in some exporter provinces. The basic materials in this study were been data which was obtained from questionnaires that were done with 254 sweet cherry growers in Isparta, Afyon, Konya, Amasya, Manisa, İzmir. Talking frequency of growers with extension staff about sweet cherry growing was found the highest in Konya. Unlikely, the lowest talking frequency was in Manisa. For all provinces, in last one year, ratio of growers attended sweet growing extension activity was over 70%. It was determined that the growers usually benefited from printed-visual sources.

Key words: Sweet Cherry, Farmer, Extension

EVALUATION OF IN-SERVICE TRAINING STUDIES ORGANIZED BY THE RESEARCH INSTITUTIONS; THE CASE OF EĞİRDİR FRUIT RESEARCH STATION

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Abstract

In this study was aimed to evaluation of in-service training organized by Fruit Research Station in Eğirdir. The main data of the study were obtained from survey studies with 83 extension personnel that participating to institution training in 2012- 2013 years. Also, we have been utilized from the records of various organizations. 96.39% of extension personnel are working at the provincial and district offices as engineers. Information demand from the growers to the extension personnel are different from extension personnel issues that they feel lack of knowledge. Extension personnel stated that they found high rate of technical courses, the time and the location in good-very good (respectively 63.85%, 57.80%, 85.54%). They said that contact with research institutions is low but their contribution to the solution of the problem is high (80.43%).

Key words: In-Service Training, Extension Personnel, Research Institution

GALA LAKE NATIONAL PARK PERCEPTIONS OF LOCAL PUBLIC: AS AN AGRICULTURE CITY PERSPECTIVE

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Abstract

Wetlands, which are considered as the most biologically diverse of all ecosystems and serving as home to a wide range of plant and animal life, play a number of roles in the environment. Gala Lake, which was declared as "Nature Conservation Area" in 1991 and "National Park" in 2005, is an important part of the Meriç Delta and one of the most important wetland ecosystems in terms of biodiversity in Turkey. But as similar to many wet lands, Gala Lake is under effect of an intensive organic and inorganic pollution originated from agricultural activities conducted around the lake and from industrial discharges by means of Ergene River. The aim of this study was to determine the perceptions of two different local public (Karpuzlu and Enez) on the Gala Lake National Park by using some systematic quantitative data collection techniques and provide functional and applicable solutions according to detected quantitative data. Factor Analysis (FA) was also applied to detected data in order to help the interpretation of complex data matrices obtained by asked questions. According to detected quantitative data, significant perception differences were determined between Karpuzlu and Enez public and the occupational status of the surveyed people was identified as one of the most important perception factor among the socio –demographic statuses and according to the results of FA, four factors named as "Agricultural", "Economic", "Health" and "Ecotourism" factors explained 63% of the total variance.

Key words: *Gala Lake National Park, Socio – Economy, Socio – Ecology, Factor Analysis*

RURAL TOURISM IN THE REPUBLIKA SRPSKA: POLITICAL FRAMEWORK AND INSTITUTIONAL ENVIRONMENT

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Abstract

The entity of the Republika Srpska (RS) in Bosnia and Herzegovina has great natural, cultural, gastronomic, religious and historic potential for rural tourism development. Rural tourism encompasses a range of activities, services and amenities provided by farmers and rural people to tourists. It includes agro-tourism, farm tourism, nature tourism, ecotourism, wine tourism, etc. The paper aims at analyzing the political, legal and regulatory frameworks as well as the governance of rural tourism in the RS. The paper is based on an extended literature review and primary data collected through structured questionnaires carried out in summer 2012 with 120 rural tourism operators, service providers and villagers in 11 municipalities in the RS. The competencies in tourism and rural development are mostly at the entity level. Support to rural tourism development in the RS is provided by the Ministries of Agriculture, and of Trade and Tourism. The main strategic documents dealing with rural tourism in the RS are: Law on Tourism; Law on Hospitality; Tourism Development Strategy 2011-2020; and Rural Development Strategy (RDS) 2009-2015. Many measures are foreseen in the RDS for rural tourism development: promotion of rural tourism; improvement of touristic services provision; and organizational support and capacity building. There are limited dynamics and coordination between involved stakeholders *e.g.* ministries of agriculture and tourism, municipalities, touristic organizations, donors, rural households, etc. Legal framework and institutional environment for rural tourism development have considerably improved in the recent period. However, there is room for improvement in particular regarding governance and rural hospitality tax regimes.

Key words: *Rural tourism, policy, governance, Republic of Srpska, Bosnia*

CONNECTION BETWEEN TRADITIONAL FOOD PRODUCTS AND RURAL TOURISM DEVELOPMENT IN SERBIA

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Abstract

Rural development is crucial for overall national development in Serbia. Rural tourism can play a significant role in achieving sustainable rural development. For that it is necessary to be aware of factors and services that attract tourists to visit a rural area. The paper aims at analyzing connection between tourists' interest in typical and traditional food products of a rural area and interest for visiting it thus fostering rural tourism development. In particular the paper sheds light on the importance of traditional and typical food products in rural areas attractiveness. The study was carried out in two phases through two questionnaire surveys. In the first phase, with 251 field questionnaires, was examined consumers' perception and interest in traditional food products, while in the second one, with 70 structured interviews, were analyzed motivations for visiting rural areas. Both questionnaires were conducted in Serbia, in the period from July 2012 to March 2014. Results indicate a positive connection between interest for traditional food products and rural tourism development. In fact, results of the questionnaire survey show that almost 50% of the first phase surveyed Serbian people is very interested in typical products. Furthermore, attributes that people mostly associate to typical products are linked to tradition and support of local economy. Besides, there is a very high level of interest for visiting rural areas for tasting locally produced traditional food. These findings should be taken into consideration for the design of effective rural tourism development strategies and for better marketing of traditional products.

Key words: rural tourism, typical food products, tradition, motivation, Serbia

ANIMAL SCIENCE

THE EFFECT OF DIETARY PROTEIN LEVELS ON GROWTH PERFORMANCE OF FEMALE HOLSTEIN CALVES DURING THE POST-WEANING PERIOD

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ABSTRACT

This study was aimed to investigate the effect of different levels of dietary protein on growth of female Holstein calves during the post weaning period. An average of 60 days old 40 female Holstein Friesian calves were used for the experiment. Calves were divided into two groups; while first group received feed containing 18% CP, second group received feed containing 22% CP. The results showed that concentrate fed protein levels were did not affect live weight (LW) of the calves (138.45 vs 157.50 kg). The BM were found 100.65 vs 102.40 cm for body length (BL), 101.45 vs 106.60 cm for wither height (WH), 45.55 vs 45.80 cm for body depth (BD), 106.90 vs 109.20 cm for hip height (HH), 30.85 vs 31.95 cm for hip width (HW) and 115.85 vs 121.55 for chest depth (CD) ($P > 0.05$). The results showed that, better performance has observed in calves fed with %22 CP.

Key words: Dietary Protein Level, Female Holstein Calves, Post Weaning Period, Performance

BODY CONDITION SCORING IN DIFFERENT FARM ANIMALS

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ABSTRACT

Body condition scoring (BCS) is a subjective method of assessing the amount of metabolizable energy stored in fat and muscle (body reserves) on a live animal and is an important management practice used by producers as a tool to help optimize production, evaluate health, and assess nutritional status. This practice helps evaluate herd or flock as to the amount of body reserves, particularly fat and muscle, an animal possesses. It is used different ways for different farm animals last over 50 years. Assessment is based on determination of fat tissue in basis for all animal species however body fats that are going to be assessment or assessment method can be shown changes according to species. Body condition score (BCS) has been shown to be an important practical tool in assessing the body condition of beef and dairy cattle, sheep, goats, horse and swine because BCS is the best simple indicator of available fat reserves which can be used by the animal in periods of high energy demand, stress, or suboptimal nutrition. As a matter of fact, today it is used most widely in the health and nutritional management of all types of farm animals because if body condition scoring is conducted at planned intervals throughout the production cycle, nutrition and management can be altered if needed. With this study it was aimed to collect BCS and assessment methods on different farm animals in one heading and be guide especially to breeders.

Key Words: Body Condition Score, Animal, Herd, Flock

THE CALF REARING GENERAL CONDITIONS IN THE CATTLE BREEDERS ASSOCIATION MEMBERS' DAIRY FARMS IN BURDUR

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ABSTRACT

The research was conducted at the Cattle Breeders Association Members' Dairy Farms in Burdur province. One hundred of these dairy farms were selected for the study and the farms were divided into 3 groups according to the number of animals; 1st group had 5-9 cattle, 2nd Group had 10-14 cattle and 3rd had 15+ cattle. Almost all the calves were located at individual pens after birth. Calves were fed with 3-4 liters of milk per day and after post-milking the cattle, calves were also allowed to suckle in their mother. The majority of calf was fed with milk replacer feed. Calves were allowed to have a calf starter feed and hay from 5-7 days old age. Mostly calves were weaned based on age at 2.5-3 months. The calves had often a diarrhea and rarely pneumonia before the weaning. Calves horns were dehorned with acid at two weeks old. The calf birth weight, health information and growth information were not recorded. As a result, it is not easy to estimate health problem and economic losses in the province. Dairy cattle farmers should be educated for feeding, health issues and the keeping the records of their calves. This will improve the dairy production and the economic income of the farmers in Burdur province.

Key words: Calves, Feeding, Breeding, Dairy Cattle Breeders Farms

BARN STRUCTURE OF PRIVATE BEEF FARMS AND AFFECTING FACTORS

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ABSTRACT

This study was performed to determine structure of beef farms in Ergani, and effect of education, experience and age of farmers on this structure. 167 beef farms were surveyed in a community country center and 24 villages chosen intentionally. Farmers' general profile happened to be 58.1% first school educated, 18-39 age (average 40.8 age) and 1-7 year experienced (average 9.8 years). The average household number was 9. All of the farms were covered barn and tie stall of 90.4% were built separately. To building closed barns, rubbery was effective for inexperienced farmers, whereas farmers having 1-7 year experience rubbery and experience was effective for that. Farmers having more than 14 years of experience built closed barns because there were closed barns around. 62.3% of the farmers bust their barn according to their own experiences, of 34,1 inspired from other barns. The ratio of building barns according to project in highly educated and young farmers than others. Stone is generally (%62.9) used in building barns. As the experience increased usage of the stone decreased and use of concrete block increased. Illumination and ventilation were determined to be efficient in 44.9% and 38.4% of the barns, respectively. Manure cleaning was done three times a day. 52.1% of the farms evaluate manure by bunging, and 35.3% of them used it as fertilizer. Majority of the farms 93.4% did not use litter. 11.3% of first school educated farmer used litter in their barns. A significant relationship ($P<0.01$) was found between education level, experience and age of the farmers and barn shape, model, ventilation and manure cleaning.

Key words: Beef farming, barn, education, experience, age.

INVASIVE PLANTS AND BEEKEEPING

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ABSTRACT

Invasive plants, which are defined as species that can thrive in areas distinct from their natural range of dispersal, have a fast and high reproductive capacity. These plants can increase the size of infestation in the case of the absence of insects and diseases that affect their developments and unless it is used for different purposes such as forage crops. Most of these invasive plants which would inevitably lead to ecological problems in the future are a source of pollen or nectar for honey bees at the same time. In this study, some invasive plants and their significance for beekeeping will be discussed.

Key words: Invasive plants, beekeeping, beeplants

APICULTURE IN TR21 THRACE REGION AND ITS IMPORTANCE IN TURKEY

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ABSTRACT

The Thrace region located on the southeast of the Balkans and which shares borders with Aegean, Marmara and Black sea regions comprises 3 per cent of Turkey's square measure with its surface area of 23,76 km². The region covers Tekirdağ, Edirne and Kırklareli cities completely but covers İstanbul and Çanakkale cities partially. In Turkey, Statistical Region Units were formed in 2002 in order to collect and develop regional statistics, to make socio-economic analyses of the regions, to determine the context of regional policies, to provide a comparable and statistical database which is suitable for European Union Regional Statistical System. According to the Classification of Statistical Region Units, it has been defined 12 Statistical Region Units as Level 1, 26 Statistical Region Units as Level 2, and 81 Statistical Region Units as Level 3. In this study, according to the classification of Statistical Region Units, apiculture data belonging to the year of 2013 has been determined for TR211 Tekirdağ, TR212 Edirne and TR213 Kırklareli cities which take place in Level 2 with code TR 21. Apiculture is an important branch of profession because it needs less capital than the other branches of livestock breeding, and provides environmental sustainability by its contribution to pollination, and makes contribution to high nutritional food production and alternative medical applications, and also in terms of evaluating the uncultivated agricultural areas. Around the world, Turkey is the third in terms of beehive existence after India and China, and also is the second in honey manufacturing after China. Our apiculture has become advantageous across the world because Turkey has substantial flora resources and colony existence, several climate and regions, a large number of agricultural uncultivated areas, substantial existence and range of regional bee genotype and is suitable for fixed apiculture. According to the information of Turkish Statistical Institute of the year 2013, Turkey possesses a total of 6.641.348 pieces of beehives and TR21 Thrace region makes up 2,2% of the total beehive existence in Turkey. The city Tekirdağ makes up the 35.5% while the city Kırklareli makes up the 32.7% of the total bee hive existence of TR21 Thrace region. 37.4 per cent, 33,3% and 29.3% of the total manufacture of honey of the Thrace Region comes from the cities Kırklareli, Edirne and Tekirdağ, respectively. Apiculture businesses of this region provide 1.96 percent of the honey production in Turkey. Turkey that has 75 percent of honey plants flora around the world takes place near the top among other world countries in terms of both beehive existence and honey production. Our honey production is 14.26 kg for per beehive but it is at lower levels in comparison with the certain countries in the world. After the next periods, it is required to give importance on making an increase in the number of beehive as country and region, and to focus on increasing productivity from per beehive as well. Queen breeding problem should be solved in the sense of region. Our apiculture enterprises will have the desired productivity values by providing protection and maintenance for the domestic bee gene pools which have been adapted to their regions, and correct selections and improvements to done by these domestic gene pools.

Key Words: Thrace Region, Apiculture, Honey Production

SOME IMPORTANT HONEYED PLANTS OF THE TR21 THRACE REGION AND THEIR BLOOMING PERIODS

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ABSTRACT

Turkey ranks among the special countries of the world in terms of plant existence and diversity it has got. This rich flora in which we are present provides great advantages for honey bees both as nectare and as a source of pollen. In the study, along with their blooming periods some plants, pasture areas and some important honeyed plants of the cities Tekirdağ, Edirne and Kırklareli that are located on the Thrace Region were put forward. Tekirdağ city which is located on the northwest of Turkey covers 8% of Turkey with a surface area of 6.313 km². 17% of the city soils consist of forest and shrubbery while 5% is grass and posture and 77% is cultivation and plantation area. Edirne city that has got a surface area of 6.074 km² is located on the Thrace region of the Marmara Region. Agriculture is done on the 57% of its soils and grass and posture areas comprise 14% of the remaining areas while shrubberies and forests comprise 25% of the remaining areas. Kırklareli which is located on the Istranca and Ergene parts of the Marmara Region and which is also the largest city of the Thrace Region is surrounded by İstanbul, Karadeniz, Tekirdağ, Edirne and Bulgaria. 48%, 44% and 8% of the soils of Kırklareli is covered with mountains, plateaus and lowlands, respectively. In addition to the factors related to plant itself such as plant species, nectare capacity, blooming status and season, environmental factors such as sunshine duration in the flora, air temperature, rainfall, wind direction and velocity have also affects on the nectare and productivity of the plants. In an attempt to use our honeyed plants that are significant for apiculture effectively, the nectare and pollen capacities must be determined by mapping the honeyed plants regionally.

Key Words: Thrace Region, Honeyed Plants, Blooming period

**BIOMETRIC STUDY OF SOME MORPHOLOGICAL CHARACTERISTICS OF THE BEE *APIS MELLIFERA*
INTERMISSA IN NORTHERN ALGERIA**

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ABSTRACT

The study of morphometric characters of bees is one of the steps of conservation program diversity. The objective of this study is to determine the morphometric characteristics of *Apis mellifera intermissa* in the north of Algeria to establish the purity of bee colonies. Samples of a minimum of 60 bees apiary location and are collected in 20 hives in 20 wilayas studied during the years 2011 and 2013. The measures relating to the six morphometric characters of the workers , the cubital index , tongue, tomentum , pilosity and coloring are made with a stereo - microscope. The analysis of cubital index showed that bees outside East which had an average value of 2.30, the bees all other localities had lower 2,30 indices. The results showed that the bees can be classified according to the value of their cubital index, in three rather distinct groups. This study having revealed a significant variation in the characters morphometric of the bee in the North of Algeria, it is important to adopt suitable strategies for the conservation of their diversity.

Key words : *Apis mellifera intermissa* , biometrics , cubital index , north of Algeria.

DETERMINATION OF POLLEN COLLECTION ACTIVITY OF HONEY BEE (*Apis mellifera* L.) DURING SPRING PERIOD AND SOME MORPHOLOGICAL AND QUALITY FEATURES OF PREFERRED POLLENS

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ABSTRACT

This study was conducted in spring period of 2013 in Apiculture Research Station Directorate Campus and the Village of Dedeli. In the flora, flowering plants being pollen source for honey bee are determined. In the starting time of flight activity, in the flowering period of March, April and May, pollen traps were attached to 3 colonies between the time of 07:00-15:00. In this period, the reference preparations were prepared with pollens that were taken from flowers in the flora. Plant species of pollens collected from traps were determined with reference preparations via microscopic examination. some morphological (colour, shape, size and weight) and quality (protein, K, Ca, Mg, Na, Fe, Cu contents) features of pollens belong to determined species were evaluated. In the period 155 species belong to 53 families were determined in the flora, 32 species belong to 24 families of them were determined as important. Honey bees preferred *Asteraceae* (16.53%), *Juglandaceae* (16.33%), *Ebenaceae* (9.81%), *Rosaceae* (9.54%) and *Fabaceae* (8.67%) in terms of pollen density. Honey bees preferred mostly the pollens of cherry laurel (*Laurocerasus officinalis*) with 27.17%, grass lily (*Ornithogalum* sp.) with 18.83%, dandelion (*Taraxacum officinale*) with 18.00% in March, walnut (*Juglans regia*) with 40.17%, daisy (*Bellis perennis*) with 21.23% in April, date plum (*Diospyros lotus*) with 24.53%, white clover (*Trifolium repens*) with 21.68% in May. The highest protein content (24.90%) was determined in the species of deadnettle (*Lamium purpureum*). It is determined that honey bees benefit the pollens of too many plant species in the period of March-May in the research area.

Key Words: Honey bee (*Apis mellifera* L.), Family, Flora, Pollen, Protein

**GASTROPROTECTIVE ACTIVITY OF *UMBILICUS RUPESTRIS* LEAF EXTRACT IN EXPERIMENTAL
ANIMAL**

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ABSTRACT

The main objective of this study is to evaluate the antiulcer activity of extract of *Umbilicus rupestris* leaf extract against ethanol-induced gastric mucosal injury in rats. Four groups of Wistar rats were pretreated, respectively, with distilled water; omeprazole 20 mg/kg; and 100, and 200 mg/kg *U. rupestris* leaf extract 30 min before oral administration of absolute ethanol to generate gastric mucosal injury. After one hour later, the rats were sacrificed and the ulcer areas of the gastric walls were determined. Gross evaluation has revealed that the negative control rats exhibited severe mucosal injury, whereas, pre-treatment with *U. rupestris* leaf extract resulted in significantly less gastric mucosal injury and flattening of the mucosal folds. Histological studies of the gastric wall that the pre-treated with *U. rupestris* leaf extract where there was marked gastric protection along with reduction or inhibition of edema and leucocytes infiltration of the sub mucosa.

MICROSATELLITE CHARACTERIZATION OF BULGARIAN DOG BREEDS

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ABSTRACT

Three Bulgarian dog breeds – Bulgarian Beagle, Bulgarian Shepherd and Bulgarian Barak, were characterized using microsatellite analysis. Dog breeds were analyzed using ten microsatellite loci: ZuBeCa1 – 6, ZuBeCa11 – 13 and ZuBeCa16. Dog breeds used as controls were Bosnian Barak, Posavac, Serbian Beagle, Tribojak, Segugio italiano, Arish and Sarplaninac accordingly. Analyses were performed by end-point PCR followed by electrophoretic separation of the products on polyacrylamide gel. Microsatellite analysis of Bulgarian Barak revealed unique alleles in five of the analyzed microsatellite loci as compared to Bosnian Barak. These data are sufficient to discriminate between these two related breeds. Microsatellite analysis of Bulgarian Beagle and Bulgarian Shepherd did not reveal alleles specific for the Bulgarian breeds as compared to the control breeds. For that reason it is hard to discriminate these two breeds from related breeds in the region using these loci. Our results suggest extensive exchange of dog genetic material within the Balkan region for the breeding purposes. This especially applies to dog breeds of high interest like Beagles and Shepherds. For these reasons a reliable breed identification needs further analysis using extended set of polymorphic microsatellite loci.

Key words: Dog breeds, microsatellite, PCR,

EFFECTS ON SILAGE pH USE OF RECOMBINANT INOCULANT IN BARLEY SILAGE

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ABSTRACT

Bacterial inoculants containing lactic acid bacteria or bacterial culture called microbial inoculant as silage additives have been used intensively in making silage, and these additives are considered as biotechnological silage additives. In this study, six different barley silage treatment groups were prepared as control, Sill-All (Alltech, UK), LC1363, LCLDH, LBPL (*Lactobacillus plantarum*) and inoculant additive LBPL+Lik. LC1363 (*Lactococcus lactis subsp. cremoris*), LCLDH (LDH mutant *Lactococcus lactis subsp. cremoris*) and LBPL+Lik (*Lactobacillus plantarum*) groups contained recombinant inoculants with $\beta(1.3-1.4)$ glucanase (likenaz) enzyme gene. Inoculants were added to silages at the level of 1.5×10^7 cfu/g. Analysed for pH were determined at the end of 7, 14, 28 and 56-day period. Significant ($P < 0.05$) differences were observed among 7, 14, 28 and 56 days silage groups for pH. In conclusion the result obtained in the study showed that recombinant inoculant, inclusion especially to the barley silage improve pH value under our experimental condition.

Key words: Barley silage, recombinant inoculant, silage pH

FORAGE RESOURCES FOR RUMINANT IN BULGARIA

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ABSTRACT

The paper is a brief overview of climate and forage sources of feed of the ruminants – cattle, sheep and goats in Bulgaria. Main sources for grazing and preparing of hay in spring-summer season are the natural pastures, and on feeding rack are the preserved forages – haylage and silage of forage cultures, grown on arable land. The natural pasture swards cover 1/3 of the agricultural area in Bulgaria, they comprise natural species, resistant to extreme temperatures, but their yield is low. They are suitable for extensive stock-breeding and to obtain healthy food of animal origin. The sown pasture swards in Bulgaria take a small share, but more and more farmers are interested in establishment of artificial pastures close to the farm. The big cattle breeding farms rely mainly on hay and haylage from alfalfa, and maize silage. The feeding for most of them have been all year-round in feeding racks in the shed. In the paper are given data for the composition of a natural sward of the mountain and foothill pastures in Bulgaria. Attention is paid on main grass-feed sources such as the alfalfa, peas and vetch, waste harsh forage, as well as maize for silage and some new technological methods for silage making.

POSSIBILITIES OF USING FUNGI WITH THE AIM OF ENHANCING THE FEED VAULES OF LOW QUALITY FORAGES

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ABSTRACT

It is essential to produce cheaper and alternative forage sources in order to meet the forage requirements of livestock enterprises. Among the forage sources, which can be used to achieve this aim, are low quality forages such as rice straw, corn straw, soy straw, sunflower head and stalks, which all have lower protein and energy contents and higher cellulose and lignin contents. Various physical, chemical and biological methods were developed in order to increase the digestibilities of these by products which are called as "lignocellulosic materials". The biological methods has come to the fore as the chemical methods require use of chemicals and also lead to enviromental pollution and physical methods are not adequately efficient. One of these biological methods is the use of fungi. The fungi sp. (*Lentinula edodes*, *Pleurotus ostreatus*, *P. eryngii* and *Ceriporiopsis subvermispora* etc.) use ligninperoxidase, manganperoxidase and laccase enzymes to perform their functions related to digestion of lignocellulosic materials. In this article, the possibilities of using fungi with the aim of enhancing the feed values of low quality forages.

Key words: Forage, feed value, fungus, digestibility.

IMPORTANCE OF FORAGE AND CONCENTRATE FEEDING ON MILK YIELD AND MILK QUALITY IN BUFFALOES

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ABSTRACT

The buffalo, in terms of milk quality, is a farm animal with significant economic efficiency. Due to various aspects of the digestive system, it utilizes the poor quality forages better than other ruminants. So, the forage constitutes a large portion of the daily ration for the buffaloes. The forage is essential for the animal's health, regular digestive activity, ingestion of the feed, normal chewing activity, saliva production as well as expected milk yield and milk fat composition. Pasture is the cheapest and the most important source of forage. However, in the cases where the pasture is inadequate, supplementation with grass hay or other forages is beneficial. Generally, when fed with the forage such as straw or other poor quality hays, most of the buffaloes' needs, especially the maintenance requirement are met. Nevertheless, the quality, variety, particle size and daily consumption of the forage which is used to meet the needs of energy, protein and minerals in lactating buffaloes at the optimum level affect the rate of milk fat. Especially, medium quality pasture grasses, green forage, hay and silage improves milk fat. Concentrated feed must be given to the lactating buffaloes depending on the quality and the quantity of the forage, milk yield, milk fat percentage and the price of the forage. For this purpose grains like corn, barley, wheat, sorghum and rye; bran and oilseed meals can be used. Physical and chemical characteristics of forage and concentrated feed and hygienic quality also affect milk yield and quality. For the future and profitability of the buffalo farming/raising, animals should be fed initially with forage and concentrated feed at sufficient quantity and portions according to lactation period.

Key words: Forage, Concentrate, Milk Yield, Milk Fat, Buffaloes

CAROB (*CERATONIA SILIQUA L.*) AND ITS USAGE FOR ANIMAL NUTRITION IN TURKEY

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ABSTRACT

Carob (*Ceratonia siliqua* L.), which is a legume adapting to typical Mediterranean Climate and similar climates, grows naturally in the territory from Mediterranean Region to Aegean coastline in Turkey. The widest range is the zone between Antalya-Silifke and Antalya-Alanya. As this plant contains gallic acid, it has antioxidant, antibacterial, antiviral, anti-bronchitic, and anti-carcinogenic effects. Besides carob fruit is directly used as animal feed, generally milled or pulped types are used in animal nutrition. Carob processing industry in Turkey produces a lot of residuals in the shape of unseeded pulp and farmers procure these at a low cost. The silage obtained from the pulp also is given to the animals. Some studies have reported that carob is rich in energy and cellulose content, and affects the digestibility of the nutrient and productive performance in various ways depending on the levels with which it is used in the rations. In this review, the utility of this invaluable plant growing naturally at ecologically appropriate places in Turkey in animal nutrition has been summarized.

Key words: Carob, Animal Nutrition, Energy, Cellulose

CHARACTERIZATION OF BACTERIOCIN PRODUCED BY *LACTOCOCCUS LACTIS* SSP. *LACTIS* STRAINS ISOLATED FROM MARINE FISH CAUGHT IN THE ALGERIAN WEST COAST

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ABSTRACT

A total of 38 strains of *Lactococcus lactis* ssp. *lactis*, were isolated from gastrointestinal tract of coastal fish: sardine (*Sardina pilchardus*) and bug (*Boops boops*). These isolates were tested for their ability to produce bacteriocins against *Listeria innocua*, *Brochothrix thermophacta*, *Salmonella* sp., *Staphylococcus aureus*, *Bacillus cereus*, *Aeromonas hydrophila*, *Pseudomonas aeuroginosa* *Escherichia coli* and Methycilin resistant *Staphyococcus aureus*. However characterization of the antimicrobial substances showed that only 04 of isolates produced antimicrobial activity in the neutralized cell-free supernatant treated with catalase against indicator strains. The compounds produced by the selected strains were fully or partially inactivated by some of the proteolytic enzymes (trypsin, α -chymotrypsin , proteinase K and pronase), which indicates their proteinaceous nature. The antimicrobial activity of crude supernatant fluid was stable after heating at 100 °C for 10 min and declined thereafter. It was also active over a wide pH range (2–8), but the highest activity was observed in the lower pH range. Selected strains in this study might be valuable for practical application as source of bacteriocin, providing future scope for the biopreservation of seafood products.

Key words: Marine fish, *Sardina pilchardus*, *Boops boop*, *Lactococcus lactis* ssp. *lactis*, Antimicrobial activity, bacteriocin, biopreservation.

DISEASE PROBLEMS IN SEAFOOD PRODUCTION IN TURKEY

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ABSTRACT

Aquaculture include breeding, rearing, and harvesting of animals and plants in all types of waters Mediterranean fish farming depends on the carnivorous fish species such as sea bass (*Dicentrarchus labrax*), gilt head sea bream (*Sparus aurata*), and also alternative species likes harps out sea bream (*Diplodus puntazzo*). In Turkey, sea bass is mainly produced fish species. The production of species was 65 512 tons in 2012. Another important fish species is gilthead sea bream and its production in 2012 was 30 743 tons; however, sea food production in Turkey is seriously affected by disease outbreaks. The aim of this study is to inform about disease problems which are observed in the cultured marine fish species. Mortalities caused by bacterial infections such as vibriosis, photobacteriosis, and flexi-bacteriosis have been reported by different authors. Vibriosis is the most faced disease and is a septicaemic infection of the marine fish. The disease is caused by different *Vibrio* species like *Listonella (Vibrio) anguillarum*, *Vibrio alginolyticus*, *V. harveyi*. Another important disease is photobacteriosis. The agent is *Photobacterium damsela* subsp. *piscicida*. It is characterized by white colored granulomatous lesions in spleen, kidney, and liver. *Tenacibaculum maritimum* causes marine flexibacteriosis in sea bassand gilthead sea bream. The less stated bacterial disease is mycobacteriosis. Lymphocystis is the most frequently detected viral infection in the gilthead sea bream. Sea food associated parasitic infestations are *Lernanthropuskroyeri* (vanBeneden, 1851), and *Ceratotho aoestroides* (Risso, 1826).

Key words: seafood, production, disease problems,

ASSESSMENT OF CONTAMINATION BY HEAVY METALS (LEAD, CADMIUM AND ZINC) OF A TELEOST THE SPOTTED WEEVER (*TRACHINUS ARANEUS* CUVIER, 1829) CAUGHT IN THE BAY OF ORAN

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ABSTRACT

Our study focused on the evaluation of the three micro- contamination: lead, cadmium, zinc, a common bony fish in the western Mediterranean coast of Algeria , Spotted weever (*Trachinus araneus*, Cuvier, 1829) . Sampling took place over a period of three months from February to April, 2013, two bodies were considered representative for the edible part man and gills that represent the filter unit muscle. The concentrations of the metal elements were determined by Atomic Absorption Spectrophotometry The flame , according to three parameters (gender, height and month) And levels of metal accumulation were determined. In this study, the results reveal that the Spotted weever (*T. araneus*) bioaccumulate three xenobiotics sought; the higher levels are those of zinc, lead to higher concentrations in the lower and lower concentrations are those of cadmium. The results were statistically processed demonstrated no significant difference between the levels of heavy metals in both sexes in muscle tissue against significant values are noted in the gill tissue. The study reveals that the accumulation of pollutants is higher in females than in males. Similarly, it is clear the chemical pressure is marked in younger individuals. Levels of concentrations of metallic elements reflect a certain pollution of the study area (Bay of Oran). In this study, trace metals recorded in the flesh of the living spider does not exceed the limit of the Maximum Allowable Dose (D.MA), but can lead to serious dysfunction in these fish.

Key words: Spotted weever, *Trachinus araneus*, metals (lead, cadmium, zinc), contamination, Muscle, Gill, DMA, Bay of Oran, Mediterranean.

**MOLECULAR IDENTIFICATION OF THE TREE SPECIES OF THE GENUS CHONDROSTOMA IN LAKES
AND RIVERS IN R.MACEDONIA**

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Abstract

Molecular analyses have been used to analyze a total of 45 fish individuals collected from different localities in Republic of Macedonia. The following were encompassed: River Bregalnica - tributary of River Vardar and two natural lakes-Ohrid Lake and Prespa Lake. Samples affiliated with the three previously mentioned fish species on the territory of Republic of Macedonia: *Chondrostoma ohridense.*, *Chondrostoma prespense*, and *Chondrostoma vardareense*. Ten random primers were employed to generate RAPD markers. Various RAPD profiles were observed for the different species.

Key words: RAPD, molecular identification, *Chondrostoma*

BIOLOGICAL INVASION: INVASIVE FRESHWATER FISH SPECIES OF THRACE REGION-TURKEY

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ABSTRACT

Non-native species is a species living outside its native distributional range, which has arrived there by human activity, either deliberate or accidental. Non-native species can have various effects on the local ecosystem. Benefits and harms of alien species are not known enough. Introduced species that have a negative effect on a local ecosystem are also known as invasive species (Sax, D., 2008). Freshwater ecosystems are particularly affected by non-native species introductions (Dudgeon *et al.*, 2006). Understanding of the aquatic invasions is important for protection of freshwater ecosystems. In this study, invasive freshwater fish species seen in the Thrace region of Turkey are mentioned.

Key words: Biological diversity, Freshwater fishes, Invasive species, Thrace Region.

BIODIVERSITY, BIOINDICATION AND HELMINTH COMMUNITIES OF *ABRAMIS BRAMA* (LINNAEUS, 1758) FROM THE DANUBE RIVER AND LAKE SREBARNA, BULGARIA

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ABSTRACT

Biomonitoring from water of the River Danube and Srebarna Lake was performed using freshwater fish and their parasites and parasite communities as bioindicators. During 2013, 78 specimens of carp bream (*Abramis brama* (L., 1758)) were examined with standard techniques for parasites. Three species of parasites (*Gyrodactylus elegans* Nordmann, 1832, *Diplozoon paradoxum* Nordmann, 1832 and *Pomphorhynchus tereticollis* (Rudilphi, 1809)) were fixed. The analysis of the dominant structure of the found taxa was presented to the level of the component communities. New parasite and host records were determined. All fixed parasite species are core for the parasite communities of examined fishes. Concentration of heavy metals (Pb, Zn, Cu) in fish (muscle, liver, intestines and bones), some endohelminth species as bioindicators and bottom sediments were analyzed. Bioindicator significance of parasite species was studied. For an ecological evaluation of the situation of the analyzed freshwater ecosystems, principal biotic indexes were fixed.

Key words: bioindication, *Abramis brama* parasite communities, heavy metals, Lake Srebarna, River Danube.

EFFECTS OF DIETS SUPPLEMENTED WITH POMEGRANATE PEEL EXTRACT ON GROWTH PERFORMANCE, SOME BLOOD PARAMETERS AND SURVIVAL OF CARP (*CYPRINUS CARPIO*) FRY INFECTED WITH *AEROMONAS HYDROPHILA*

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ABSTRACT

This study was carried out to evaluate the effects of ethanol extract of pomegranate peel (*Punica granatum*) on growth, body composition, blood parameters and resistance to *Aeromonas hydrophila* of common carp fry, *Cyprinus carpio*. Five isonitrogenous (38.5% crude protein) and isocaloric (3580 kcal/g) experimental diets were formulated to contain 0.0% (control), 0.1%, 0.5%, 1.0%, and 2.0% of pomegranate peel extract. Fish (4.37 g) were distributed into triplicate tanks per treatment at a rate of 20 fish per 65-L aquarium and fed thrice a day up to apparent satiation. At the end of the feeding trial, five fish were randomly sampled for blood analyses and five fish for determination of body composition. The remaining fish were used for a challenge test by *A. hydrophila* and their mortality was monitored over 10 days post-challenge. Linear and quadratic effects of dietary pomegranate peel extract levels on the responses were tested to reveal the trends. A statistical package JMP v.8.0 for Windows was used for the statistical analyses. Results showed that pomegranate peel extract treatments had a significant increasing effect on final weight and specific growth rate (linear $P < 0.05$). However body composition, condition factor, feed conversion ratio, feed and protein intakes, serum glucose, blood urea nitrogen, triglyceride, cholesterol, alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, total protein, creatinine, albumin, total globulin levels, hematological parameters and lysozyme activity did not change regardless of dietary pomegranate levels ($P > 0.05$). The survival of fish challenged by *A. hydrophila* decreased in pomegranate supplemented treatments and the control (70%) during 10 days after infection. These results indicated that oral administration of pomegranate peel extract to juvenile carp neither stimulated immunity nor developed a resistance against *A. hydrophila* infection. Further studies are needed to investigate the possibility of including higher levels of pomegranate peel extract in fish diets than levels included in the present study.

Key words: Carp performance, pomegranate peel extract, blood biochemistry, hematology, *Aeromonas hydrophila*.

HELMINTH COMMUNITIES OF SILURUS GLANIS AND ITS BIOINDICATOR SIGNIFICATION FOR THE CONDITION OF THE IVAYLOVGRAD RESERVOIR, BULGARIA

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ABSTRACT

Biodiversity and ecological particularities of the parasite communities of the wels catfish (*Silurus glanis* L., 1758) from the Ivaylovgrad Reservoir were studied during 2013. Eleven specimens of *S. glanis* were examined with standard techniques for parasites and heavy metal contamination. The purpose of this research is to represent new data for the biodiversity, prevalence, intensity and mean intensity, mean abundance of parasite communities of *S. glanis* from the Ivaylovgrad Reservoir. Concentration of heavy metals (Pb, Zn, Cu) in fish (muscle, liver, intestines and bones), some endohelminth species as bioindicators and bottom sediments were analyzed. The obtained results for the parasite communities of *S. glanis* correspond and are in close connection with dependence of the biology and ecology of the determined species of helminthes and the place of the intermediate hosts as bioindicators for the status of the studied natural freshwater ecosystems. The results may be applied in the various monitoring systems for assessment and forecast of the Ivaylovgrad Reservoir condition.

Key words: parasite communities, heavy metals, bioindication, *Silurus glanis*, Arda river – Ivaylovgrad reservoir.

**A MODEL FOR AQUACULTURE: FRESHWATER FISH PRODUCTION AND RESEARCH CENTER OF
ATATURK UNIVERSITY, FACULTY OF FISHERIES**

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ABSTRACT

The continuously increasing world population and insufficient food production have raised the issues of famine and unbalanced nutrition, in recent years. This situation is the leading issue among the problems of mankind, which should be solved. To overcome this problem, people have been conducting different studies to produce foods from resources of plant and animal origins. The increase in the world population and the absence of new arable lands has made it necessary for the people to feed more on aquatic resources. The aquaculture industry is an industry that has been on the rise over the last years. Aquaculture products, which are the products of animal origin that we import to EU countries, also play an important role in the economy of our country. Due to the fact that the national growth in the aquaculture industry also spread to our region, the Department of Breeding will contribute to the effective use of our national and regional water resources. At the Inland Water Fish Practice and Research Center of our Faculty, we provide spawn and brood fish to the producers in the region, as well as performing the majority of practices of the breeding courses. Our faculty, whose main aim is to develop technical staff with proper knowledge, compliant with the conditions of today, also supplied spawns and fry besides technical support. Within this period, besides the above mentioned facts, it is very pleased to be the first answerer of the firms which design to invest in this province regarding this industry and serving these businesses. In 2013, Faculty of Fisheries was authorized by Ministry of Food, Agriculture and Livestock to produce 10 tons of fish (8 tons of rainbow trout, 1 ton of brown trout and 1 ton of brook trout), and 1 800 000 pieces of fingerlings (1 500 000 pieces of rainbow trout, 150 000 pieces of brown trout and 150 000 pieces of brook trout) annually.

Key words: Aquaculture, *Oncorhynchus mykiss*, *Salvelinus fontinalis*, *Salmo trutta fario*

FATTY ACIDS AND AMINO ACIDS IDENTIFICATION OF *PAMPUS ARGENTEUS* VACUUM PACKING FILLET AND DETERMINATION OF STORAGE TIME AT -18°C

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Abstract

The aims of this research were to identify the amino acid, fatty acid profile and proximate analysis and their changes in the fillet of *Pampus argenteus* during six months of cold storage at -18° C. As the results 16 amino acids were identified, which 9 of them were essential and the others were nonessential amino acids. In the fresh sample, the sum of essential and nonessential amino acids were 53.94 and 45.92 percent, respectively; however, these values were changed significantly ($P<0.05$) during the cold storage period and were reported as 51.32 and 49 percent, respectively. Twenty five fatty acids were also identified in the fresh sample. The sum of saturated and unsaturated fatty acids in the fresh sample was 50.04 and 42.70 percent, respectively; however, these values were changed during the cold storage period and were reported 47.98 and 41.06 percent, respectively. The values for Trideconoic, Henicosonoic, Arashidic, Meristoleic, Pentadesnoic, Gamalinoleic, Orosic, Neronic, Eicosapentanoic and Docosahehexanoic were significantly changed ($P<0.05$). In the fresh sample the mounts of moisture, ash, crude lipid and protein were evaluated, which were reported as 74.80 ± 0.25 , 1.4 ± 0.18 , 5.1 ± 0.11 , 19 ± 0.27 percent, respectively. At the end of the cold storage period the aforementioned values were changed significantly ($P<0.05$) which were determined as 75.87 ± 0.1 , 2.23 ± 0.48 , 3.37 ± 0.15 and 18.15 ± 0.29 percent, respectively. The evaluated value for peroxide and TVN in the fresh sample were 0.095 ± 0.004 meq/kg and 13.05 ± 0.09 mg/100g respectively, and at the end of the cold storage procedure the values were changed significantly ($P<0.05$) and were equal to 3.93 ± 0.05 meq/kg and 27.76 ± 0.3 mg/100g, respectively.

Key words: *Pampus argenteus*, Cold storage, Amino acid, Fatty acid, Protein, Lipid, Moisture, Approximate analyses

FATTY ACIDS AND AMINO ACIDS IDENTIFICATION OF *SCOMBEROMORUS GUTTATUS* VACUUM PACKING FILLET AND DETERMINATION OF STORAGE TIME AT -18°C

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Abstract

The aim of this research were to identify the amino acid, fatty acid profile and proximate analysis and their changes in the vacuum packing fillet of *Scomberomorus guttatus* during six months of cold storage at -18°C. As the results revealed 15 amino acids were identified, which eight of them were essential and the others were categorized as nonessential amino acids. In the fresh sample, the sum of essential and nonessential amino acids were equal to 55.09 and 44.77 percent, respectively; however, these values were changed significantly ($P<0.05$) during the cold storage period. Twenty four fatty acids were also identified in the fresh sample. The sum of saturated and unsaturated fatty acids in the fresh sample were 51.52 percent, respectively; however, these values were also changed during the cold storage period and were reported 48.98 and 45.95, respectively. The amount of Loric, Meristoleic, Palmitic, Estearic, Gamalinoleic, Arashidic, Henicosonoic, Orosic, Tricosanoic, Eicosapentanoic, Neronic, Docosahexanoic and Eicosadienoic were significantly changed ($P<0.05$). In the fresh sample, the amounts of moisture, ash, crude lipid and protein were evaluated, and reported as 70.77 ± 0.30 , 1.35 ± 0.01 , 6.29 ± 0.41 , and 21.75 ± 0.15 percent, respectively. At the end of the cold storage period the aforementioned values except moisture (71.85 ± 0.10), and crude lipid (5.48 ± 0.07) were changed significantly ($P<0.05$) which were determined as 2.21 ± 0.20 , 20.81 ± 0.06 percent respectively. The evaluated value for peroxide and TVN in the fresh sample were 0.08 ± 0.00 meq/O₂/kg and 11.80 ± 0.17 mg/100g respectively, and at the end of the cold storage procedure the values were changed significantly ($P<0.05$).

Key words: *Scomberomorus guttatus*, Cold storage, Vacuum packing, Amino acid, Fatty acid, Approximate analysis

A VIEW OF BIOCHEMISTRY, SAFETY, AND PROCESSES OF FISH

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ABSTRACT

Balanced and sufficient nutrition must be essential in the human health, Evaluation of fish products contain processed fish products apart from fresh or natural consumption of fish and its waste and by-products. Food safety is the great issue of the food consumption that means providing food production without becoming any risk and hazard to human health from field or source of food until reaching consumer fork. Food safety also comprises environment factors. It is well known that fish has a rich biochemical composition or high nutritive value. Balanced nutrition to be able to get all of nutrients, particularly essential nutrients such as essential amino acids, essential fatty acids, minerals, vitamins that cannot be synthesized food compounds in the human body. Sufficient nutrition is providing intake of daily energy requirement. On the other hand, evaluation of waste or by products processed fish is the important from point of both health and economy that including environment. Water pollution is the great threatened to food safety. In this review, mentioned topics will be explained in detail.

**ON OCCURENCE OF FLYING GURNARD (*DACTYLOPTERUS VOLITANS* LINNAEUS, 1758) IN THE
GALLIPOLI PENINSULA (NORTHERN AEGEAN SEA, TURKEY)**

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ABSTRACT

A single specimen of Flying Gurnard (*Dactylopterus volitans* Linnaeus, 1758) was caught on 18 September 2013 in the Gallipoli Peninsula (Northern Aegean Sea, Turkey). This study is a first occurrence of *D. volitans* in the Gallipoli Peninsula.

Key words: Occurrence, Flying Gurnard, *Dactylopterus volitans*, Northern Aegean Sea

LENGTH-WEIGHT RELATIONSHIP AND REPRODUCTION OF CHUB MACKEREL (*SCOMBER JAPONICUS* HOUTTUYN, 1782) FROM DARDANELLES (NORTHEASTERN MEDITERRANEAN, TURKEY)

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ABSTRACT

This study was carried out, monthly, in six different stations in the Dardanelles (Northerneastern Mediterranean, Turkey) between January 2012 – December 2012. The sex ratio (F:M) was 1:0.85. The length-weight relationships were calculated, separately, for females and males as: $W = 0.0069TL^{3.08}$ ($R^2 = 0.95$, % CL of $b = 3.03 - 3.13$), $W = 0.0083TL^{3.03}$ ($R^2 = 0.95$, % CL of $b = 2.98 - 3.08$). The elevated GSI values suggested the spawning period was from June to August.

Key words: Length-weight, Reproduction, Chub mackerel, *Scomber japonicus*, Dardanelles

OXYGEN UPTAKE IN A FRESHWATER AIR-BREATHING FISH WITH MACROPHYTES

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ABSTRACT

In the cultivation of various fish species in aquaculture is an important to have enough dissolved oxygen available for fish respiration. This oxygen can be produced by the photosynthesis of aquatic plants and algae. The purpose of this study was to monitor the uptake of oxygen in the growing of fish with macrophytes. The experimental part was consisted of three aquariums with *Perca fluviatilis* - as one without macrophytes (like a control) and the other two with macrophytes (*Lemna* sp., *Myriophyllum* sp.). Oxygen uptake rate was measured at water temperature $23\pm 1^{\circ}\text{C}$. Experiments give an estimate of only aquatic oxygen uptake through gills at the water flow of $150\text{ ml}\cdot\text{min}^{-1}$ ($9\text{ l}\cdot\text{h}^{-1}$) with a cylindrical glass respirometer. The mean oxygen uptake rate is better in the cultivation of *Perca fluviatilis* with *Lemna* sp.

Key words: *Lemna* sp., *Myriophyllum* sp., oxygen uptake, *Perca fluviatilis*

MODELLING DEPOSITION OF PARTICULATE ORGANIC MATERIALS DERIVED FROM MARINE CAGE FARMS: EFFECTS OF DEPTH, CURRENT SPEED AND FEEDING RATE ON IMPACT AREA

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ABSTRACT

Accumulation of particulate organic materials (POM) derived from marine cage farms is the crucial component of their environmental impact. Determination of the deposition rate and deposition area (footprint) is important to make appropriate impact assessment of cage farms and develop sustainable management strategies. In recent years, various computer models were developed to determine deposition rates of POM that can be used for better management of marine cage farms and sustainable production. In this study, the deposition rates and distribution area of POM derived from a marine cage farm located in Gerence Bay (Çeşme, İzmir, Turkey) have been determined using a software developed for impact assessment of marine cage farms (MERAMOD, v.1.4). For this purpose, data on farm characteristics (number of cages, biomass, farm layout, depth) and hydrodynamic conditions (current speed and direction) have been collected over a 2 year period. These data were then used to determine the deposition rates and distribution area of POM for a set of different conditions in current speed, depth and feeding rates. Increasing current speeds resulted in larger distribution areas indicating the importance of current speeds underneath the cages. With the existing current speed of 2.7 cm sn^{-1} , the area of the foot print was 18.922 m^2 corresponding to a deposition rate of 900 kg yr^{-1} . When the mean current speed was increased to 8.1 cm sn^{-1} , the deposition area increased to 34.993 m^2 , corresponding to a flux of 1050 kg yr^{-1} . Deeper sites had also a positive effect on the deposition of POM by increasing the distribution area. When the depth of the farm site was increased from 20 to 60 m, the deposition area of maximum flux was also increased by 2.5 fold, from 2633 m^2 to 6602 m^2 . Increasing fish biomass had considerable effect on deposition rates. A three-fold increase in stocking rates corresponding to an increased feeding rate from 85 kg cage^{-1} to $255 \text{ kg cage}^{-1} \text{ day}^{-1}$ resulted in an increase in deposition rate from $1630 \text{ gr m}^{-2} \text{ yr}^{-1}$ to $4000 \text{ gr m}^{-2} \text{ yr}^{-1}$. Increased current rates had also similar positive effects resulting in larger distribution areas. Larger distribution areas will help reducing the environmental impact of marine cage farms due to reduced accumulation rates that will result in higher oxygen concentrations in the sediment which in turn, will create conditions for assimilation by the local fauna, thus reducing the impact. Since feeding and fecal waste are the main sources of POM, reduced feeding rates resulted in less flux indicating the importance of determination of carrying capacity for a given farm location. Modeling can be a useful tool for monitoring the environmental impacts of existing cage farms and evaluating future farm locations in coastal areas. Further studies on validation efforts of simulations are required for more powerful use of modeling as an important component of their impact assessment.

Key words: Marine cage farms, Environmental impact, Pollution, Particulate organic material, MERAMOD, Modeling.

ORGANIC FISH PRODUCTION IN TURKEY: CURRENT STATUS AND FUTURE PERSPECTIVES

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ABSTRACT

In this study, current status and future perspectives of organic fish production in Turkey was discussed. Organic fish farming that is fairly new in Turkey has been started with the production of carp in Germany and Austria by the early 90s. The fish are referred as an organic fish when produced according to the principles of organic aquaculture production and controlled and certified at every stage from production to consumption. Organic fish farming which is an alternative model for sustainable aquaculture aims to protect animal and human health without polluting the environment. Both in the world and in the Turkey, as a result of the absence of standards and laws that regulates the organic fish farming, organic fish farming has been very late when compared to other organic agriculture areas. In the Turkey, the organic fish production based on Organic Agriculture Law (No. 5262/2004) and the Regulation on Principles and Application of Organic Agriculture (No.27676/2010). After the formation of the official regulations and standards by the year 2010 there are 6 fish farms completed certification for organic production in the Turkey. Certification process of organic fish production are quite bureaucratic and expensive for new entrepreneurs. Also the organic production standards require the use of expensive organic feed in production. Organic fish feed and low stock density caused high production costs in organic aquaculture when compared to conventional aquaculture. At the future, trends of organic fish production in Turkey will be determined by price and demand in the market.

Key words: Organic fish, species, procedures, rules, certification, organic fish farms

TROPHIC ETHOLOGY OF COMMON GENET *GENETTA GENETTA* (LINNÉ, 1758) AROUND LAKE TONGA AT THE NORTH EASTERN OF ALGERIA

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ABSTRACT

The present study is realized around the Lake Tonga which is located in El Kala National Park at the north eastern of Algeria. The Lake has a great importance given by its biodiversity. The decortication of 35 droppings of common genet (*Genetta genetta* L., 1758) collected from July 2012 to February 2013 and the identification of the preys find revealed the presence of 1079 items divided into 119 families. The collecting of the droppings was done each month. The class of Insecta is the dominant one (R.A. % = 75.5 %), followed by Batrachia (R.A. % = 7.9 %), then Arachnida (R.A. % = 7.1 %). The dominant species in relatives abundance is *Tetramorium biskrens* (R.A. % = 9.2 %) followed by *Discoglossuspictus* (R.A. % = 7.8 %). The values of Shannon-Weaver index varied from 2.25 to 4.91 bits, 31 out of 35 analyzed droppings have values higher than 3 bits which indicates an important diversity of prey. The values of the equitable index vary from 0.67 to 1, we indicate that 32 out of 35 decorticated droppings have values higher than 0.84. The operating results with index such as the relative biomass index indicate the dominance of the Aves class (B % = 41.9 %) succeeded Mammalia (B % = 17.6 %) and Batrachia (B % = 15 %). The value of fragmentation index applied on pieces of *Rhizotrogus* sp. and on fragment bone of *Discoglos suspictus* and *Apodemus sylvaticus* indicates high values of fragmentation.

Key words: Common genet, Lake of Tonga, diet, relative biomass, *Discoglos suspictus*.

EFFECTS OF FEEDING SYSTEM ON RATES OF FEEDING AND WELFARE BEHAVIOURS BY KARAYAKA MALE LAMBS WITH DIFFERENT BIRTH WEIGHT

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ABSTRACT

After weaning, 14 low birth weight (LBtW, 20.1 ± 0.92) and 14 high birth weight (HBtW, 21.1 ± 1.38 kg) Karayaka male lambs, 3 months of age, were used to compare feeding system with different dietary treatments throughout the day. While seven lambs in the each of these groups were fed *ad libitum* with TMR, the other seven lambs were fed with free-choice feeding (FCF). The TMR was consisted of 80% of a commercial compound feed and 20% of roughage based on a dry matter basis (140 g crude protein and 2550 kcal ME/kg), whereas the FCF consisted of the same ingredients as that of TMR, but putted each ingredient into five separate troughs throughout the daily. Hence, there were four experimental treatments after weaning; namely TMR-fed LBtW, FCF-fed LBtW, TMR-fed HBtW and FCF-fed HBtW. To determine the behavioural responses, such as eating, ruminating, drinking, standing, playing and resting of lambs, each lamb was monitored behaviourally twice a week for a period of 1 h at 04:00, 08:00, 12:00, 16:00, 20:00 and 24:00 h at 5 min time intervals twice in a week during experimental period 60 days. Changes in rate of feeding and welfare behaviours of lambs with low and high BtW in the studied times throughout the daily were not dependent on the feeding systems (TMR or FCF). Differences in body weight influenced feeding and welfare behaviours. Lambs in FCF showed more ruminating ($P < 0.01$) and resting ($P < 0.05$), but less drinking, standing and playing behaviours ($P < 0.05$). The present results indicated that there were significant differences in proportions of eating and drinking, rumination, resting and locomotion for Karayaka male lambs with different birth weight fed TMR or free-choice feeding.

Key words: Feeding choice, rate of feeding, feeding time, behavior, feeding system

AN INVESTIGATION OF SOME SERUM MINERAL LEVELS IN NORDUZ EWES REARED UNDER SEMI-INTENSIVE CONDITIONS

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Abstract

The objective of this study was to investigate some serum mineral levels of Norduz ewes reared under semi-intensive conditions. The study was conducted at Research and Application Farm of Yuzuncu Yil University (Van, Turkey). Fe, Cu, Zn, K, Mg, Mn, Pb levels were investigated in blood samples obtained from 96 head Norduz ewes between 2-4 ages. Mineral levels of ewes were determined with atomic absorption spectrophotometer (AAS) in ppm level. Results were expressed as mg/L for Fe, Cu, Zn, Mn, Pb and mmol/L for K and Mg. Mineral levels of Norduz ewes were found as 2.088 ± 0.072 mg/L for Fe, 1.671 ± 0.044 mg/L for Cu, 1.052 ± 0.022 mg/L for Zn, 5.006 ± 0.044 mmol/L for K, 2.169 ± 0.032 mmol/L for Mg, 1.936 ± 0.096 mg/L for Mn and 0.010 ± 0.002 mg/L for Pb. Differences in the levels of Mg and Mn of 2 and 4 old years old ewes were significant ($P < 0.05$). With respect to correlation coefficients between mineral levels, correlations between Fe-K ($P < 0.001$), Fe-Mg ($P < 0.001$), Cu-K ($P < 0.001$), Cu-Mg ($P < 0.001$), Zn-K ($P < 0.001$), Zn-Mg ($P < 0.001$) and K-Mg ($P < 0.001$) were positive and significant. There was not significant negative correlation between mineral levels in Norduz ewes. As a result, it was found that serum mineral levels in Norduz ewes were within physiological ranges.

Key words: Atomic absorption spectrophotometer, Norduz, ewe, serum minerals

AN INVESTIGATION OF SOME SERUM MINERAL LEVELS IN NORDUZ AND HAIR GOATS REARED UNDER SEMI-INTENSIVE CONDITIONS

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ABSTRACT

The objective of this study was to investigate some mineral levels of Norduz and Hair goats with different ages reared under semi-intensive conditions. The study was conducted at Research and Application Farm of Yuzuncu Yil University (Van, Turkey). Fe, Cu, Zn, K, Mg, Mn and Pb levels were investigated in serum samples obtained from 45 head Norduz and 31 head Hair goats between 2-4 ages. Mineral levels of goats were determined with atomic absorption spectrophotometer (AAS) in ppm level. Results were expressed as mg/L for Fe, Cu, Zn, Mn, Pb and mmol/L for K and Mg. Mineral levels of Norduz goats were found as 1.578 ± 0.088 mg/L for Fe, 1.300 ± 0.067 mg/L for Cu, 0.972 ± 0.029 mg/L for Zn, 4.574 ± 0.091 mmol/L for K, 2.089 ± 0.057 mmol/L for Mg, 2.163 ± 0.152 mg/L for Mn and 0.078 ± 0.005 mg/L for Pb. On the other hand, Fe, Cu, Zn, K, Mg, Mn, Pb levels of Hair goats were 1.379 ± 0.095 mg/L, 1.303 ± 0.080 mg/L, 0.937 ± 0.029 mg/L, 4.670 ± 0.098 mmol/L, 2.102 ± 0.074 mmol/L, 2.215 ± 0.198 mg/L and 0.087 ± 0.006 mg/L, respectively. The differences in mineral levels of two genotype groups were not statistically significant. There were no significant differences between age groups in terms of mineral levels, except Fe and K. The levels of Fe and K in 2 years old goats were higher than those of 3 and 4 years old goats ($P < 0.05$). With respect to correlation coefficients between mineral levels, the best positive correlations were obtained between Fe-Cu ($P < 0.001$), Fe-K ($P < 0.001$), Fe-Mg ($P < 0.001$) and K-Mg ($P < 0.001$) for Norduz goats. In addition, correlations between Zn-Mn ($P < 0.01$), Fe-Pb ($P < 0.05$) and Cu-K ($P < 0.05$) were positive and significant. Similarly, high positive correlations were found between Fe-K ($P < 0.001$), Fe-Mg ($P < 0.001$), K-Mg ($P < 0.001$) and Cu-Mg ($P < 0.001$) in Hair goats. Correlation coefficients between Zn-K ($P < 0.01$), Fe-Cu ($P < 0.05$), Fe-Zn ($P < 0.05$), Cu-Zn ($P < 0.05$), Cu-K ($P < 0.05$) and Zn-Mg ($P < 0.05$) were also positive and significant. Regarding the negative correlations, correlation coefficient between Cu-Pb was found significant ($P < 0.05$) in Hair goats. There was not significant negative correlation between mineral levels in Norduz goats. As a result, it was found that serum mineral levels in Norduz and Hair goats were within physiological ranges.

Key words: Atomic absorption spectrophotometer, serum minerals, goats

CHANGES IN COMPOSITION OF EWE COLOSTRUM DURING SEVEN DAYS POSTPARTUM

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ABSTRACT

Awassi sheep are the most productive and preferential small ruminants in Middle East countries and Turkey. The chemical composition Awassi sheep's colostrum from the University herd was analysed during seven days postpartum period. Data from 30 Awassi sheep at 2 years old with single-dropping were used to determine colostrum composition during 7 days after parturition. The first colostrum samples (400 ml) were collected after birth before suckling and sample collection was repeated with 24 hours interval during 7 day. Colostrum contains high level of many nutrients; high level of antibodies against a variety of infectious agents which has a vital importance for lamb health and performance. It is critical important that lambs receive colostrum during the first 24 hours of life in order to ensure adequate absorption of colostrum antibodies. There was considerable variation in chemical composition during the first day and the seventh day of postpartum. Fat content decreased from 11.26 ± 0.21 at first day to 3.91 ± 0.139 at seventh day. Protein concentration decreased sharply after the 3rd day. Results of the statistical analyses indicated significant day effects on the contents of total solid, solid non fat, fat, protein, lactose, casein, urea, density, acidity, free fatty acid, citric acid, freezing point depression ($p < 0.01$) and density ($p < 0.05$). Total solid, fat, protein, casein, urea and FFA contents were the highest on d1 and decreased gradually from the first day to 7 days postpartum whereas lactose and citric acids contents increased. After postpartum, TS, SNF, fat, protein, lactose, casein, urea, density, acidity, FFA, citric acid and FDP content of ewe milk were found to be 28.90 ± 0.086 %, 17.21 ± 0.075 %, 11.26 ± 0.21 %, 11.98 ± 0.012 %, 3.12 ± 0.046 %, 8.57 ± 0.370 %, 49.58 ± 1.84 mg/dl, 1.030 ± 0.001 g/cm³, 30.82 ± 0.029 SH, 9.52 ± 0.252 mmol ffa/100g fat, 0.085 ± 0.002 % and 0.963 ± 0.029 whereas normal ewe milk is to be as 11.80 ± 0.372 %, 8.85 ± 0.193 %, 2.72 ± 0.138 %, 4.03 ± 0.599 %, 3.75 ± 0.338 %, 2.953 ± 0.339 %, 64.58 ± 1.979 mg/dl, 1.030 ± 0.001 g/cm³, 10.04 ± 1.380 SH, 7.30 ± 0.110 mmol ffa/100g fat, 0.144 ± 0.005 %, -0.517 ± 0.006 , respectively.

Key words: Awassi Milk, Colostrum, Postpartum, Chemical composition

EFFECT OF THE LINE ON THE PRODUCTION TRAITS OF FINE FLEECE RAMS

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ABSTRACT

In order to establish the effect of the genealogical line of rams the herd on the quantitative and qualitative traits of the wool and their live weight study was conducted in two groups rams 1.5 years of Karnobat fine wool breed. The animals of the first group, 153 in number were born in the period 1991-1996, and from the second-63 numbers, in the period 2002 - 2007. On rams comparative assessment was made on its own productivity, as the animals were 4 genealogical lines. Line 2081 and line 777 originated in a brood of Australian merinos and the 1825 line-ram of North-East-Bulgarian fine wool breed. Data for wool productivity, wool yield, clean wool, staple length, wool thickness and live weight were processed by the methods of variation statistics and were adjusted for the impact of the year. Is established between the lines some differentiation as signs wool productivity distinguished line 777, wool yield, clean wool, staple length and live weight, line 2081, and wool thickness-line 576. During the period 1991-2007 year wool productivity, quantity clean wool and live weight were slightly lower and the wool yield - sensibility increased. The wool thickness was maintained in the bounds of requirements for the merino wool.

Key words: ram productivity, line, wool productivity, wool yield, clean wool, staple length, wool thickness, live weight

CONSERVATION OF GENETIC RESOURCES IN LIVESTOCK BREEDING IN THE EXPERIMENTAL STATION OF AGRICULTURE - SREDETS

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ABSTRACT

Protection and preservation of valuable local breeds is a priority of the Experimental Station of Agriculture - Sredets for implementation of the state policy in the field of breeding, management and conservation of genetic resources. These processes are a function of the Livestock Act, which defines as important tasks management of genetic resources, their use for efficient production of animal products and the conservation of populations of farm animals adapted to different agro-ecological regions of the country. The East Balkan swine and Bulgarian gray cattle are local breeds, classified by risk status as endangered under the approach of FAO (2007). Both breeds are nuclei and are included in the records of the breeding herds maintained regulated by EASRAB. In recent years due to aggressive human activity valuable local breeds that are part of the heritage of the country have irrevocably disappeared. Proper management of genetic resources requires compliance with the principles of sustainable development in agriculture and stopping loss of populations of local breeds. Experimental Station of Agriculture - Sredets works on the ambitious task of contributing to the protection and maintenance of genetic diversity among domestic animals in Bulgaria, by storing and maintaining both valuable rare breeds - Bulgarian gray cattle and East Balkan swine.

Key words: Genetic Resources, East Balkan swine, Bulgarian gray cattle, Strandja, local breeds

INFLUENCE OF THE TEMPERAMENT OVER THE MILK-YIELD OF GOATS OF BULGARIAN WHITE MILK BREED AND ITS CROSS-BREEDS WITH TOGGENBURG AND ANGLO-NUBIAN BREED

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ABSTRACT

The relation between milk productivity and the temperament in goats of Bulgarian White Milk breed and its cross-breeds are with Toggenburg and Anglo-Nubian. The temperament of 53 goats was evaluated, as these of nervous and calm temperament were respectively 35 and 18 animals at the age from 1.5 to 8.5 years. It was found that the temperament of mother goats corresponded to the level of milk productivity, in mechanical milking. The mothers from the group of calm temperament had 3.4% higher milk yield in comparison with the goats with nervous temperament.

Key words: goats, behaviour, milk yield, temperament

ADULT LIVE WEIGHT ESTIMATES OF HASMER AND HASAK SHEEP WITH THEIR SOME BODY MEASUREMENTS

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ABSTRACT

This study aimed to determine some regression models to estimate the adult live weights of Hasmer and Hasak sheep in different age groups as used with their body measurements. The animal materials, Hasak (223 heads) and Hasmer (158 heads), in total 381 heads, which were improved for meat, were obtained from Bahri Dagdas International Agricultural Research Institute. The least square means belonging to live weight (LW), wool yield (WY), chest circumference (CC), withers height (WH), rump height (RH), chest depth (CD), and body length (BL) for the animal material were found as 58.47 kg, 2.57 kg, 90.96 cm, 67.81 cm, 67.44 cm, 29.07 cm and 67.62 cm respectively. The best forecasting powers in created the multiple regression models were obtained from the models belonging to the chest circumference, and chest circumference and wither height ($R^2= 0.826$ $R^2= 0.845$). As a result, body weight could be estimated with statistical methods in high accuracy using somebody measurements in Hasmer and Hasak sheep has been demonstrated.

Key Words: Live weight, Body Measurement, Correlation, Regression

OPPORTUNITIES FOR THE WELFARE IMPROVEMENT OF LAYING HENS UNDER SEMI-OPEN REARING DURING THE COLD PERIOD WITH ARGININE AND VITAMIN C SUPPLEMENTATION

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ABSTACT

The purpose of the present study was to evaluate the welfare of *DeKalb Brown* laying hens whose feed was supplemented with 1% L-arginine or either with a combination arginine and vitamin C during the cold winter days, using a assessment model. The welfare was scored on the basis of hen's behavior, plasma corticosterone and several blood biochemical parameters. The extremely low environmental temperatures during the cold period provoked in *DeKalb Brown* hens a cold stress, manifested with excessive blood corticosterone concentrations, behavioural and blood biochemical changes and the welfare score of control hens was PW=46,67 %. The 1% L-arginine supplemented hens were characterized with positive behavioural changes and reduced blood corticosterone and some biochemical indices compared to controls, as well as an increased welfares core to PW=73,33 %. The supplementation with 1 %L-arginine and 250 mg vitamin C during the cold period was reflected positively on the behaviour, blood corticosterone and some biochemical indices in the *DeKalb* hens. Their welfares core increased to PW=80,00% due to the synergic cold stress reducing effect of arginine and vitamin C.

Key words: welfare, DeKalb Brown, arginine and vitamin C, behavior, corticosterone

EFFECT OF SUPPLEMENTATION OF EXOGENOUS ENZYMES AND ORGANIC ACID ON PERFORMANCE OF BROILER

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Abstract

Exogenous enzymes and organic acid are used in poultry feed to reduce feed cost, enhance growth rate and efficient utilization of nutrients. Poultry lacks endogenous enzymes to digest some complex polysaccharides. Enzyme supplementation can improve digestion of such kind of nutrients and enhance growth rate. Current study was conducted to evaluate the efficiency of enzyme activity in the presence of organic acid in broiler chicks. 240 day old Hubbard broiler chicks were reared in 8 groups with 3 replicates per group, comprising 10 birds in each replicate. Dietary treatments comprised of basal diet-T1 (control-1, 2740 kcal/kg), low energy diet-T2 (control-2, 2630 kcal/kg), T3, T4, T5, T6, T7, T8 having 0.25 g/kg, 0.5 g/kg enzyme and 0.5%, 1.5% citric acid supplementation in low energy diet, alone and in combination. Results showed improved weight gain ($p < 0.05$) in groups T4, T7 and T8 groups as compared to T2 while non-significant ($p > 0.05$) as compared to T1. Feed consumption was reduced ($P < 0.05$) in all groups as compared to T2 while T4 and T7 was equal to T1 in feed consumption ($P > 0.05$). FCR was observed better ($p < 0.05$) in T4 and T8 while M.E was non-significant ($P > 0.05$) in all groups. Blood glucose level was observed higher ($P < 0.05$) in T4, T7 and T8. In conclusion, it was observed that enzyme supplementation resulted in improved performance in broiler fed low energy diet while organic acid supplementation in low caloric diet has no pronounced effect on performance.

Key Words: Broiler, Enzyme, FCR, Feed Intake, Organic acid, Weight gain

ORGANIC POULTRY IN TURKEY POULTRY INDUSTRY

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ABSTRACT

The present study is prepared to focus on the organic poultry production in Turkey poultry industry. Poultry industry has been following the latest technology and has a strategical importance for supplying animal protein in Turkey. Organic poultry has started to implement the without legal basis since 1985. In recent years, organic poultry production industry has become a popular alternative to the conventional way of producing egg and meat with the awareness of consumers in Turkey. According to the data of 2013 taken from the Ministry of Food, Agriculture and Animal Husbandry, there are 24 enterprises performing organic poultry farming in Turkey. According to the data of 2013 taken from the Ministry of Food, Agriculture and Animal Husbandry and TUIK, organic broiler and broiler meat productions have a 0,1% share while the organic laying hen's production and egg production have 0,3% and 0,6% share in the enterprises, respectively. That amount is expected to increase because of the increasing conscious of consumers for their healthy.

Key words: Turkish poultry industry, organic poultry, production.

MORPHOMETRIC STUDY OF THE EGGS OF THE BARBARY PARTRIDGE *ALECTORIS BARBARA* IN AN EXPERIMENTAL BREEDING

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ABSTRACT

The present study was conducted in an experimental breeding Barbary Partridge during the years 2005 and 2006. The objective of this work is to know the quality of the eggs of this bird native and very sensitive to stress. The calculation of morphometric parameters of eggs (N = 513) shows that the average weight is 20.12 ± 1.81 g and the shape index is 0.75 ± 0.03 . The index recorded shell is 0.50 ± 0.03 . The density and volume of eggs obtained are respectively 1.14 ± 0.24 and 18.01 ± 2.10 cm³. Water loss recorded is 11.5%. The analysis of variance applied for the comparison of egg weight during the period 2005 and 2006 shows that there is no significant difference in the same form factor ($P > 0.05$). Otherwise, the comparison test used shows a highly significant difference with $P < 0.0001$ between the volumes, densities, indices of shell and water loss of eggs of the Barbary Partridge during the study period. Indeed, several factors may explain the difference as the absence of sorting eggs during incubation and other factors that will be exposing later.

Key words: Barbary Partridge, Experimental breeding, Morphometry of eggs, Analysis of variance

EMBRYONIC MORTALITY AND HATCHABILITY ANALYSIS USING CLASSIFICATION TREE METHOD IN CHUKAR PARTRIDGE

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ABSTRACT

The Chukar partridge (*Alectoris chukar*) is a wild bird in poultry. Its natural populations significantly diminished in recent years due to excessive hunting and destruction of natural habitats. However, partridge breeding for hunting and egg and meat production gets more and more common. The egg quality characteristics and embryonic mortality have been well documented for domestic fowl. Egg fertility and embryonic mortality were found affecting hatchability. Egg weight, shell weight, shell thickness and fertility, which are physical characteristics of eggs, also play an important role in the processes of embryo development and hatching success in poultry. However, there is little information in literature regarding egg characteristic parameters and embryo mortality for partridge. Classification tree method (CTM) is a potentially powerful tool to predict membership of cases in the classes of a categorical dependent variable from their measurements on one or more predictor variables. CTM will be a good choice, especially when data set is large, relations between variables are non-linear and when independent variables are mixed (both continuous and categorical). CTM is a binary decision tree also structurally very simple and easy to visualize. The study was carried out to investigate the effects of some external egg traits on embryonic mortality and hatchability using classification tree method (CTM) in Chukar partridge (*Alectoris chukar*).

Key words: Embryonic Mortality, Hatchability, Classification Tree Method, Chukar Partridge

EFFECTS OF DIETARY ENERGY LEVELS ON GROWTH PERFORMANCE AND FEED COST ANALYSIS IN JAPANESE QUAIL

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Abstract

Feed cost has a direct influence on routine farm operations. Optimum energy level in the feed can result in better performance as well as cost saving effect. The present study was conducted to examine the growth and production of the highly nutritious quail meat using different energy levels along with the feed cost analysis. Three diets having energy levels of 2900 kcal/kg (Control group), 2700 kcal/kg (B) and 3100 kcal/kg (C) were offered to 600 day old quail chicks for 28 days to examine the carcass quality and growth performance. Birds were divided into 3 groups. Each group was further divided into 4 replicates with 50 birds in each. High energy diet (3100 kcal/kg) resulted in improved body weight gain, increased feed intake and better FCR ($p < 0.05$). Liver weight was observed better in high energy diet ($p < 0.05$). Dressing percentage was not affected by high energy diet ($p > 0.05$) but a numerical difference was observed while breast meat percentage was lower in high energy supplemented group ($p < 0.05$). It is concluded that higher energy diet resulted in better performance and is more economical as it is resulted in low cost per Kg live weight of birds.

Key words: Energy Levels, Weight Gain, Feed Intake, FCR, Quail Economics

INFLUENCE OF THE BREEDING QUAIL AGE ON BIOMETRIC EGGS OF DOMESTIC QUAIL *COTURNIX JAPONICA* (AVES, PHASIANIDAE)

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ABSTRACT

In order to improve the sources of the food needs of mankind in animal protein, poultry several industrial projects are currently installed to cover the needs white meat on the market. This industry is primarily of interest farms of chicken meat, turkey and in recent years, raising Japanese quail. The latter has one of the tracks on which is committed Algeria, given the high demand for quail carcasses as breeders. Domestic quail is the most effective because its breeding is easy in the minimum conditions and the meat is too much to ask. To benefit from quality and performance previously indicated and increase success rates in these farms, we must fight against embryonic mortality in quail; eggs latter also have therapeutic qualities. Therefore, the work done, focuses on biometric characteristics that affect their eggs hatch and explain the causes of mortality of embryos. Age of breeding is considered. These have started laying at 7 weeks of age and were followed until the age of 22 weeks. Some biometric parameters include the weight, the length and the largest diameter; shape index indicates the shape of eggs; this index can help or not the hatching. The calculated volume of the eggs and the density value P exhibit a significant ($P < 0.0001$) between the beginning and the end of laying. Another parameter is added to study the strength of the eggshell, it's the index shell. Storage can also influence the outbreak; water loss of eggs is analyzed. Other farms in the results, like correlations between biometric characteristics, will reveal others conclusions.

Key words: domestic quail, eggs, biometrics, breeding, hatching

RIDGE REGRESSION ANALYSIS METHOD IN MULTICOLLINEARITY AND AN APPLICATION

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ABSTRACT

Multicollinearity is a significant problem encountered in multiple linear regression analysis. The analysis results obtained by the least squares (LS) estimates are unbiased, but with a larger variance, in the presence of multicollinearity problem. There are alternative methods to overcome the multicollinearity problem. Ridge Regression (RR) being a biased method is one of them. The investigation aimed to use RR in prediction of internal egg quality characteristics in Japanese Quails and to compare the RR with LS.

Key words: Multicollinearity, Ridge Regression, multiple linear regression.

EFFECTS OF VARIOUS LEVELS OF ROSEMARY AND OREGANO VOLATILE OIL MIXTURE ON OXIDATIVE STRESS PARAMETERS IN QUAILS

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ABSTRACT

The aim of this study was to determine the possible effects of various levels of rosemary and oregano volatile oil (VO) mixture dietary supplementation on oxidative status parameters in the blood and various organs of quails. A total of 880 one-day-old Pharaoh quails (*Coturnix coturnix* Pharaoh) including both males and females, were divided into four groups containing 220 quails and treated as follows: a control group with 0 mg VO/kg of diet; group I, with 100 mg/kg rosemary VO plus 100 mg/kg oregano VO, 50:50%; group II, 60 mg/kg rosemary VO plus 140 mg/kg oregano VO (30:70%); and group III, 140 mg/kg rosemary VO plus 60 mg/kg oregano VO (70:30%). The quails were euthanized and then serum, erythrocyte, heart, liver and spleen were obtained. Serum malondialdehyde, nitric oxide, antioxidant activity, glutathione, vitamin A, vitamin C, erythrocyte superoxide dismutase, as well as malondialdehyde, nitric oxide and superoxide dismutase levels from the heart, liver and spleen were determined by enzyme-linked immunosorbent assay. The results of the study show that whereas the lowest serum malondialdehyde and serum nitric oxide values were observed in group III ($p<0.05$), the highest serum malondialdehyde and serum nitric oxide values were in group I ($p<0.05$). Moreover, the highest nitric oxide and superoxide dismutase levels in group I were found in the liver and spleen, respectively ($p<0.05$). In conclusion, supplementation with a rosemary and oregano VO mixture to the diets of quails may alter the antioxidant activity depending on the diets, and the most effective doses of rosemary and oregano VO mixture were 70% and 30%, respectively.

Key words: Rosemary, Oregano, Oxidative status, Quail

MEAT CHARACTERISTICS, FATTY LIVER WEIGHT AND BLOOD BIOCHEMICAL PARAMETERS IN FORCE-FEEDING GEESE

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ABSTRACT

A study on growth performance, meat characteristics, fatty liver weight and serum biochemical parameters (ASAT, ALAT, alkaline phosphatase, γ -glutamyltransferase, total cholesterol, triglycerides and creatinine) in Landes geese before and after force-feeding was carried out. The overfeeding of geese with corn was taken after 90-days of age. Frequency of daily force feeding was gradually increased from 2 to 5 until the 15th day of force feeding. During force-feeding period, the body weight increased with 57,02 % (from 4507 ± 135 g to 7077 ± 102 g). The liver weight increased from 93 ± 4 g to 568 ± 44 g (6,11 times), and breast muscle with skin from 557 ± 24 to 848 ± 29 (1,52 times). In the end of cramming period it was established significantly increased the serum concentration of ALAT, ASAT, triglycerides and total cholesterol ($P < 0,001$).

Key words: Geese, Force-feeding, Meat characteristic, Fatty liver (foie-gras), Blood biochemical parameters

BODY CONDITION SCORING IN DIFFERENT FARM ANIMALS

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ABSTRACT

Body condition scoring (BCS) is a subjective method of assessing the amount of metabolizable energy stored in fat and muscle (body reserves) on a live animal and is an important management practice used by producers as a tool to help optimize production, evaluate health, and assess nutritional status. This practice helps evaluate herd or flock as to the amount of body reserves, particularly fat and muscle, an animal possesses. It is used different ways for different farm animals last over 50 years. Assessment is based on determination of fat tissue in basis for all animal species however body fats that are going to be assessment or assessment method can be shown changes according to species. Body condition score (BCS) has been shown to be an important practical tool in assessing the body condition of beef and dairy cattle, sheep, goats, horse and swine because BCS is the best simple indicator of available fat reserves which can be used by the animal in periods of high energy demand, stress, or suboptimal nutrition. As a matter of fact, today it is used most widely in the health and nutritional management of all types of farm animals because if body condition scoring is conducted at planned intervals throughout the production cycle, nutrition and management can be altered if needed. With this study it was aimed to collect BCS and assessment methods on different farm animals in one heading and be guide especially to breeders.

Key Words: Body Condition Score, Animal, Herd, Flock

CELL-CYCLE SYNCHRONIZATION OF SHEEP AND GOAT ADULT MUSCLE CELLS BY CONFLUENCY, ROSCOVITINE AND SERUM STARVATION

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ABSTRACT

Nuclear transfer (NT) technology is being used to clone desirable adult genotypes and phenotypes for animal husbandry and biomedical applications. The cell cycle stage and synchronization of donor cells are important factors influencing the success of nuclear transfer. This study examined the effects of cell cycle synchronization protocols, such as confluency, roscovitine treatment and serum starvation, in goat and sheep muscle cells on synchronization accuracy at G0/G1, viability, apoptosis, necrosis for use as a nuclei donor. The cells in 2–6 passages were randomly allocated into six treated groups. The cells in 2–6 passages were randomly allocated into six treated groups. Cells were cultured either in culture medium with 30µM roscovitine for 24 h (group 1), 15µM roscovitine for 24 h (group 2), in culture medium until 100% confluent (group 3), 100% confluent for 3 days (group 4), or in culture medium containing 0.5% FBS for 3 days (group 5), 0,5% FBS for 5 days (group 6). Analysis of cell cycle distribution of goat cell by flow cytometry showed that the ratios of arrested cells in the G0/G1 phase were higher ($p < 0.05$) in group 5,6 (82,29%, 84,95%, respectively) than other four groups (64,14%, 65,74%, 75,22%, 76,58% ; group1,2,3,4). Same analysis of sheep cells showed that the ratio of arrested cells in the G0/G1 phase were higher in group 5,6 (88,43%, 92,56% ,respectively) than other four groups (65,66%, 78,72%, 75,10%, 79,62% group1,2,3,4). Although double staining by PI and Annexin V FITC analysis of cell showed that there were no differences in viability of sheep cells between groups, viability of goat cells reduced in 2, 3, 5. This result showed that the use of confluency and serum starvation are suitable for cell cycle synchronization in both animal cells, but goat cells are more sensitive than sheep cells base on cell viability to cell synchronization protocols. This research was supported by TUBITAK with grant numbers TOVAG-1120932 and Namik Kemal University with grant numbers NKUBAP.00.24.AR.12.10.

Key words: cell cycle, cell viability, serum starvation, confluency, roscovitine, flow cytometry

FIRST DATA ON THE FORENSIC ENTOMOFAUNE OF THE CORPSES OF THE WILD BOAR (*SUS SCROFA*) IN THE AREA OF BORDJ BOU ARRERIDJ, ALGERIA

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ABSTRACT

This work is followed on a corpse of wild boar. The first observations are collected close to Ain Soltane (Bordj Bou Arreridj) during the summer 2013. They relate to the entomofaune necrophagous of the wild boar (Known scrofa). The capture of the insects is made thanks to traps with lime. On wild boar 15 species are recognized. As of the second day the first section is dominated by *Lucilia sericata* (A.R. % = 69,7%). this one deposited its eggs in great number on the wounds of the biological model. Layings take place on the eyes and the mouth. Other species, *Muscina stabilans*, *Sarcophaga* sp. , *Musca domestica*, *Piophilina* sp. seem to belong to the first troop. To 3rd and 4th days after the biological death of model, *Lucilia sericata* reduces its participation (25,9%; 0,7%). The Coleopters like Dermestidae (*Dermestes* sp.) and Histeridae (*Gnathoncus* sp.) appear, observed directly. During this same period, two other species of Coleoptera intervene with a small percentage. It is of Staphylinidae like *Creophilus maxillosus* and Cleridae like *Necrobia rufipes*.

Key words: Corpse, Wild boar, Bordj Bou Arreridj, insects necrophagous, *Lucilia sericata*.

A SUSTAINABLE APPROACH TO THE CONTROL OF GASTROINTESTINAL NEMATODES OF GOATS

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Gastrointestinal (GIT) nematodes are among the commonest causes of poor productivity and profitability in tropical climates. This research was carried out to examine the effects of introducing molasses/mineral feed blocks beside the use of medicated blocks on gastro-intestinal nematode infection in grazing goats. A goat farm with 100 Boer goats was used for this experiment it was located in Penang, Malaysia. Twenty four male Bore goats were separated with an age average of 7-8 months. The goats were first dewormed, given an anti-parasite drug. The animals were then allowed a 15 day adjustment period to their new feeding and housing conditions prior to the start of the experiment. The goats fed for a period of 90 days. Results shows that molasses/mineral feed blocks and medicated blocks have significant effects ($p<0.05$) on growth performance of the goats. At the end of the experiment, the blood also was taken and analyzed to measure pathological and biochemical parameters. The results shown that a combination of molasses/mineral feed blocks and medicated blocks has significant effects ($p<0.05$) on some blood factors and has no negative effects on body function. The results of faecal egg counting (FEC) stated the positive effect of using molasses/mineral feed blocks along with the use of medicated blocks on controlling gastrointestinal nematodes. Histological results revealed the damages in intestinal epithelium of the goats affected with gastrointestinal nematodes in the control group. In Abstract, with regards to the observed results in growth performances, blood tests, fecal egg counts, the histological work and also the observations made by the researchers to measure the commercial productivity of the projects, the use of urea molasses/ mineral blocks and medicated urea molasses mineral blocks is highly recommended and can be used as a sustainable approach to the control of gastrointestinal nematodes of goats.

Key words: Gastrointestinal nematodes, medicated blocks, goats,

THE WHITE STORK (*Ciconia ciconia*) IN THE WETLANDS OF NORTH EAST OF ALGERIA

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Abstract :

Our study focuses on the distribution of the white stork "*Ciconia ciconia* L. 1758" in the wetlands of El Tarf (North eastern of Algeria): recognized by its remarkable number of breeding pairs, monitoring of nesting, using a GPS, has been performed in an attempt to explain the functioning of populations and population strategies for an overall design of its distribution, which has not so far been investigated in this region. Between 2012, and 2013, the number of breeding pairs has increased considerably, from 174 in 1996 to 475 in 2007 and 968 in 2013. It should be noted that in the distribution of breeding pairs between 1996 and 2011, there is a significant development since the density of nests increased from 25.22 in 1996 to 84.16 couples/100 km² in 2013. More endemic bread appears in the region, this fluctuation is related to climatic change and changing season. Changes related to local climatic conditions might induce binding conditions for the development of this species.

Key words : white stork, *Ciconia ciconia*, wetland El Tarf, northeast Algeria, climatic changing, density.

USING OF LAB ANIMALS AS A CONCEPTUAL MODEL INTO A PROGRAM OF NON-FORMAL EDUCATION

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One of the most important questions in research ethics is the use of animals in research. It is very important to learn many aspects of laboratory animals' situations. The total number of animals used in 2013 in the EU amounted to 12.2 million. Mice, rats and rabbits represent 77.5% of the total number of animals used. Bulgaria has a modern legal framework for the protection of laboratory animals. The purpose of this study was to present a conceptual model of a program of non-formal education at students studying biology "The use of animals in research" - specific problems such as requirements and recommendations for health monitoring of experimental animals; experiments with them for scientific research or in instruction, disease diagnosis, development of medicine or chemical products or for other comparable purposes; permission for using; issues and documents, as well as International standards. The program was implemented in cooperation with the National Center of Infectious and Parasitic Diseases - Sofia. Student's participation in activities using the methodology of non-formal education, gave a direct opportunity for practical application of knowledge and skills in the field of formal education at Sofia University "St. Kliment Ohridski".

AROMATIC PLANTS

EXTRACTION OF CELL WALLS AND BIOMETRIC OF FIBERS OF PODS OF *RETAMA MONOSPERMA* (L) BOISS

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The *Retama monosperma* locates in sandy areas of Algerian littoral belong to the fabaceae family, this species presents an economic and ecological interest and it is rich in alkaloids. The cellulose and the pectins have interests in the medicinal domain, fibers parietales seem to act by surrounding the molecules of cholesterol and in entrainment to have their elimination. In order to know well this plant in a better development, we have suggested undertaking a biochemical analysis of parietal fractions. The extraction of hemicelluloses and cellulose in one protocol and pectins in other protocol as the best return 52,66 % of cellulose, 14,33 % of hemicelluloses and 5,74 % of pectins. The morphological and biometric study of the fibers of the pods of *Retama monosperma* shows that this species can be classified among plants with average fibers. The obtained results concerning the quantity of the wall, the rate of cellulose, hemicelluloses and pectins to the pods of *Retama monosperma* we conclude to say that the pods of *Retama monosperma* present interests in various domains (industrialists, pharmaceutical and cosmetic).

Key words: *Retama monosperma*, Wall, Extraction, fibers, Valuation

A PINK-PIGMENTED FACULTATIVE *METHYLOBACTERIUM* SP ISOLATED FROM *RETAMA MONOSPERMA* ROOT NODULES

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Abstract

A pink-pigmented, aerobic, facultatively methylotrophic bacterium, was isolated from *Retama monosperma* root nodules and identified as a member of the genus *Methylobacterium*. Inoculation of *R. monosperma* plants by pure culture of isolate strain under hydroponic condition, resulted, 10 dpi, the puffiness at lateral roots. The observation in detail the anatomy and ultra structure of infection sites by light and electron microscopy show that the bacteria induce stimulation of the division of cortical cells and digestion of epidermis cells, than, *Methylobacterium* was observed in the inter-and intra-cellular spaces of the outer cortex root. These preliminary results allow us to suggest the establishment of an epi-endosymbiotic interaction between *Methylobacterium* sp and *R. monosperma*.

Key words: *Methylobacterium*; Microscopy; Nodule; *Retama monosperma*; Pink pigmented; Endophytic colonization.

ANATOMICAL ADAPTATIONS OF THREE *ASTRAGALUS* SPECIES UNDER SALT STRESS

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Abstract

The effect of NaCl stress on root and leaf anatomy was investigated in three *Astragalus* species grown in 0-300 mM NaCl for 30 days under greenhouse conditions. Root cross section and cortex thickness was reduced under salt stress in both species while *A. tenuifolius* showed thinner cortex and the root cross section was unchanged. The epidermis stele thickness was unaffected by salinity in *A. armatus* and *A. tenuifolius* and was reduced in *A. mareoticus* with smaller xylem vessel size. In addition, vessel density and wall thickness of xylem was increased under salt conditions in the studied species. The entire lamina and mesophyll of the three species were thinner in salt-stressed plants. *A. armatus* and *A. tenuifolius* showed the higher thickness with increased size of the lower epidermis. NaCl (300 mM) reduced leaf water content by 41.5 % in *A. mareoticus* while it was unchanged in the other species. The size of the vascular bundle increased under salinity in *A. tenuifolius* leaves and it was unchanged in the other ones. A longer distance between leaf vascular bundle was occurred in *A. mareoticus*. The effects of NaCl on root and leaf ultrastructure are discussed in relation to the degree of salt resistance of these species. The unchanged biomass production under salt stress confirmed the higher tolerance of *A. tenuifolius* to salinity. *A. armatus* was moderately salt tolerant with decrease of biomass production by 14.2 % while *A. mareoticus* was considered as salt sensitive plant when the decrease in biomass production reached 56.8%.

THE EVOLUTION OF THE ANTI-MICROBIAL ACTIVITY OF THE ESSENTIAL OIL, TANNINS AND ALKALOID OF THE BUIX (*BUXUS SEMPERVIRENS*)

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Abstract

Research in the plant world of chemical molecules in therapy; is still a very fruitful area of research. Thousands of plants are still untapped sources of bioactive substances. It is an infinite keyboard available to the researcher for the discovery of new drugs. It is in this context that our work is. The latter focuses on the Boxwood '*Buxus sempervirens*' which belongs to the family of Buxaceae, small shrub, which all parties roots, leaves and bark contain alkaloids, including buxine, tannin and essential oils. This work subject is extraction, separation and identification of the alkaloid, tannins and essences, to test her activity to different microbial strains known resistant. The most significant results show a sensitivity of *Staphylococcus aureus* and *Enterobactere aerogenes* in the essential oil and tannins. As against the yeast *Candida albicans* appears to be resistant to all extracts except the buxine.

Key words: Essential oil – Alkaloid – Tannins- *Buxus sempervirens* – antimicrobial activity – antifungal – synergy

PHARMACEUTICAL PROPERTIES AND ANTIMICROBIAL ACTIVITIES OF *THYMELAEA HIRSUTA* (THYMELAEACEAE), FROM WESTERN ALGERIAN ARID AREAS: PRELIMINARY STUDY.

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Abstract:

Thymellaea hirsuta: perennial plant, used in traditional medicine for dermatoses treatment, therapeutic use based on mixtures applications. This study consists in use of natural ingredients, after mixtures extraction: leaves/flowers, phytochemical, microbiological tests: first concerning metabolites available, second deals with natural extracts application on bacteria: *Staphylococcus aureus*, *Pseudomonas aeruginosa*, fungi: *Microsporum audouinii* *Microsporum gypseum*. Results: Phytochemical tests revealed phenolic, flavonoids, terpenes, sterols, quinones and anthraquinones. *Staphylococcus aureus* inhibition at 10mg/ml extracts were: 24±1.41mm, 19.5±0.71mm, 22.5±3.54mm, 27.5±3.54mm, and 12.5±3.54 mm 31±1.41, at 5mg/ml of dichloromethane: extract were: 5±7.1mm, 20±14.1mm; methanolaqueous 15±7.1 and 220±28.3; 105±7.1. Minimum inhibitory concentration was 500µg/ml for *Staphylococcus aureus*, 1000µg/ml for *Pseudomonas aeruginosa*. Antifungal activity dependent on extract concentrations, reduction in speed of mycelial growth, spores absence, delayed initiation of mitosis with shorter duration of fungi activity, For species *M. audouinii*, *M. gypseum*, inhibitory concentrations 50 (IC₅₀), were respectively: 488±48.92µg/ml and 512.62±47.40mg/ml (petroleum ether), 510±63.13µg/ml, 490.49±48.12µg/ml (dichloromethane), 674.06±20.14µg/ml, 461.56±11.94 µg/ml (methanol), 524.79±17.68µg/ml, 487.48±46.15 µg/ml (ethanol), 510.94±44.41 and 454.37±3.45µg/ml (aqueous) and 477.81±40.22, 450.58±3.12 µg/ml (decoction). IC₉₀ were respectively 795.31 ±27.48 and 792.51±9.34 g/ml (petroleum ether), 808.02±4.32; for IC₉₀ was 795.31±27.48 µg/ml respectively and 792.51±9.34µg/ml (petroleum ether), 808.02±4.32, 803.04±1.33µg/ml (dichloromethane), 818.64±15.19, 783.14±6.10µg/ml (methanol), 809.15 ± 4.92, 789.83±7.20 µg/ml (ethanol), 782.50±11.44, 794.95±11.28 µg/ml (aqueous) and 767.92±08.25, 760.25±7.76µg/ml.

Key words: *Thymellaea hirsuta*, Extracts, Phytochemistry, Interaction, Micro-organisms.

CHEMICAL COMPOSITION AND ANTIFUNGAL ACTIVITY OF ESSENTIAL OILS OF *ARTEMISIA HERBA ALBA ASSO* GROWN WILD IN OUENZA (TEBESSA -ALGERIA)

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Abstract:

Essential oils have found their place in aromatherapy , pharmacy, perfumery, cosmetics and food preservation . Their use is related to their broad spectrum of biological activities recognized. The aim of the present study was to evaluate the antifungal effect of *A.herba alba Asso* essential oils. The essential oils were isolated by hydrodistillation from the aerial parts of *Artemisia herba alba Asso* and analyzed by Gas Chromatography-Mass Spectrometry (GC-MS). Essential oils yield ranged between 1.27 and 1.37 %. The main components were found to be Camphor (48.5 %) , α - Thujone (11.9 %) , Chrysantone (6.3 %) , eucalyptol (5.6 %) , pinocarvone (5.0 %) and Camphene (4.8 %). The essential oil has been tested for antifungal activity against *Candida albicans*, minimal inhibitory concentration (MIC) was made in Sabouraud liquid medium by the serial dilution method. The essential oil of *Artemisia herba alba Asso* presented a very good antifungal potency against *Candida albicans* with MIC value of 80 % = 5.04 μ l/ml.

Key words: *essential oils, Artemisia herba alba Asso, GC-MS, antifungal activity, MIC.*

STUDY OF THE ANTIBACTERIAL ACTIVITY OF ESSENTIAL OILS AND MACERATED GINGER: *ZINGIBER OFFICINALE*

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Abstract

Zingiber officinale L, commonly known as ginger in Algeria (Zinjabile, Skenjbir) is a rhizomatous plant cultivated throughout Asia, South-East , China and some parts of Japan , Latin America , Jamaica and Africa. it has been used as a spice and medicine in India and China since ancient times. The extraction of essential oils from the dried and fresh rhizomes give with successive values of 0.6 % and 0.8 %, and the preparation of macerated of 12 hours requires grating rhizomes to crush internal oily cells. The evaluate the antimicrobial activity of the oil and the macerate against *Pseudomonas aeruginosa* , *Escherchia coli* , *Staphylococcus aureus* , *Klebseilla sp* , *Enterobacter sp* by the disc diffusion method and the results obtained are comparable with the reference compounds. The MIC values are calculated and compared , which is very important to the efficiency and *Staphylococcus aureus* , *Escherichia coli* dilutions for all of the oil and by disbelieved against the other strains are ineffective

Key words: essential oil, ginger, extraction, *Staphylococcus aureus*

EVALUATION OF THE POTENTIAL BIOCIDES AND STUDY OF THE COMPOSITION OF ESSENTIAL OILS OF SOME ALGERIAN PLANTS ON *RHYZOPERTHA DOMINICA* (F.) (COLEOPTERA: BOSTRYCHIDAE)

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Abstract:

The objective of this research was to determine insecticidal activity of essential oils from two species of plants *Origanum glandulosum* Desf. and *Laurus nobilis* L. against *Rhyzopertha dominica* F. insect pest of stored grains. Essential oils from aromatic plants were obtained by steam distillation. The major compounds in these essential oils were identified using gas chromatography-mass spectrometry. While the major compound found in *Origanum glandulosum* Desf. was carvacrol, and linalool is constituent of *Laurus nobilis* L.. However, these substances were bioassayed to determine possible fumigant, contact, ingestion and repellent activity against *Rhyzopertha dominica* F., lesser grain borer.

Key word: Aromatic plants; essential oils; *Origanum glandulosum*; *Laurus nobilis*; *Rhyzopertha dominica*, insecticidal activity, stored food products.

DESCRIPTION AND POPULAR USEFUL OF MEDICINAL PLANTS COLLECTED IN RELIZANE REGION (NORTHERN WEST ALGERIA)

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Abstract:

Relizane is a region of western Algeria with processes large varieties of plants that need identification. Therefore a preliminary census of medicinal plants has been done locally, allowing the establishment of 4125 vascular plants species belonging to 123 different families. Thus in this region, we identified 112 medicinal species, distributed in 52 families with the dominance of families Lamiaceae, Asteraceae, Poaceae and Umbelliferae; among these species: Thyme, Mentha and Lavandula are mostly used. Currently, wild medicinal species may be put in risky situation following an abuse picking and overfishing for this effect, it will be necessary to provide legislation in order to protect them for a long period. In this work and through this prospectus, we present some examples of some plants used by local people in traditional medicine.

Key words: Medicinal plants, identification, Relizane.

CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITY OF SIX SPECIES OF THE GENUS THYMUS OF ALGERIAN FLORA

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Abstract

In the prospect of the valorization of the Algerian flora, we studied six species of the genus thymus growing spontaneously in the East Algerian and empirically employed in traditional medicine because of their disinfectant, antispasmodic, stomachic and antimicrobial properties. This study aims at providing data on the chemical composition, antibacterial, antifungal and antioxidant activities of various essential oils issued from these species. The analysis by GC/MS was employed to determine the chemical composition of the essential oils obtained by steam distillation of the aerial parts. Essential oils obtained from *Thymus numidicus*, *Thymus fontanesii*, and *Thymus ciliatus*, were rich in phenols (thymol and carvacrol) and their corresponding precursors (*p*-cymene and γ -terpinene) as well as the oxygenated monoterpenes (linalool and bornéol). On the other hand, essential oils of *Thymus algériensis* and *Thymus munbyanus* present a chemical composition in which α -pinene, 1,8-cineol, camphor, borneol and sabinene are in a majority. The essential oil of *Thymusserpyllum* is characterized by the prevalence of monoterpenes products: isocaryophyllene, α -bisabolene, caryophyllene oxide, germacrene D and β -terpineol. The essential oils were examined for their antifungal activities on *Candida albicans*. The best antifungal activities were obtained with *Thymus fontanesii* (MIC = 0.79 μ L/mL). Antibacterial activity was evaluated towards seven strains, the essential oils of *Thymus fontanesii*, *Thymus numidicus serpyllum* and *Thymus ciliatus*, showed an antibacterial broad spectrum with MIC from 0,33 to 0,66 μ L/mL %. the best antioxidant activities (μ g of ascorbic acid/100 mg HE) were obtained with *Thymus ciliatus* (414), *Thymus numidicus* (393) *Thymus* and *fontanesii* (351) . The results are promising and we may use essential oils as antifungal drugs and fight against antibiotics developing resistance.

Key words: Essential oils, GC-MS, antifungal activity, antibacterial activity, antioxidant activity, MIC.

EVALUATION OF ANTIOXIDANT ACTIVITY AND PHYTOCHEMICAL ANALYSIS OF *OSYRIS QUADRIPARTITA*

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Abstract:

Osyris quadripartita in the Arabic name is Madjdade is a medicinal plant used in traditional herbal medicine to treat cancer. The studied plant harvested from Misserghin-Algeria- on June 2008. The extraction by heat reflux with water distilled carried out. The antioxidant activity was evaluated *in vitro* by DPPH assay and compared with authentic antioxidants. ". In parallel of this biological study, screening of secondary metabolism phytoconstituents was undertaken with polyphenols and flavonoids quantification. The results of antioxidant test showed that this plant is very active and has almost similar activity with BHA. The results of phytochemical tests demonstrated the presence of polyphenols (flavonoids, lignans, coumarins), the anthracenic derivated and sesquiterpene lactones

Key words: medicinal plant, aqueous extraction, antioxidant activity, Phytochemistry

**PHENOLOGICAL STAGES OF *TRIBULUS TERRESTRIS* L. (ZYGOPHYLLACEAE R. BR.) DEVELOPMENT
UNDER THE CONDITIONS OF THE THRACIAN LOWLAND FLORISTIC REGION OF BULGARIA**

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Abstract

The phenological stages of *Tribulus terrestris* L. in the Thracian Lowland floristic region of Bulgaria were studied. Growth characteristics of the species, the length of the vegetation period and the duration of each phenological stage were studied in three consecutive years. A detailed phenological spectrum was presented. A direct relation was established between the duration of the phenological stages, the calendar periods and the climatic features of the respective year.

Key words: *Tribulus terrestris*, phenological stages, medicinal plant, steroidal saponins

ANTICANCER NATURAL DERIVED FROM MEDICINAL HERBS

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Abstract:

Anti-cancer chemotherapy approximately was born. 10 years after antibacterial chemotherapy, all which the innovation is the distinction currently emerges all which the cytotoxic drugs appears between of chemical origin and the origin of new cytostatic drugs biological and botanical, all which presents great year with a tolerance less toxicity. A large field of investigation remains open fields in botanical little explored in private clinic and ignored until now by pharmaceutical industry. Thus, the anticancer ones of vegetable origin represents a new research orientation recently loved exploring with year of increasing the electivity of therapeutic actions on the level of the tumor cell, the anti-cancer ones derived from taxanes, The alkaloids of the periwinkle, the derivatives of camptothecin and derived from podophyllotoxine are among new thesis moyen de fight against cancer. In this context, we propose this objective whose work are: chemical and therapeutic classification of anti-cancer of vegetable origin. presentation of main specialities farming in the algeria. comparative study of the processes of obtaining anti-cancer thesis.

Keyword: Anti-cancer, Plant, Production, Analysis, Cytotoxic drugs.

ANTISTAPHYLOCOCCAL ACTIVITY OF OREGANO

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Abstract

Staphylococci are among the most robust microbes that infect humans. This and its propensity to develop antibiotic resistance establish this microbe as a major human pathogen. The aromatherapy can be an alternative to combat antimicrobial resistance. The essential oil of *Origanum glandulosum* Desf (Oregano) is one of the most powerful thanks to its wealth of phenols. This oil was tested on 10 multiresistant strains of *Staphylococcus aureus*. The aromatograms gave inhibition diameters ranging from 9.9mm to 26.65 mm in average. MICs were equal to 0.125%. These results are very important for the development of a strategy to deal with this serious problem.

Key words: *Origanum glandulosum*, Essential oil, Bacterial multiresistance. Aromatogram, MIC.

DETERMINATION OF SOME PESTICIDE RESIDUES IN SEaweEDS OF İSKENDERUN BAY (NORTHEASTERN MEDITERRANEAN)

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Pesticides are widely used for controlling pest population in modern agriculture. They are one group of toxic compounds that have a profound effect on aquatic life and water quality. İskenderun Bay is one of the areas under threat of pesticide residues due to the intensive agricultural activities in Çukurova Region. In this study, seaweeds (*Padina pavonia*, *Jania rubens*, *Corallina elongata* and *Cystoseira corniculata*) collected from the coastal area of Yumurtalık were analysed and four pesticide residue (Pyrethrin I, Pyrethrin I, Molinate and Metribuzin DADK) were determined. Metribuzin DADK was determined in *Cystoseira corniculata* (5,01±0,12 mg/kg), *Corallina elongata* (0.703±0.04 mg/kg) and *Jania rubens* (3,85±0,11 mg/kg) . Pyrethrin I was determined only in *Padina pavonia* as 0.567±0.02 mg/kg. Pyrethrin II was determined in *Padina pavonia* and *Corallina elongata* as 1.214±0.09 mg/kg and 0.229±0.02 mg/kg respectively. Molinate was a minor contaminant and only found in *Corallina elongata* as 0.002mg/kg.

Key words: Seaweed, İskenderun Bay, Pesticide, Herbicide, Insecticide

ANATOLIAN ORCHIDS AND SALEP

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Orchidaceae, a very large family of the flowering plants comprises 600-800 genera and from 25000 to 35000 species. They grow in the tropical and sub-tropical regions. Turkey where has been determined 154 species of orchids and 20 species are endemic in Anatolia. Orchids naturally grow in the North, northeast, west, South and southwest regions in Turkey. The tubers of orchids called salep. Salep is used a raw material of some drugs and food. Commonly, salep produced by tuber of the species *Orchis*, *Ophrys*, *Platanthera*, *Dactylorhiza* and *Spiranthes*. The dried and pulverized tubers are used in a Turkish beverage "Salep" and also as an ingredient in traditional Kahramanmaraş type ice cream. Harvesting time and species are affected about the composition of salep. The most common component of salep is glucomannose which acts as a stabilizer, ranges from %16 to %55. Salep also contains moisture, starch, sugar and minerals. Some endemic orchid species decreased to a critical level and endangered because of uncontrolled and unconscious harvesting. Therefore exportation of salep is prohibited by Turkish Ministry of Food, Agriculture and Livestock. In this review some knowledge are mentioned about Anatolian Orchid species and salep.

Key Words: Orchid, Anatolia, Salep

NUTRIENT STRESS ENHANCED ANTIOXIDANT ACTIVITIES IN CALLUS CULTURES OF *BELLIS PERENNIS* L. (COMMON DAISY)

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Bellis perennis L. (common daisy) is a medicinal plant in the family Compositae (Asteraceae). It has been used in the treatment of common cold, wounds, rheumatism, eczema, eye diseases, stomach ache, tonsillitis and laxative in traditional medicine in Turkey. Present study investigates the effect of five different nutrient stress conditions (MS/2, MS/4, -Ca, -Mg and -Ca & -Mg) on callus of *B. perennis* for phenolics production. Green and compact calli obtained from *in vitro* raised *B. perennis* pedicels sub-cultured on MS medium supplemented with 0.5 mg L⁻¹ indole-3-acetic acid (IAA) and 0.5 mg L⁻¹ thidiazuron (TDZ) and different nutrient stress conditions for 2 weeks, and incubated at 24 ± 2 °C and 22.4 μmol m⁻² s⁻¹ light intensity provided by white fluorescent tubes for 16 h. The air-dried and powdered calli obtained from different culture conditions were extracted with methanol using an ultrasonic water bath. The antioxidant potential elevated under nutrient stress treatments in calli using DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging activity, total phenolic content (folin-ciocalteau method) and total flavonoid content (aluminum chloride colorimetric method) assays. In DPPH assay, methanol extracts of calli showed a concentration dependent antiradical scavenging activity (%) by scavenging DPPH radical. Calli obtained from the cultured on MS/2 (91.54 ± 0.01% at 40 μg/ml) showed higher DPPH radical scavenging activity compared with other stress groups and control (56.19 ± 0.01% at 40 μg/ml). On the other hand, when Mg deficiency increased total phenolic content (167.7 ± 0.03 mg gallic acid equivalent/g dried weight), MS/2 treatment increased total flavonoid content (110.11 ± 0.02 mg catechol equivalent/g dried weight). The results of this study showed that callus obtained from MS/2 treatment has a great antioxidant potential.

Key words: Nutrient stress, Callus, *Bellis perennis* L., Common daisy, Antioxidant activities

CHEMICAL COMPOSITION AND ANTIFUNGAL ACTIVITY OF THE ESSENTIAL OIL OF *ORIGANUM VULGAR L* GROWING WILD IN EAST ALGERIA

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Abstract:

Origanum species are used as powerful disinfectants, flavouring agents, in perfumes and in scented soaps. The essential oils and the constituents of many *Origanum* species have been studied, they could be an inexpensive and effective alternative to antibiotics and potentially used to combat drug-resistant hospital superbugs. Fungal infections have been increasing in recent years due to a growing number of high-risk patients, particularly immunocompromised hosts, candidosis is the most common invasive fungal infection. The aim of this work is to study the chemical composition of *Origanum Vulgar L* and evaluate the antifungal activity of its essential oil. The qualitative and quantitative composition of the essential oil analyzed showed more than fifteen (15) components characterized by high amounts of thymol (26.0%), and of carvacrol. The antifungal activity of the essential oil and its main components was evaluated against *Candida* strains. The present study indicates that *Origanum Vulgar L* essential oil has considerable antifungal activity, deserving further investigation for clinical applications.

Key words : *Origanum Vulgar L* ; essential oils ; chemical composition; antifungal activity.

**SEED GERMINATION, GROWTH AND MORPHOLOGICAL PARAMETERS OF *BETONICA BULGARICA*
DEG. ET NEIC. CULTIVATED UNDER DIFFERENT CONDITIONS**

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ABSTRACT

Betonica bulgarica Deg. et Neic. is a Bulgarian endemic species listed in the Red Data Book of the Republic of Bulgaria. Harvested seeds of the plants were collected by using insulators to assist the natural reproduction of the populations. In laboratory conditions was studied germination of seeds under the influence of different temperature treatments - in the laboratory at 15 °C, in a thermostat at 20 °C and 25 °C, at a temperature of 5 °C, treated with water at 35 °C, and direct sowing in the soil without additional treatments. The growth of the *B. bulgarica* was studied in three soils: soil from natural habitat; California red worms Lombricompost (CRWL); soil mixture of 2/3 soil + 1/3 CRWL. Leaf characteristics - length, width, petiole length, leaf number and leaf area were studied. It was found that the *B. bulgarica* was characterized by a prolonged period of germination. Best germination - 35.0 % was observed under direct sowing, and in laboratory conditions at temperature of 15 °C - 25.0 %. Stratification and treatment with hot water at 35 °C did not produce good results in terms of seed germination. Best plant growth was seen in a soil mixture of 2/3 soil + 1/3 CRWL. The soil strongly influenced the leaf length and width and leaf area - 46.1 to 58.6 % of the total variation.

Key words: *Betonica bulgarica* Deg. et Neic., germination, leaf length, leaf width, leaf area.

SOME IMPORTANT PLANTS BELONGING TO ASTERACEA FAMILY USED IN FOLKLORIC MEDICINE IN SAVUR (MARDIN/TURKEY) AREA AND THEIR APPLICATION AREAS

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Abstract:

In this study; it is aimed to determine the purpose and the mode of use of some important plants belonging to Asteraceae family used in folk medicine in Savur (Mardin). Surveys were carried out in Savur Town Centre, and in some towns and villages of Savur district, during the years of 2012-2013. A total of 207 resource persons were interviewed. As a result of the study, 8 species belonging to Asteraceae families were determined which have been used for therapeutic purposes. The plants determined in research area were; *Achillea aleppica* Dc (tatarcı otu), *Achillea biebersteinii* Afan. ex Hub.-Mor. (Hanzabel), *Chrysophthalmum montanum* (DC.) Boiss. (Tutça), *Gundelia tournefortii* L. (Kenger sakızı), *Matricaria aurea* Schultz Bip. (Çiçeğzer), *Notobasis syriaca* (L.) Cass. (Suriye diken), *Onopordum carduchorum* Bornm. Et Beauverd (Kav diken), *Tripleuro spermum parviflorum* (Willd.) Pobed. (Beybunik). Local names and the mode of use and necessary doses of therapeutic plants were documented.

Key words: Medicinal Plants, Folkloric Medicine, Savur, Mardin, Turkey

HERITABILITY AND CORRELATION COEFFICIENT ANALYSIS FOR FRUIT YIELD AND ITS COMPONENTS IN CORIANDER (*CORIANDRUM SATIVUM* L.)

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Abstract:

The objectives of this study were to estimate the phenotypic and genotypic coefficients of variation, broad sense heritability, genetic gain and correlations in coriander (*Coriandrum sativum* L.). The experiment was laid out in a randomized complete block design with three replications in the Institute of Agriculture, Karnobat, Bulgaria during a three-year period (2011–2013) and involved 9 coriander genotypes. Genotypes differed significantly at ($p > 0.001$) for all the traits studied. Genotypic coefficients of variation were lower than the corresponding phenotypic coefficients in all the traits studied, indicating considerable influence of the environment on the expression of the traits. High to medium broad sense heritability estimates observed on days to heading, days to maturity, plant height, grain yield and number of grains per panicle, panicle weight, number of panicles per m² and panicle length suggests high component of heritable portion of variation, which is the portion exploited by breeder and that selection for these traits can be achieved directly based on their phenotypic performance. The low broad sense heritability observed for the number of tillers per plant and 1000 grain weight is indicative of the influence of the environment on these traits. Low heritability of these traits indicates the ineffectiveness of direct selection for these traits. High broad sense heritability estimates ranged from 55,88 % for fruit weight per umbel to 94,41 % for number of primary branches per plant, while fruit yield showed 82,80 % heritability. High heritability and genetic advance were recorded for the number of umbels per plant. This suggests that this trait is primarily under genetic control and selection for it can be achieved through its phenotypic performance. Fruit yield exhibited significantly positive correlation with the number of umbels per plant ($r = 0,858$) and fruit weight per plant ($r = 0,789$). Therefore, the results suggest that these traits can be used for fruit yield selection.

Key words: Coriander, Broad sense heritability, Genotypic coefficient of variation, Phenotypic coefficient of variation, Genetic gain, Fruit yield, Yield components

CHEMICAL COMPOSITION AND ANTIFUNGAL ACTIVITY OF THE ESSENTIAL OIL OF *ORIGANUM VULGAR L* GROWING WILD IN EAST ALGERIA.

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Abstract :

Origanum species are used as powerful disinfectants, flavouring agents, in perfumes and in scenting soaps. The essential oils and the constituents of many *Origanum* species have been studied, they could be an inexpensive and effective alternative to antibiotics and potentially used to combat drug-resistant hospital superbugs. Fungal infections have been increasing in recent years due to a growing number of high-risk patients, particularly immune compromised hosts, candidosis is the most common invasive fungal infection. The aim of this work is to study the chemical composition of *Origanum vulgare* L and evaluate the antifungal activity of its essential oil. The qualitative and quantitative composition of the essential oil analysed showed more than fifteen (15) components characterized by high amounts of thymol (26.0%), and of carvacrol. The antifungal activity of the essential oil and its main components was evaluated against *Candida* strains. The present study indicates that *Origanum Vulgare* L essential oil has considerable antifungal activity, deserving further investigation for clinical applications.

Key words : *Origanum vulgare* L ; essential oils ; chemical composition; antifungal activity.

PHYSICAL PARAMETERS INFLUENCING THE YIELD OF *NIGELLA SATIVA* OIL EXTRACTED BY HYDRAULIC PRESSING

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Abstract:

The *Nigella Sativa* oil yield extracted by hydraulic pressing is influenced by the pressure, temperature and size particles. The optimisation of oil extraction is investigated. The rate of extraction of the whole seeds is very weak, a crushing of seeds is necessary to facilitate the extraction. This rate augments with the rise of the temperature and the pressure, and decrease of size particles. The best output (66 %) is obtained for a granulometry lower than 1mm, a temperature of 50°C and a pressure of 120 bars.

Key words: Oil, nigella seeds, extraction, hydraulic pressing, optimization, size particle pressure, temperature.

PHYSIOLOGICAL RESPONSES OF QUINOA CULTIVATED UNDER DEFICIT WATER IRRIGATION

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Abstract:

Water availability is the most critical factor, which limits the productive potential of plants. Plants adapt to water deficits by physiological alteration, biochemical changes and osmotic adjustments. The responses of two quinoa (*Chenopodium quinoa*) cultivars (Titi caca and 143) were investigated to elucidate the physiological response by following leaf water status (Ψ), stomatal conductance (Gs) and leaf area index (LAI), under varying levels of progressive drought stress. Quinoa cultivars were submitted to four water supply regimes [100, 50, 25% Evapotranspiration (ETc) and the rain fed (RF)]. Results of Ψ show gradual decreases from -0.45 to -1.8 MPa for the control and -0.85 to -2.25 respectively for 50 to 25% ETc for "Titi", where the RF achieved to -4 MPa. However in "143" the Ψ down slightly from -0.75 to -1.1, subsequently the Ψ reducing becomes more important and increases with the intensity of the stress, to reach -3.6 MPa in the RF treatment. Among the variety "Titi" stomatal conductance (Gs) of control remain relatively constant around 150 mmol. m⁻². s⁻¹. However in the other treatments (50, 25% and RF), the Gs decreases to 80, 60 and 30 mmol. m⁻². s⁻¹, respectively, for the variety "143", the Gs decrease for all treatments to reach 11 mmol. m⁻². s⁻¹ in the RF. LAI of the control among both varieties "Titi" and "143" varying from 2.2 to 4 then down to 2,4 for "Titi" and 3,3 for "143". The decline in the LAI was increased with the water stress. Overall the cultivar "143" was better able to resist drought as indicated by better leaf water status (Ψ), stomatal conductance (Gs) and leaf area index (LAI) in comparison to the "Titi caca" cultivar.

Key words: Quinoa, water stress, deficit irrigation, leaf water status (Ψ), stomatal conductance (Gs) and leaf area index (LAI)

THE EFFECTS OF DIFFERENT TREATMENTS ON CAROB (*CERATONIA SILIQUA* L.) SEED GERMINATION

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Abstract:

This study was carried out to determine the effects of different treatments on seed germination on a wild carob genotype grown in Silifke province (Mersin, Turkey). In this study, the fruits were harvested in 2012 and their seeds were stratificated. After the stratification, sulfuric acid and gibberellic acid were applied to the seeds. Experimental design were planned with three replicates, and 30 seeds per each replicate were used. Carob seeds were treated with different diluted sulfuric acid concentrations (Control, 80, 85, 90 and 95%) for 30 minutes in petri dishes, and then were soaked in water for two days. In gibberellic acid treatments, seeds were treated with 500 ppm, 1000 ppm and 1500 ppm concentrations for 24 hours. All treated seeds were sowed to perlite. The results showed that the seeds didn't germinate in control group, the highest germination rate for sulfuric acid treatments was observed in 95 % sulfuric acid as 89 % rate, and the highest germination rate for gibberellic acid treatments was observed in 1000 ppm dose as 29 % rate.

Key words: Carob, *Ceratonia siliqua*, seed, treatments, germination

PRODUCTIVE POTENTIAL AND ADAPTABILITY OF ADVANCED OAT BREEDING LINES (AVENA SATIVA L.)

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Abstract:

During the period of 2010-2014 was conducted a comparative study of advanced oat breeding lines. It established the productive potential of the investigated genotypes and the variability of productivity, which determines the adaptive varietal characteristics. Parameters of stability for the main yield elements were established by the models of Lin and Binns (1988) and Finlay-Wilkinson (1963). The analysis of variance of yield data showed that the environment and the genotype-environment interaction had greatest effect on the yield variability. Although statistically proven, the genotype impact was about 5 times weaker than the genotype-environment interaction.

THE DETERMINATION OF ANTIOXIDANT ACTIVITY OF SOME SAGE POPULATIONS OF IN THE MARMARA REGION

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Abstract

Methanolic extracts of 40 different population of three species of *Salvia* (*Salvia fruticosa* Mill. 20 samples, *Salvia pomifera* Mill. 5 samples and *Salvia tomentosa* Mill. 15 samples) were analyzed for their antioxidant properties. Samples were collected from different natural ecological areas in Marmara Region in Turkey. The antioxidant capacity (TAC) was investigated with the 2,2-Diphenyl-1-picrylhydrazyl (DPPH) radical scavenging method and expressed as trolox equivalents (TE). The amount of total phenolics was determined by using Folin–Ciocalteu method and Flavonoid contents in the extracts were determined by a colorimetric method. The TAC values of the spices ranged from 288.57 to 3608.32 μmol (TE)/100 g dw. The total phenolic and flavonoid content ranged from 488.07 to 3277.97 mg of gallic acid equivalents (GAE)/100 g DW and 664.03 to 4046.77 mg of catechin equivalents (CE)/100 g DW respectively.

Key words: Sage, antioxidant activity, phenolic, flavonoid

ISOLATION AND DETERMINATION OF BIOLOGICALLY ACTIVE COMPOUNDS OF *LIMONIASTRUM FEEI* (PLUMBAGENACEAE)

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Abstract:

In the pharmaceutical field, plants and their extracts are extremely important, and this, not only because of their efficiency in the treatment of various diseases but also because of their great tolerance towards the body too. Flavonoids are a large group of structurally related because of their biological and physiological importance. In this context, we are interested about a plant known by its richness of. Because of their potential therapeutic significance, the number of identified is increasing rapidly and extensive screening of their actions is being carried out in many laboratories.

One of the medicinal plants used to treat gastric infections is *Limoniastrum feei* (Plumbagenaceae). The plant is native to the southeast of Algeria (region of Bechar) and Northern Africa. The other uses of *Limoniastrum feei* are as an antibacterial for the treatment of bronchitis and for stomach infections. Our work focused on the study of *Limoniastrum feei* (Plumbagenaceae) The dried aerial parts of *limoniastrum feei* (flowers(227g), leaves(990g)and roots (720g)) powdered and each parts was macerated in ethanolic solution (80 %) the residues obtained was successively treated with chloroform, ethyl acetate and n-butanol , all the extracts were pointed on TLC eluents with BAW and Acetate-CH₃COOH-H₂O (80-10-10), both of n-butanol extracts of flowers and root were similar , 10 g of n-butanol extract was chromatographed on silica gel colonne using the isocratic system Acetate-CH₃COOH-H₂O (80-10-10), to obtained 100 lots and regrouped with TLC to 22 fractions ,between the fractions worked on, we separated F13 . 126mg of the fraction13 soluble on 1260µl of MeOH using the HPLC separations were conducted on a Shimadzu LC-8A series pumping system equipped with a Shimadzu RID-10A refractive index detector and Shimadzu injector on a C18 m-Bondapak column (30 cm £ 7.8 mm, 10 mm, Waters, flow rate 2.0mLmin⁻¹). with MeOH -H₂O (25-75) to obtained 4 pure compounds: If/6/4(2mg): catechine, If/6/11(2.8mg): epicatechine, If/6/8 (1.3mg): salidroside If/6/13 (1.5mg): Myrciaphenone A all the compounds were identified by elucidation (¹H and ¹³C-NMR, HMBC ,HSQC, COSY)

Key words: *limoniastrum feei* , secondary metabolites, flavonoids, HPLC,

EFFICIENT EMBRYOGENIC CALLUS FROM FILAMENTS WITH ANTHER IN *THERMOPSIS TURCICA*

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Abstract:

Thermopsis turcica is an endemic endangered species. The establishment of improved micropropagation method is very important to preserve this species *in vitro* conditions. Due to this reason, the effects of different media and temperature pretreatments on the stamens picked from *T. turcica* planted at Nezahat Gokyigit Botanical Garden in Istanbul were investigated. *T. turcica* filaments with anther were excised and cultivated *in vitro* with Murashige and Skoog's basal media supplemented with Naphthaleneacetic acid (4 mg L^{-1}), Benzylaminopurine (0.1 and 0.5 mg L^{-1}), and AgNO_3 (15 mg L^{-1}) at 4 , 28 and 37°C for a week under complete darkness. Moreover, to determine the effects of activated charcoal on regeneration, the medium containing 0.25% activated charcoal was also used. A week after culture initiation, all samples were then incubated at 28°C for a month under a 16 h photoperiod. The most promising callus formation were observed from filaments cultured on the media with 0.1 mg L^{-1} Benzylaminopurine (100%) pretreated at 37°C , whereas the development of embryos from callus could be visualized from the filaments cultured on the medium with 0.5 mg L^{-1} Benzylaminopurine (50%) pretreated at 4°C . None of the activated charcoal treatments gave positive results regarding callus formation instead it exhibited negatively affected callus formation in the mixture media. Furthermore, control groups which incubated on MS medium free from growth regulators, did not show any growth. According to the literature on *T. turcica* that to date no stamen culture has been performed. The results obtained from the present study proved that filament culture in *T. turcica* can be a good source for *in vitro* propagation.

Key words: Callus, embryo, filament, *Thermopsis turcica*

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MICROPROPAGATION OF *LAMIUM GARGANICUM* L. SUBSP. *STRIATUM* (SM.) HAYEK VAR. *STRIATUM* ENDEMIC TO TURKEY

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Abstract

Lamium is known by medicinal and aromatic plant. *Lamium garganicum* L. subsp. *striatum* (Sm.) hayek var. *striatum* is a plant which is endemic to Turkey and under threatened species in the *Lamiaceae* family. This species is used in folk medicine for the ancient time. Micropropagation is an alternative method for rapid clonal propagation. Aim of this study was to protect this endangered species and redound it to the ornamental industry. In this study, *Lamium garganicum* L. subsp. *striatum* (Sm.) hayek var. *striatum* species were micropropagated using MS media containing different combination of plant growth regulators; BA and GA₃ (0, 0.5, 1 and 1.5 mgL⁻¹) for propagation, IBA 0, 0.5, 1, 1.5 and 2 mgL⁻¹ for rooting.

Key words: *Lamiaceae*, *Lamium* sp., endemic, micropropagation, rooting, genetic resources

EFFECT OF SOME SEED TREATMENTS ON GERMINATION OF *SIDERITIS PERFOLIATA* L.

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ABSTRACT

Sideritis perfoliata L. belongs (Labiatae = Lamiaceae) to family which perennial or annual crops. 46 species collected in Turkey under two sections, 12 sub-species and varieties which it is quite common firstly Western later South and Central Anatolia. Of these 36 species, 4 sub-species and 2 varieties are endemic. So that there is 77% rate of endemism in *Sideritis* genus that grow in Turkey which it is one of the most high endemism genus among the all plant. *Sideritis* species both Turkey and European folk medicine was determined that have effect like painkillers, anti-rheumatic, and antimicrobial activity. Because of this widely effects, it is consumed as tea at Anatolian. Also in recent years due to its antioxidant properties there are increasing interest and demand in Europe. Seed germination studies of this species have great importance in the determination of production strategies. In this study *Sideritis perfoliata* L. was conducted to determine the effects of various chemical applications (ethylene, gibberellin, mannitol, seaweed and cold pre-treatment). It was carried out at 25/15 temperature conditions. Experiment was established according to randomized design with 3 replications at Adnan Menderes University, Faculty of Agriculture, Field Crops Laboratory. Germination rate and germination power values have been determined that there are significant differences between applications.

Key Words: *Sideritis perfoliata* L., Lamiaceae, Antioxidant, Seed germination, Germination rate and germination power values

THE DETERMINATION OF DIFFERENT GERMINATION APPLICATIONS ON *CNICUS BENEDICTUS* L.

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ABSTRACT

Cnicus benedictus L. is a thistle-like plant in the family Asteracea. After freed from thorns that rosette leaves and roots can be cook as vegetables. It is edible plant. Drug of Herba Cardui benedicti can be obtained due to drying of ariel parts of plants at Blooming period. These plants are commonly found in Anatolia roadsides and often grow in arid ridges. It is known as St. Benedict's thistle, blessed thistle, holy thistle or spotted thistle. It grows at Aegean and Mediterranean regions and it is sold as Blessed thistle in the market. Blessed thistle has a bitter taste substance called flavonoids, essential oils and viscous liquids plant. In alternative medicine it is used as antipyretic, booster, appetite enhancer, relieve diarrhea, diuretic, liver cleanser, cell regeneration, wound healing and digestive problems. Seed germination studies of this species have great importance in the determination of manufacturing strategy of production. In this study *Cnicus benedictus* L. was conducted to determine the effects of various chemical applications (ethylene, gibberellin, mannitol, seaweed and cold pre-treatment). It was carried out in 25/15 temperature conditions. Experiment was established according to randomized design with 3 replications at Adnan Menderes University, Faculty of Agriculture, Field Crops Laboratory. Germination rate and germination power values have been determined that there are significant differences between applications.

Key Words: Seed germination, *Cnicus benedictus* L., Asteracea, Chemical applications

STUDY OF THE PROTECTIVE EFFECT OF THE AQUEOUS EXTRACT OF *ARTEMESIA CAMPESTRIS* ON OXIDATIVE STRESS INDUCED IN RATS BY CARBON TETRACHLORIDE (CCl₄)

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Artemisia campestris is a medicinal plant belonging to the *Asteraceae* family, also known by the name of « Dgouft ». This species is wide-spread in the Algerian south. The aqueous and ethanolic extracts were obtained using hot maceration and soxhlet extraction respectively, leading to a yield of 12.08% for the aqueous extract and 14.90% for the ethanolic extract. The phenol content determined with Folin-Ciocalteu reagent represents 81.25 and 205.35 mg AG/g of extract in aqueous and ethanolic extracts respectively. The flavonoid content was obtained following the “aluminium trichloride method” which leads for the aqueous and ethanolic extracts to 13.64 and 28.56 mg eq quercetin /g of extract. Two different methods were performed in vitro for the antioxidant activity: the free radical DPPH and the reduction power. For the first test, the CI50 were estimated to 191.68 mg/l for the aqueous extract, 27.8 mg/l for the BHT and 9.97 mg/l for the ethanolic extract. However, the second test had shown a weak extracts reduction power compared to the BHT. The “*in vivo*” study used rats divided in 4 batches of 6 rats each, for a period of 30 days. The model batch and the batch 01 have received a daily dose of paraffin and *A.campestris* aqueous extract respectively, whereas the batches 02 and 03 received in addition, an oral dose of CCl₄, 24 hours before every sacrifice. The biochemical markers analyses of hepatic check up (ASAT, ALAT, PAL and bilirubin) registered high contents for these markers for batch 02 when aqueous extract pretreated rats and CCl₄ intoxicated showed a reduction on the biochemical markers.

Key Words: *Artemisia campestris*, polyphenols, Toxicity, CCl₄, Hepatic check-up.

**INVESTIGATION OF MICROPROPAGATION VIA SPORE CULTURE TECHNIQUE IN SOME FERN SPECIES
(*ASPLENIUM SCOLOPENDRIUM*, *ASPLENIUM SEPTENTRIONALE*, *ASPLENIUM ADIANTUM-NIGRUM*
L., *ASPLENIUM TRICHOMONAS*) GROWN NATURALLY IN TURKEY**

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Abstract

The aim of this study was to propagate some fern species which grown naturally in our country (*Asplenium scolopendrium*, *Asplenium septentrionale*, *Asplenium adiantum-nigrum L.*, *Asplenium trichomonas*) using spore culture technique and to observe the stages of germination, gametophyte emergence and sporophyte formation. *In vitro* regeneration experiments were conducted using spore explants belong to different fern species to search micropropagation possibilities of this plant which is a valuable genetic resource of Turkey. In the experiment, different plant growth regulators; NAA (0, 0.5, 1.0 mg L⁻¹), BA (0, 0.5, 1.0 mg L⁻¹), KIN (0, 0.5, 1.0 mgL⁻¹) and IBA (0, 0.5, 1.0, mgL⁻¹) combinations and concentrations were used to optimize micropropagation protocol. As a result, ratio of the spores viability, ratio of germination, the growth and development of gametophyte and sporophyte stages were determined for all species.

Key words: Fern, sporeculture, micropropagation, geneticresources

VOCATIONAL CURRICULUM OF ORGANIC MEDICINAL AND AROMATIC PLANTS FOR MEDITERRANEAN COUNTRIES

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Abstract

Organic farming of herbs and medicinal and aromatic plants is of major importance for rural economy due to their contribution to agricultural diversification and better use of land. Herbal.Mednet is a project funded by the European Commission's Life Long Learning Program, Transfer of Innovation, with duration of two years (2012-2014) and 7 partners: Sociedad Española de Agricultura Ecológica (Coordinator, Spain), Universidad de Alcalá (Spain), Agro-Know Technologies (Greece), University of Thessaly (Greece), University of Agronomic Sciences and Veterinary Medicine Bucharest (Romania), Associazione Italiana Agricoltura Biologica (Italy), APIVITA Organization (Greece). The papers aims to present e-learning training program for advisors and trainers in the field of organic Medicinal and Aromatic Plants (MAPS) in order to equip them with knowledge, competences, skills and understanding necessary for providing a support and technical and managerial assistance to producers and processors of organic farming of medicinal, aromatic, herbal plants in Mediterranean countries (Spain, Italy, Greece). The vocational curriculum developed by Herbal.Mednet project consists of different training modules: M1 – Pedagogy, M2 – Technology, M3 – Business Ideas, M4 – Principles of organic agriculture and organic MAPS, M5 – Legislation and Standards, EU policies and programs to support organic MAPS, M6 – Organic MAPS cultivation, M7 – Marketing organic MAPS products - Packaging -Trade, where each module consists of various units. The first module is about the pedagogical aspect of the training of trainers and will help the trainers decide the best approach to follow when designing a training program. The second module is about the technological tools used in the training context, while the third one is an introduction to the concept of business ideas and provides the required knowledge for the trainers to be able to develop their own business in organic MAPS. The rest of the modules (4 to 7) are designed by project partners and are related to the training of organic MAPS advisors / trainers, as they include topics on OA and organic MAPS. For developing a complete training module, the trainers should include the basic three modules about pedagogy, technology and training and then include or develop the training modules on organic MAPS according to their interest.

Key words: organic medicinal and aromatic plants, vocational curriculum, e-learning, training modules

HERBAL MEDICINES: INTEREST, QUALITY AND SAFETY

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Abstract

Technical progress in allopathic therapies has excellent results. However, this medicine called "modern" is not stripped of adverse effects modifying the behavior of some prescribers and that of the population, hence the rediscovery of herbal and traditional medicine. In recent years, the market for so-called natural therapies progresses, revealing a substantial louder patients and prescribers regarding the herbal medication. Whether to alleviate symptoms or to maintain good health, phyto-medicines address the concerns of the citizens of the twenty-first century. Evaluating these products and ensuring their safety and effectiveness through registration and regulation present significant challenges. The aim of this approach is to depict the interest that brings phytomedicines describing the different galenics forms derived from herbals and finally, to discuss regulatory circuits that run the production and the distribution on the pharmaceutical market of these products derived from God's pharmacy.

Key words: phytomedicines, medicinal plants, drugs marketing authorization.

ESSENTIAL OIL CONTENTS OF SOME SPICES AND SEASONINGS WIDELY TRADED IN NORTEASTERN PART OF TURKEY

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Abstract

In the current study, the essential oil content of some spices and seasonings widely traded and commonly consumed by local inhabitants were determined. In this context, thirty-four samples from thyme, melissa, chamomile, mint, rosemary, cumin, dill, coriander were obtained from local spice shops in Rize, Turkey. The experiments were designed in three-replicates. The essential content in spices and seasonings ranged from 0-5.4%. Essential contents were 2.7-4.2% in thyme, 0.4-0.6% in basil, 0-0.1% in lemon balm, 0.02-0.1% in chamomile flower, 1.4-3.8% in dill seeds, 3.6-3.9% in cumin seeds, the 3.0-4.3% in mint leaves, 0.7-1.0% in tea leaves, 0-0.9% in yarrow, and 3.2-4.0% in fennel. In the recent, herbal extracts and essential oil production in addition to crude drugs in harmony with the established quality standards are interest of added values. In addition to the good agricultural practices associated with medicinal and aromatic plants (MAP), post-harvest process are also essential in relation to required and desired quality of herbal products in accordance with standards. Indeed, the percentages of essential oil distilled from the plants were below the Turkish Standards Institute (TSI), which may result from the cultivation techniques, harvesting time, harvesting techniques, post-harvest processes or genetic factors and growth conditions.

Key words: Local spice shops, seasoning, spice, essential oil, Rize

A NATURAL SWEETENER: STEVIA (SUGAR LEAF)

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Abstract:

Stevia is a sweetener and sugar substitute made from the leaves of the plant species *Stevia rebaudiana*. Stevia's taste has a slower onset and longer duration than that of sugar and some of its extracts may have a bitter or licorice like aftertaste at high concentrations. The plant *Stevia rebaudiana* has a long history of ethnomedical use by the Guarani, having been used extensively by them for more than 1500 years. The leaves have been traditionally used for hundreds of years in both Brazil and Paraguay to sweeten local teas and medicines, and as a "sweet treat". In 1899 Swiss botanist Moises Santiago Bertoni, while conducting research in eastern Paraguay, first described the plant and the sweet taste in detail. Only limited research was conducted on the topic until 1931 two French chemists isolated the glycosides that give stevia its sweet taste. These compounds, stevioside and rebaudioside, are 250-300 times as sweet as sucrose and heat-stable, pH-stable and not fermentable. Stevia has attracted attention with the rise in demand for low-carbohydrate, low-sugar sweeteners. Because stevia has a negligible effect on blood glucose it is attractive to people on carbohydrate-controlled diets. In the 1970s, sweeteners such as cyclamate and saccharin were suspected of being carcinogens. Consequently, Japan began cultivating stevia as an alternative. In the mid 1980s, stevia began to become popular in U.S. natural foods and health food industries, as a non-caloric natural sweetener for teas and weight-loss blends. The makers of the synthetic sweetener Nutra Sweet asked the FDA to require testing of the herb. Today, *Stevia rebaudiana* is cultivated and used to sweeten food in East Asia including Japan, China (since 1984), Korea, Taiwan, and Malaysia. It can also be found in Saint Kitts and Nevis, Brazil, Colombia, Peru, Paraguay, Uruguay, and Israel. China is the world's largest exporter of stevioside. A study found that stevioside and related compounds may have anti-hyperglycemic, anti-hypertensive, anti-inflammatory, anti-tumor, anti-diarrheal, diuretic, and immunomodulatory actions. The other study found that the use of stevia sweeteners as replacements for sugar would likely benefit diabetic patients. Steviol and rebaudioside are not mutagenic at doses and routes of administration at which humans are exposed to them. Two review studies found no health concerns with stevia or its sweetening extracts. The WHO's Joint Experts Committee on Food Additives has approved, based on long-term studies, an acceptable daily intake of steviol glycoside of up to 4 milligrams per kilogram of body weight. *Stevia rebaudiana* plants which are found in the wild in semiarid habitats ranging from grassland to mountain terrain, do produce seeds, but only a small percentage of the seeds germinate. Planting cloned stevia is a more effective method of reproduction.

Key words: Stevia, Sugar Leaf, Natural Sweetener, Stevioside, Rebaudioside

FIELD CROPS

DROUGHT TOLERANCE IN CHICKPEA (*Cicer arietinum* L.) GENOTYPES

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Abstract

Chickpea (*Cicer arietinum* L.) is an important legume crops in Turkey. A field study in randomized complete block design was conducted to investigate drought resistance characteristics of Chickpea varieties in the Mediterranean condition (Adana province) of Turkey. Results showed that Chickpea grain yields were influenced by drought stress and genotypes without a significant interaction. Averaged across Chickpea genotypes, grain yields were significantly decreased by 43% in response to drought stress. The highest seed yield was recorded in FLIP 98-108 C and lowest in FLIP 98-42C. Among the genotypes, the FLIP 98-108 C and FLIP 98-63 C had significantly higher mean productivity, geometric mean productivity, yield index and yield stability index when compared with Aydın and İnci as control. In contrast, the FLIP 98-24 C and FLIP 98-42 C had significantly lower STI and DTE with higher values of DSI and TOL. A significantly lower values of TOL and DSI but higher values of MP, YI, YSI, STI, DTE and GMP indicated a greater drought tolerance in FLIP 98-108 C, FLIP 98-63 C, FLIP 98-128 C, FLIP 00-18 C, FLIP 98-55 C, Aydın and FLIP 98-24 C, respectively. These traits are recognized as beneficial drought tolerance indicators for selecting a stress tolerant variety. Therefore, these genotypes can be used as sources of drought tolerance in further breeding programme for evolving the drought tolerant genotypes in chickpea.

Key words: Chickpea, Drought, Yield Stability Index, Tolerance Index, Drought Susceptibility Index

THE CONSIDERATION OF SOME CHICKPEA (*Cicer arietinum L.*) VARIETIES AND LINES IN CUKUROVA REGION REGARDING YIELD AND SOME PLANT CHARACTERISTICS

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ABSTRACT

Food legumes dry seeds are one of the main protein sources for humans and animals because of the high protein, vitamin and mineral levels they have. This study was conducted under seasonal conditions of Cukurova region with local materials and the materials from ICARDA. This research was made as winter sowing by 20 lines at Dogankent, where is East Mediterranean Agricultural Research Institute located. In this study trials in our region showed us that, it is possible to get yields as high as 205.03 kg/da FLIP 05-54C line as low as yield 20.55 kg/da from local varieties as when certain varieties are used for winter sowing. 100 seed weight between 46.89 - 20.66 gr., flowering days between 61-78 days, plant height between 66.77-53.44cm, However, Ascochyta Blight (*Ascochyta rabiei* (pass.)Labr.) appears as a significant problem especially at rainy and mild winters during growing of winter varieties. Even though no disease symptoms were observed on any of the chickpea local varieties.

Key words: Chickpea, yield, variety breeding

CHICKPEA (*CICER ARIETINUM* L.) IN VITRO MICROPROPAGATION

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ABSTRACT

Breeding and genetic transformation improvement needs suitable and reliable protocols development. This is especially essential for recalcitrant plant such as grain legumes. For chickpea, the establishment of a repeatable micropropagation protocol is needed to promote plant regeneration. Stem nodes and mature embryos were cultured on Murashige and Skoog (MS) medium used alone or supplemented with plant regulators, to induce shoots and roots formation either via callogenesis or directly.

Key words: *Cicer arietinum* L., nodes, mature embryos, plant regulators.

**THE GROWING AS SECOND CROP SOME CHICKPEA (*Cicer arietinum* L.) VARIETIES IN VAN/GEVAS
ECOLOGICAL CONDITIONS**

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ABSTRACT

This study was carried out to determine the second product of some chickpea cultivars in Van-Gevaş conditions in 2002. The experiment was designed in randomized blocks design with three replications. In this study, three different varieties of cheakpea (Canitez, ILC-482 and Yerli) were used as plant materials. The experiment were planted in the first week of July after or barley harvest, row spaces were 30 cm and 10 cm on row were applied. In this study plant height, firs pod height, number of branches per plant, number of pods per plant, seed number per plant, 100 seed weight, grain yield per unit area and the crude protein content were determined. At the end of the study, the highest grain yields per unit area were obtained as 153.93 kg/da with ILC-482 cultivar, the lowest grain yields per unit area as 97.70 kg/da with Yerli genotype.

Key words: Chickpea varieties, second crop, sowing time, yield components

DETERMINATION OF SOME MORPHOLOGICAL AND PHENOLOGICAL CHARACTERISTICS OF LOCAL DRY BEAN (*PHASEOLUS VULGARIS* L.) GENOTYPES

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It is extremely important to record and protect genetics plant resources to avoid problems that may occur in the future and development of new products. Many different variations can be seen even though the material is collected from the same city. The aim of this study is to determine some morphological and phenological characteristics of local dry bean genotypes collected from districts and center of Giresun. Materials collected in 2010 and field studies were carried out in Giresun Şebinkarahisar ecological conditions in 2011. The experiment was carried out in complete randomize blocks design with three replication. In the study 28 local dry bean genotype was used collected from districts and center of Giresun. In the study 6 genotypes are determinate and 22 genotypes are indeterminate. The height of seeds from 0.59 to 1.93 mm, the length of the seeds from 0.40 to 1.01 mm. The output period ranged from 13.33 to 25.00 days, the flowering period ranged from 30.33 to 88.67 days and vegetation period ranged from 133.67 to 147.33 days.

Keys Words: Dry bean, Genotypes, Morphological, Phenological

PHYSIOLOGICAL PERFORMANCE AND YIELD OF DRY BEAN (*PHASEOLUS VULGARIS* L.) GENOTYPES UNDER WATER DEFICIT

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Lack of water during vegetative and/or reproductive growth stages is one of the most limiting factors for bean growth. The purpose of this study was to evaluate the effects of water deficit applied during two phenological stages, flowering and seed filling, on physiological parameters, yield and yield components. Seven populations from different geographical origins and three improved lines of dry bean *Phaseolus vulgaris* L., indeterminate climbing type IV, were tested during two successive cultivation periods in Florina, north Greece. The treatments were normal irrigation (C), water deficit during anthesis (WDA) and water deficit during the seed filling stage (WDSF). Net photosynthesis (A), stomatal conductance (gs), transpiration rate (E) and total chlorophyll content (SPAD) were recorded at the onset of each treatment (well-hydrated plants, day 0), and days 4, 8 and 12 of each water deficit, as well as on the third day after rewatering. Seed yield plant⁻¹, number of pods plant⁻¹, and 100-seed weight (g) were recorded at harvest. After 4 days of water deficit A, gs and E were decreased between 10-30%, 13-68% and 9-47% at WDA and 0-11%, 0-30% and 0-15% at WDSF whereas at the end of the water stress treatments the reductions were greater with 42-66%, 43-99% and 53-87% at WDA and 19-45%, 16-82% and 16-50% at the WDSF respectively for the genotypes tested compared with the control. SPAD values were statistically reduced mainly at the end of each water deficit treatment with genotypic differences. Water deficit induced significant seed yield plant⁻¹ reductions among the different genotypes between 0-26% at WDA and 0-44% at the WDSF treatment. High yield losses at the WDSF treatment were caused by significantly higher decrease in the number of pods plant⁻¹ and 100-seed weight. Two genotypes showed significantly lower yield reduction either at both or one of the water deficit treatments and this coincided with better physiological response and recovery after the end of each water deficit.

Key words: Photosynthesis, Respiration, Stomatal conductance, Chlorophyll content, Recovery

INFLUENCE OF THE DIMENSIONS OF LIFTING BRUSHES ON THE LOSSES AT DIRECT HARVESTING OF STANDING VINE DRY BEAN

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The influence of the dimensions of lifting brushes, mounted on the cutting bar of a small combine, on the losses at direct harvesting of standing vine dry edible bean, bred in Bulgaria, was studied. The form of the brushes was cylindrical and they were mounted on the cutterbar along the direction of travel of the machine. The diameter and the longitude of the brushes were studied as well as the distance between them on the cutterbar. Losses at cutting were evaluated. The limits of space position of the pods by height of two brand new cultivars of standing vine dry bean were determined. It was established that application of these brushes could decrease the losses at direct harvesting under 12%. A brushes diameter of $\varnothing 38$, a longitude equal of the longitude of the fingers of the cutterbar and a distance of 76.2 mm between brushes were found as optimal.

Key words: Dry bean, Standing vine, Direct harvesting, Lifting brushes

THE DETERMINATION OF YIELD AND YIELD COMPONENTS OF DIFFERENT WINTER LENTIL GENOTYPES (*LENS CULINARIS MEDIC.*) IN KAHRAMANMARAS CONDITIONS

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Abstract

This study was aimed to determine of yield and yield components on 12 different lentil genotypes which were grown in 2009-2011 growing seasons, two times by repeating, according to randomized block desing with four replication in Kahramanmaraş conditions. In this study, the plant height (cm), ripening period (days), the first pod height (cm), the branch number (unit/plant), number of pods per plant (unit/plant), the number of grains per pod (unit/pott) and grain yield (kg/ha) were investigated. According to result of two-years combined the analysis, the plant height, ripening period, the first pod height, the branch number, number of pods per plant, the number of grains per pod and grain yield of genotypes were significant as statistically. It was found that the highest values of grain yield were obtained from FLIP 2007-106L (368 kg/da), FLIP 2005-58L (310 kg/da) and FLIP 2005-20L (298 kg/da) respectively. The lowest of grain yield was 197 kg/da and FLIP 2007-133L genotyp was obtained. In the ripening period was investigated, the shortest ripening periods were showed FLIP 2005-20L (145 day), FLIP 2005-58L (151 day) and FLIP2007-106L (152 day) genotypes respectively.

Key Words: Lens genotip, yield, yield components.

DETERMINATION OF YIELD AND YIELD COMPONENTS IN SOME DRY BEAN (*PHASEOLUS VULGARIS* L.) CULTIVARS UNDER GİRESUN CONDITIONS

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This study was carried out to determine yield and yield components under Giresun ecological conditions in 2011. 6 dry bean cultivar (Balkız, Akman 98, Önceler 98, Yunus 90, Göynük 98, Karacaşehir 90) obtained from Eskişehir Gateway Zone Agricultural Research Institute and 2 cultivar Çelik strimax and Alman Ayşe grown by farmers in the region. The experiment was arranged in complete randomize blocks design with three replication. As a result of study, number of pod per plant from 13.90 to 18.00, number of grains per pod from 3.97 to 5.43, 1000-seed weight from 205.33 to 421.33 and protein content from 20.50% to 24.06%. According to the statistical analysis, differences between averages were found significant. Grain yield per unit of area is the lowest in 82.31 kg/da cultivar Önceler-98, the highest in 131.11 kg/da cultivar Alman-Ayşe.

Key words: Bean, Cultivar, Yield, Yield Components

CORELATION AND PATH ANALYSIS OF PHYSICOCHEMICAL PROPERTIES OF PEA GENOTYPES

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ABSTRACT

Pea, a legume plant, is the most developed industry and while variety of pea is developing, seed quality should be more preplan than seed yield. Therefore, seed quality relationships was determined in selection study which we began to variety developed. This study was conducted to determine relationships in between some physicochemical properties of local pea materials which has been collected from Blacksea Regions and obtained from Gene Bank of Eagean Agriculture Research Institue and also morphologically characterized. Fortyfour lines and 4 local pea lines used in the experiment and it was deteremined cooking time was very significantly and positive correlated with water absorption capacity, swelling capacity, dry matter rate passed to cooking water, seed length, protein and ash rate in seed, tryptophan and P quantity in seed; significantly and positive corelated with 100 seed weight, amylose rate in seed and Ca quantity in seed; very significantly and negative corelated with fragmentation ratio of seed after cooking and starch rate in seed. As a result of path analyses; dry matter rate passed to cooking water (0.5637) and water absorption capacity (0.5459) have positive and highest direct effects; starch rate in seed (-0.3548) and K quantity in seed (-0.2900) have negative and highest direct effects on cooking time were determined. Starch rate in seed have been effected negative to cooking time (0.641^{**}). The increaser starch rate in seed, the shorter cooking time. According to the path analysis, direct effect of starch rate in seed to cooking time is 28.4736 % and it was seeing the propety doing higest indirect effect is water absorption capacity (16.9914 %).

Key words: Pea, correlation, path, physicochemical.

PHYSIOLOGICAL AND YIELD RESPONSES OF FABA BEAN DROUGHT IN A MEDITERRANEAN-TYPE ENVIRONMENT

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ABSTRACT

A field experiment was carried out to study Open and controlled experiments were conducted to estimate responses of five faba bean (*Vicia faba*) genotypes under water deficit. Yield and its components were estimated in field experiment under three irrigation regimes 50,100,150 mm of Class "A" water evaporation pan, for two consecutive seasons 2011-2013. Under growth chamber conditions, seeds were soaked in 0, 5, 10 and 15 % (W/V) of PEG-8000 for four weeks. Results showed pronounced reduction in seed yield and its components significantly due to water deficit by 37 and 69% at 100 and 150 mm evaporation, respectively. Hassawi2 produced the highest seed yield under all irrigation treatments. Total chlorophyll, maximum quantum yield of photosystem and photon yield of PSII dropped significantly under water deficit conditions. Increasing PEG concentration significantly decreases the seed germination percentages; shoots height, chlorophyll content and PSII mediated photoreactions. On the other hand, crude protein, free proline and malondialdehyde contents in faba bean leaves increased by osmotic stress. While root length of Giza Blanka and Hassawi2 were decreased gradually, root length of Goff1, Hassawi1 and Gazira2 was increased with elevation of osmotic stress. Gazira2 and Hassawi2 had the highest estimates of RWC, proline and protein under water deficit conditions while lowest values were recorded for Giza Blanka. The selection of faba bean genotypes with genetic traits such as chlorophyll and PS II activities and osmolyte accumulation might be useful in improving the adaptive responses to water stress. Due to their ability to maintain the higher PSII activity, chlorophyll, compatible solute content, RWC and proteins content, Gazira2 and Hassawi2 could be considered drought tolerant genotypes and could be utilized in faba bean breeding program.

Key words: faba bean, PEG, photosystem, water deficit, physiological responses.

ADAPTATION OF SOME HORSEBEAN (*Vicia faba* L.) GENOTYPES IN ECOLOGY OF ERZURUM

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ABSTRACT

In Erzurum province, the study area, the main source of livelihood is animal production which is mainly dependent on natural grasslands. During harsh and long winter period it is difficult to feed the farm animals with sufficient and balanced diets. In order to alleviate these problems new forage crops should be introduced to the existing production pattern along with the measures to be taken to preserve the grazing lands from degradation due to any reason. In fact, introduction and considering the new crops to/in existing production pattern is said to be a necessity since production pattern is expected to be modified in time due to changing climatic conditions. Like all legumes horsebean is a good rotation crop. It is a good source of protein because of high protein content of its grains. It can be used as fresh or dried. Because of high nutritive value it is used as food and feed considering the grain size. In this study, it is aimed to reveal the adaptability of horsebean, an important legume, to Erzurum ecological conditions through adaptation trials regarding a number of aspects such as winter and drought hardiness and tolerance to pests and diseases. This study was conducted to determine plant characteristics of some local faba bean (*Vicia faba* L.) populations between 2012 and 2013 under Erzurum ecological conditions. *Vicia faba* L. cvs Eresen-87, Filiz-99, Kıtık, Sakız, Seher and Lara were used as control cultivars. 15 faba bean populations collected from some districts and villages of Samsun, Maçka, Balıkesir, Çanakkale, Muđla, Antalya, Tokat and Adapazarı provinces were compared with control cultivars. Pasinler and Aziziye as a matter of compliance by testing at two locations especially seeds and dry hay yields have been made in the area 4.2 m². Combining (place/year) research findings were done statistical analysis, place (year) and type in all the examined parameters were found significantly (P<0.01).

Key words: Legume forage crops, broad bean, horse bean, horsebean cultivation

EXOGENOUS TREATMENT WITH SALICYLIC ACID UNDER SALT STRESS OF *VICIA FABA* L. ASSESSED BY THE CHLOROPHYLL A FLUORESCENCE TRANSIENT

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Abstract

Vicia faba L. is an important pulse crop in the Mediterranean region. In many cases faba bean is grown on saline soils where growth and yield are limited by salinity. Recently, the chlorophyll a fluorescence OJIP transient (OJIP transient) has been used as an effective tool for studying damage and activity of the electron transport chain in the photosynthetic apparatus under various environmental stresses. The aim of this study was to evaluate the validity of the OJIP transient as a stress indicator and to characterize the effect of salt stress on the photosynthetic apparatus in broad bean leaf. OJIP transients were measured after exposure to salt stress for 21 days with salicylic acid, and several parameters were calculated according to the JIP-test. The OJIP curves and the JIP parameters clearly revealed differences between stress types and between tissue types. In addition, the JIP parameters and the energy pipeline model indicated that salt stress had a greater influence on the photosystem (PSII) electron transport chain than salt stress, and that changes were greater in the leaf. Furthermore, the PS I electron transport chains of leaf appeared to be more salt resistant than those in PS II. Our results indicate that, in broad bean leaf, OJIP transients and calculated JIP parameters can be used as sensitive methods for measuring the salt stress damage to the photosynthetic apparatus, and to identify the action sites of salt stress.

Key words: Salt stress, Chlorophyll a fluorescence transient, broad bean, salicylic acid.

IDENTIFICATION OF *I*-GENE FOR BCMV RESISTANCE WITH SCAR MARKER SW13 IN *PHASEOLUS VULGARIS* L. GENERATIONS, DERIVED FROM THE CROSS (BAT 477 X DOBROUDJANSKI RAN)

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ABSTRACT

Resistance to BCMV (*Bean common mosaic virus*) was established in *Phaseolus vulgaris* variety BAT 477, following artificial inoculation with the virus. Crosses were performed between BAT 477 and BCMV susceptible parent Dobrujanski ran, a widely spread Bulgarian variety, in order to transfer the resistance in the generations. By PCR, using SCAR marker SW 13, the presence of *I*-gene for BCMV resistance was proved in donor parent BAT 477, in all F₁ plants and in segregating F₂. The monogenic control of resistance was demonstrated by 690 bp fragment amplification in 75 plants and absent of fragment in the remaining 31 plants. The ratio of segregation was approximately 3:1, as evidenced by the criterion " χ^2 " at level of significance $0,50 > P > 0,20$.

Key words: *Bean common mosaic virus* (BCMV), *I*-gene, *Phaseolus vulgaris* L.

**INHERITANCE OF THE TRAITS - SEED'S COLOR AND PLANT HABITUS, IN *PHASEOLUS VULGARIS* L.
CROSS BAT 477 X DOBROUDJANSKI RAN**

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A study to establish the inheritance of the traits color of seeds and plant habit, in common bean cross BAT 477 x Dobrudjanski ran, was conducted. It has been found that in the F₁-generation were exhibited dominant traits - brown seeds, purple color and III a type of habitus. In F₂-generation the disruption by the coloration of flowers was in ratio 3 purple : 1 white (0,50 <P> 0,20). The ratio of disruption by the traits brown : beige seeds (0,20 <P> 0,10) and brown : white seeds (0,50 <P> 0,20) was also 3 : 1, while beige : white seeds - was 1 : 1 (0,90 <P> 0,50). The ratio of disruption by the trait type of habitus was also 3 : 1 (III a : III b type), (0,90<P>0,50). A monogenic control of studied traits was found. Brown and beige colors of seeds are probably controlled by different alleles of the same gene. It was established that traits color of flowers and color of seeds are relatively inherited.

Key words: Common bean, habitus, inheritance, *Phaseolus vulgaris* L., seeds

INHERITANCE OF SOME QUANTITATIVE TRAITS IN COMMON BEAN CROSS BAT 477 X DOBRUDJANSKI RAN

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ABSTRACT

Studies were conducted in the period 2011 - 2014. Biometric analysis of the quantitative traits was performed on 50 plants from parents, F_1 and F_2 -generation of the cross BAT 477 X Dobroudjanski ran. Inheritance in a wide (H^2) and narrow sense (h^2) was established by Mahmud and Kramer (1951) and Warner (1952). The number of effective genes (n_E), controlling traits was determined by Wright (1968). *Overdominant inheritance* in the F_1 -generation was found for the traits: height of the first pod placement, height of the plants and number of branches. *Incomplete dominance* occurs in the inheritance of traits - mass of plants with pods, number of pods per plant, number of fruit branches, mass of pods with seeds, number of seeds, seed weight and length of pods. The most strong heterosis effect was manifested in the traits - number of branches, plant height, and length of the pods, number of pods per plant and a thickness of the seeds. The highest values for criteria H^2 and h^2 in F_1 and F_2 -generations were established for the traits - seed weight, number of pods and number of seeds per plant, thickness and length of the seeds. Higher values of H^2 and h^2 in the F_1 -generation also have the trait mass of the pods with seeds, while in F_2 -generation - number of fruit branches and height of the first pod placement. Highest number of effective genes were reported in the control of traits: number of pods (4-5 genes); number of fruit branches and mass of the pods with seeds (2 - 3 genes), as well as the thickness of seeds (3-4 genes).

Key words: common bean, inheritance, *Phaseolus vulgaris* L., quantitative traits

THE DETERMINATION OF YIELD AND YIELD COMPONENTS OF DIFFERENT WINTER LENTIL GENOTYPES (*LENS CULINARIS MEDIC.*) IN KAHRAMANMARAS CONDITIONS

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Abstract

This study was aimed to determine of yield and yield components on 12 different lentil genotypes which were grown in 2009-2011 growing seasons, two times by repeating, according to randomized block desing with four replication in Kahramanmaraş conditions. In this study, the plant height (cm), ripening period (days), the first pod height (cm), the branch number (unit/plant), number of pods per plant (unit/plant), the number of grains per pod (unit/pott) and grain yield (kg/ha) were investigated. According to result of two-years combined the analysis, the plant height, ripening period, the first pod height, the branch number, number of pods per plant, the number of grains per pod and grain yield of genotypes were significant as statistically. It was found that the highest values of grain yield were obtained from FLIP 2007-106L (368 kg/da), FLIP 2005-58L (310 kg/da) and FLIP 2005-20L (298 kg/da) respectively. The lowest of grain yield was 197 kg/da and FLIP 2007-133L genotyp was obtained. In the ripening period was investigated, the shortest ripening periods were showed FLIP 2005-20L (145 day), FLIP 2005-58L (151 day) and FLIP2007-106L (152 day) genotypes respectively.

Key Words: Lens genotype, yield, yield components.

AMELIORATION OF THE SANITARY STATUS OF THE SEED STOCK IN LENTIL AT LOW DENSITY

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ABSTRACT

Among viruses that infect lentil, *Pea seed-borne mosaic virus* (PSbMV) is the most destructive and it is transmitted in high rates by lentil seed. Lentil landraces reproduced outside of any certification or sanitation scheme are at the highest risk for virus spread and seed transmission. Ultra-low densities accentuate phenotypic differences among individual plants and facilitate the discrimination between infected and healthy ones. This work aimed to evaluate the hypothesis that early seed multiplication at very low density might improve the sanitary status of the seed stock produced. The procedure was established in a commercially cultivated landrace from Northern Greece (Orestiada) for three cycles, by using a stock seed produced locally in isolation. In each cycle, among a number of survived ultra-spaced plants, the highest yielding that did not show any disease symptoms were selected, and their seed was mixed to form a sister population. Three seed-borne viruses were detected in the stock seed including PSbMV. The selection applied progressively decreased virus load and no virus was detected in the seed of the 3rd cycle sister population. Compared to the mother population, the sister populations had higher percentages of survived and reaching maturity plants and a lower coefficient of variation (CV) of single-plant grain yield. Additionally the grain yield of the sister populations was higher at both the low density (up to 44%) and the typical farming dense stand (7.4%). It was concluded that initial reproduction of lentil landraces at an ultra-low density and subsequent multiplication at dense stand appears an effective technique to ameliorate the healthy status of the seed stock.

Key words: Breeder seed, Genetic resource conservation, PSbMV, Seed reproduction

Acknowledgement

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PRODUCTIVE CAPACITY OF SIX ANNUAL LEGUME GRAIN VARIETY UNDER THE CLIMATIC CONDITIONS OF CENTRAL SOUTH BULGARIA

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ABSTRACT

Increasing the production of plant protein for feed and food purposes, is one of the important tasks of agricultural production. To produce in a given region the most protein per unit area, with the lowest cost, it must include the cultivation of the most suitable for its conditions legume plants. In 2010 - 2013, at the experimental base of the Department of "Plant Growing " at Trakia University - Stara Zagora field experiment was conducted to establish productive capacity of grain legumes: spring pea, winter pea, common vetch, bitter vetch, grass pea and chickpea under the environmental conditions of Central South Bulgaria. The survey was designed by the block method in 4 repetitions. The cultivation of plants was performed by the conventional technology. It was established that in non irrigation conditions for Central South Bulgaria the most productive of the tested grain legumes are spring pea (0.244 kg.m⁻²) and chickpea (0.198 kg.m⁻²). Specific climatic conditions over the years have the least impact on productivity in chickpea and grass pea. Studies for determination the effect of test factors (type of crop and year) showed the strongest influence on grain yield and plant height has the type of crop. On the grain yield weather conditions of the year has the higher impact (33.87% of the total variation). The height of the stem in the tests legumes is well correlated with the precipitation in May. Grain yield of winter pea and bitter vetch is in a good correlation with the amount of rainfall during the period from March to June, and in common vetch - the amount of the precipitation in May. Developed on this basis regression relationships, allow a preliminary assessment of productivity of grain legumes with sufficient accuracy for practical purposes.

Key words: spring pea, winter pea, common vetch, bitter vetch, grass pea, chickpea productivity, height of the stem, climate conditions, regressions

EFFECTS OF INOCULATION BY *BRADYRHIZOBIUM JAPONICUM* STRAINS ON NODULATION, NITROGEN FIXATION, AND YIELD OF *LABLAB PURPUREUX* IN ALGERIA

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Abstract:

With the aim of acquiring a better understanding of ecological growth and biomass of *Lablab purpureux* and to assess the effect of *Bradyrhizobium japonicum* strains on the performance of *Lablab purpureux*, an experiment was conducted during the February to May 2013 growing season. Inoculation of *Lablab purpureux* with *Bradyrhizobium japonicum* and grew them in a greenhouse for 2 months under varying light (L), phosphorus (P), and nitrogen (N) treatments. I obtained the following results: (1) L, P × N, and L × P × N treatments affected every response variable, but most increases. All the nodulation parameters, namely, nodulation rating, nodule number per plant, nodule volume per plant, and nodule dry weight were significantly influenced by the main effect of *Bradyrhizobium japonicum* strains alone. The results obtained were analyzed statistically by ANOVA using the software statistica and had shown that the main effect of Lablab was highly significantly. The dry matter production and nitrogen uptake at mid flowering were highly significantly affected by the main effects of both plant and strain. The yield and the yield components such as number of pods per plant, number of seeds per pod, seed yield, thousand seed weight, above-ground dry biomass, and total nitrogen uptake were highly significantly affected by inoculation of *Bradyrhizobium* strains alone. A yield increase of 80% was obtained due to inoculation over the uninoculated control. Effect was also significant on number of pods per plant, seed yield, thousand seed weight, harvest index, and total nitrogen uptake.

Key words: *Lablab purpureux*, inoculated, *Bradyrhizobium japonicum*, analyzed statistically, nodulation.

SKEWNESS AND KURTOSIS VALUES IN Adapop 1 POPULATION

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Abstract

This study is conducted to provide source material for kind development studies carried out in the Research Directorate for Maize Research Station Directorate in Sakarya in 2012 and it is conducted by using "S₁ Replication Selection Method" in populations called as Adapop 1 which have different features such as grain structure, grain color, and maturity group. The data is obtained from yield experiment of progeny control. In our study, coefficient of skewness of population for Adapop1 is defined as 0,94, and for selected families this value is defined as 1,34. Coefficient of kurtosis of population for Adapop 1 is defined as 1,99 and for selected families this value is defined 1.88.

Key Words: Adapop 1 Population, Coefficient of skewness, coefficient of kurtosis, maize

DETERMINATION OF GRAIN YIELD POTENTIAL OF SINGLE MAIZE CROSSES IN ÇUKUROVA REGION CONDITIONS

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Abstract:

This research was conducted to determine grain yields of single crosses maize in Çukurova Region conditions. In the study, 21 single crosses maize derived from dent homozygous inbred lines developed by East Mediterranean Agricultural Research Institute and three commercial varieties were used as trial material. Experiments were conducted in 2012 year and planned in a randomized complete block design with three replications. Spacing between the rows were 70 cm and within the rows were 25 cm. Each parcel consisted of 4 rows with 5 m lengths. Analysis of variance indicated that there were significant differences among the single crosses maize. The yield levels of all hybrids varied from 8450 to 16590 kg ha⁻¹ and average grain yield was 11570 kg ha⁻¹. The highest grain yield was proved from standard commercial variety P31G98 and the lowest grain yield was proved from single cross ÇM 12. According to results of research, SASA 18 single crosses candidate variety was in the same group as statistical with standard commercial varieties in term of grain yield.

Key Words: Çukurova Region, Hybrid Maize and Grain Yield

VARIATION OF MAIZE YIELD IN CROATIA AND BOSNIA AND HERZEGOVINA AMONG YEARS WITH ASPECT OF CLIMATIC CHANGES

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Abstract

Climate changes, especially precipitation and temperature regimes, have often adverse influences on field crop yields. Based on 5-year data (2008-2012) maize for grain is main field crop in Croatia (302 406 ha) and Bosnia and Herzegovina (B&H: 189 557 ha) and covering 34% (Croatia) and 42% (B&H) of used (882 752 ha and 447 181 ha, respectively) arable lands. The harvested areas of maize among years are mainly similar, while yield variation is considerable and in range from 4.3 t/ha to 8.0 t/ha (Croatia) and from 3.75 t/ha to 5.12 t/ha (B&H). The lower precipitation and the higher air temperatures, particularly in July and August, are in close connection with the lower yields. In both countries the lowest maize yields were realized in 2012 (4.30 and 2.90 t/ha in Croatia and B&H, respectively) and they were lower for 48% (Croatia) and 40% (B&H) than in 2008. Precipitation and mean air temperature in July + August of 2012 in Osijek were 52 mm and 24.5 °C (average 1961-1990: 123 mm and 20.7 °C), while in 2008 these values were 145 mm and 21.8 °C. The data for Tuzla (average 1961-1990: 138 mm and 22.4 °C) were 8 mm and 23.5 °C (2012), 156 mm and 20.8 °C (2008). The western parts of both countries had the higher precipitation and the lower air temperatures (July + August 1961-1990: 178 mm and 19.7°C in Zagreb, 159 and 21.5 °C in Banja Luka) and this trend was found also in the 2008-2012 period.

Key words: climate changes, precipitation, air temperature, maize yield, year effects

VARIATION OF WINTER WHEAT YIELDS IN CROATIA AND BOSNIA AND HERZEGOVINA AMONG YEARS WITH ASPECT OF CLIMATIC CHANGES

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Abstract

The used arable land covering in Croatia 882752 ha and in Bosnia and Herzegovina (B&H) 447181 ha (average 2008-2012) or 15.60% (Croatia) and 8.75% (B&H) of the state territory. Main field crops (average 2008-2012) are maize for grain (302266 ha and 189 557 ha and winter wheat (168433 ha and 57480 ha). Annual yields of wheat in the mentioned period were from 4.00 to 5.50 t/ha (Croatia) and from 2.63 to 3.80 t/ha (B&H). Global warming and increasingly experiencing with extreme weather conditions around the globe affecting often adversely on field crop yields. Annual temperature over Europe increased between 0.1 and 0.4% /decade. In our study, average air temperature in 2008-2012 (October-June) were higher from average (1961-1990) for 0.9 °C (Osijek), 1.5 °C (Zagreb), 0.8 °C (Tuzla) and 1.2 °C (Banja Luka). As both in Croatia and B&H are dominant less permeable soils, the low yields of wheat in the growing season 2009/2010 (4.00 t/ha in Croatia and 2.63 t/ha in B&H: average of the remaining four years 5.30 t/ha and 3.74 t/ha, respectively) are in close connection with excessive precipitation. Precipitation in December-February (mm) were 244 (Osijek), 230 (Zagreb), 296 (Tuzla) and 414 (Banja Luka) or the higher for the referent values (1961-1990) for 76%, 57%, 59% and 90%, respectively. Also, loss of yield is partly caused by excess of precipitation in May and June (350 mm in Osijek, 434 mm in Tuzla and 383 mm in Banja Luka (average 1961-1990: 147 mm, 203 mm and 209 mm, respectively).

Key words: climate changes, precipitation, air temperature, wheat yield, year effects

DETERMINATION OF SOME AGRONOMICAL CHARACTERISTICS OF LOCAL FLINT CORN (*Zea mays L. indurata*) GENOTYPES IN THE BLACK SEA REGION OF TURKEY

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Abstract

In this study, 84 flint corn (*Zea mays L. indurata*) genotypes were used. Ten agronomical characteristics of 84 flint local corn genotypes were examined. Local corn genotypes were collected from 12 cities in The Black Sea Region in 2008 and field and laboratory studies were completed in 2009. Variance analysis showed that there were high variations in most of the agronomical characteristics. In the study, plant height, ear height, stem diameter, leaf number, ear length, ear diameter, row numbers in ear, seed number in row, rachis diameter, seed weight in corncob, seed yield, ranged between 102-374 cm, 25-203 cm, 8.7-40.4 mm, 7.6-16.2 number, 9.7-23.0 cm, 31.7-49.8 mm, 8-16 number, 15-58 number, 15.7-31.6 mm, 23.6-186.8 g, 26.9-197.7 g/plant respectively. It was concluded that local corn genotypes collected from The Black Sea Region could form a rich genetic base in improvement programs.

Key Words: Corn, local genotypes, agronomical characters

IRRIGATION AND LIMING AS FACTORS OF MAIZE YIELD IN EASTERN CROATIA

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Abstract

Maize is the main field crop of arable lands in Croatia. Climatic changes, particularly temperature regime and precipitation quantities and their distribution during growing season, had often adverse effects on maize yield. With that regard, irrigation of maize crops in critical periods is useful with aspect of alleviation yield variations among years. Also, acid soils covering third part of agricultural soils in Croatia (about 832 thousand hectares) and correction of pH by liming is important factor increase and stabilization of yield among years. Aim of this study was review of irrigation and liming effects on maize yield in the eastern Croatia. Region of the eastern Croatia cover with 12454 km² or 22.0% of the state territory. This region is "granary of Croatia" because about 75% of wheat and 50% of maize harvested areas of the country are situated in this region. As affected by irrigation, maize yields in the experiment on Agricultural Institute Osijek since 2000 were increased average for 20%, while under drought conditions of three growing seasons (2007, 2011 and 2012) yield increases were 32%, 36%, and 47%, respectively. Soil improvement by liming by increasing rates of carbocalk (by-product of sugar factory containing about 43% CaO and about 6% of organic matter) up to 60 t ha⁻¹ was also useful management practice, because in two experiments maize yields were increased up to 25% (4-year average). However, for satisfied yield increases for 16% in both experiments were adequate the lowest rate of applied carbocalk in the amount of 15 t ha⁻¹.

Key words: irrigation, liming, maize yield, eastern Croatia

DETERMINATION OF SWEET CORN (*Zea mays* L. *saccharata* Sturt.) VARIETIES FOR DIYARBAKIR CONDITIONS

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ABSTRACT

The aim of this study is to determine the high yielding and suitable sweet corn cultivars for Diyarbakir regions. The study was conducted with randomized completed block design at Diyarbakir conditions during 2011 summer season. Merit, Martha, Vega, Lumina, Jubile, SF-201, Sweet Corn and Kompozit Seker cultivars were used as material. Number of ear per plant, fresh husked ear weight, fresh dehusked weight, thousand kernel weight, kernel rows per ear, number of kernel per row, ear length, ear width, first ear height, plant height, grain yield per unit area, fresh kernel weight, soluble solid contents, SPAD value, the length of unfilled ear-tip were investigated in cultivars. According to results, differences were observed between cultivars for all investigated characters except soluble solid content SPAD values and tip space length. The highest fresh husk and dehusk weight were obtained from Martha (232 g) and Merit (164 g). Merit had the highest values (913.3 kg/da- 106.1 g/ear) for grain yield per unit area and fresh kernel weight. It is determined that Merit is a suitable variety for cultivation of fresh kernel yield.

Key words: Sweet corn, cultivar, yield.

DETERMINING OF SILAGE PROPERTIES OF DIFFERENT MAIZE VARIETIES UNDER SECOND CROP PRODUCTION IN THE ECOLOGY OF ADANA

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Abstract

This research was conducted for determine varieties of corn silage the most suitable on second crop conditions to the ecology of the Adana at the DATAEM-Hacıali production station in 2013. Randomized block design with four replications carried out by the 12 pieces corn varieties has been used as seed material in this research. Plant height (cm), plant appearance (1-5), leaf number (number / plant), ear number (number / plant), stem diameter (mm), tassel extraction time (days), silage time (days) green herbage yield (kg/da), ear/plant ratio (%), leaf/plant ratio (%) and stems/plant ratio (%) values among the varieties statistically significant differences were identified and these differences occur between varieties are grouped with LSD tests. Green herbage yield of varieties has changed between 3704.74 to 5640.15 kg/da. Herbage yields the highest value in terms of the type of P30B74 obtained, while the lowest value was found in the kind of BOLSON.

Key words: Second Crop Maize, Silage, Green Herbage Yield

PLANT YIELD EFFICIENCY IS ESSENTIAL FOR MAIZE HYBRIDS TO COPE WITH DROUGHT

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Given that under severe drought conditions low number of plants could survive, it has been hypothesized that maize hybrids of improved plant yield efficiency (i.e. of high yield potential at the single plant level) is a good option to deal with the occasionally prevailing dry seasons, on the presupposition that these hybrids perform well at the typical farming densities (TFD). At three locations in north Greece during the 2013 season, 31 hybrids were tested under the ultra-low density (ULD) of 0.74 plants/m² to be allowed fully express their yielding capacity at the single-plant level. In parallel, the same hybrids were tested under normal irrigation at the TFD of 7.84 plants/m², as well as under water deficit regime at the assumed as more appropriate for drought prevailing conditions low density (LD) of 4.44 plants/m². Twelve out of the 31 hybrids were categorized into three groups on the over-environment yield at the TFD, assumed to reflect their crop yield potential (CYP). The first group achieved CYP of 11.5 Mg/ha, and grain yield per plant at the ULD of the four hybrids was 877, 839, 662 and 645 g, while the respective yield loss at the LD under water deficit regime and relevant to CYP was, 17, 29, 34 and 46%. The respective values for the second group (CYP of 12.7 Mg/ha), were 927, 773, 741 and 679 g/plant at the ULD, and 35, 36, 46 and 51% yield loss at the LD. The third group (CYP of 14.4 Mg/ha), exhibited yield efficiency of 1103, 1014, 1043 and 977 g/plant, with the respective yield losses at the LD being 36, 38, 40 and 51%. It was concluded that improved plant yield efficiency is essential element to release hybrids from high populations and stabilize their optimum plant population density at lower levels, and minimize the over-season yield losses, contributing thus to density-independent hybrids. Further, density-independence is crucial for maize adaptation to enormously fluctuating across season conditions and promotes the crop sustainability.

Key words: Dryland Production, Optimum Density, Sustainability

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OBTAINING MAIZE (*ZEA MAYS L.*) LINES UTILIZING BY DOUBLED HAPLOID TECHNOLOGY AGRONOMIC AND MOLECULAR CHARACTERIZATION

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Abstract

The core activity of seed sector and seed is plant breeding and variety development. The progress in achieved science, technology and economy becomes accelerated and advanced to have new plant variety in 20 th century. Most critical stages of maize breeding is to improve inbred lines which has highest general and specific combining ability. This kind of working takes long time, needs high budget and labor force. Having inbred lines which will be used for hybrid development takes at least 7-10 years. Nowadays double haploid (DH) lines produced by in vivo induction of maternal haploids are prevalent in maize (*Zea mays L.*) breeding. Haploids in maize can be obtained either through in vitro or in vivo. Haploid technique utilizing by anther culture for reducing times has been used for many years as well but not become widespread because of low success rate. Success rate is getting higher by using inducer lines in recent years and DH technology has been applied in maize breeding programme especially by commercial seed companies. In vivo DH technology reduces breeding cycle to 2-3 seasons for obtaining inbred lines process. The other advantages are maximum genetic variance, complete homozygosity, reduced expenses etc. Agromar Seed Company has started to use this technology since 2011. Haploid and doubled haploid line's molecular characterization and genetic diversity identified by marker assisted selection (MAS) . Having two generations in one season in greenhouse facilities has also been used. 20 different donorxinducer crossing process had been done in 2012-2013 season and 4105 putative haploid seeds were identified. The induction rate in this working may vary % 8-18. As a result 75 DH-lines were obtained at the end of 2013 season and crossing process for having hybrid has been going on. Among 75 DH lines, 40 DHL were screened by SSR and 39 were identified as a homozygous.

**EFFECTS OF DIFFERENT ORGANIC MATERIALS ON FORAGE PRODUCTION FROM SORGHUM X
SUDANGRASS HYBRID (*SORGHUM BICOLOR X SORGHUM BICOLOR VAR. SUDANENSE*)**

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Abstract

This study was conducted to investigate effects of three organic materials (poultry litter, cattle manure and leonardite) on forage production from sorghum x sudangrass hybrid under Çukurova Conditions. Field trial was established at the experimental area of the Field Crops Department of Çukurova University according to randomized complete block design with three replications in 2010 and 2011. The 8 different treatments were used in the study, these are; recommended inorganic fertilizer dose (INORG), poultry litter applied to meet crop P requirement and with supplemented inorganic nitrogen (PL-P+N), poultry litter applied to meet crop N requirement (PL-N), cattle manure applied to meet crop P requirement and supplemented with inorganic nitrogen (CM-P+N), cattle manure applied to meet crop N requirement (CM-N), 500 kg/ha leonardite plus 100% of recommended inorganic fertilizer dose (LEO-100), 500 kg/ha leonardite plus 75% of recommended inorganic fertilizer dose (LEO-75), 500 kg/ha leonardite plus 50% of recommended inorganic fertilizer dose (LEO-50). Green herbage and crude protein yield were observed in the study. According to results, green herbage yield of sorghum x sudangrass hybrid ranged from 83130 to 58610 and 62740 to 36070 kg/ha in 2010 and 2011, respectively. The highest green herbage yields were provided by LEO-100 in both years (83130 and 62740 kg/ha in 2010 and 2011, respectively) where lowest values were observed in PL-N and CM-N in 2010 and 2011, respectively. On the other hand, crude protein yield of sorghum x sudangrass hybrid ranged from 1437 to 954 and 1190 to 626 kg/ha in 2010 and 2011, respectively. While the highest crude protein yield (1437 kg/ha) was obtained from LEO-50 in 2010, LEO-100 gave the highest value (1190 kg/ha) in 2011.

Key words: Sorghum x sudangrass hybrid, organic material, poultry litter, cattle manure, leonardite

GENETIC DIVERSITY OF TRACE ELEMENTS DISTRIBUTION IN RICE (*ORYZA SATIVA L.*)

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Abstract

The effects of variety and growth location on trace elements distribution were investigating using four rice (*Oryzasativa L*) cultivars recently introduced in R. of Macedonia from Turkey. The results obtained were compared with a domestic variety Prima Riska and with the, long time ago adopted and registered variety from Italy, San Andrea. The four newly introduced Turkish varieties (Kiziltan, Gala, Halilbey and Gönen) were cultivated in the eastern part of Macedonia, the region of Kochani, which is well known as a rice producing region. The present study was undertaken to investigate the quality of the rice produced under the climate and soil conditions in this region. The assessment of the genetic diversity of trace element distribution in the rice whole grain and in the polished rice grains is very important from different points of view. The most important is the quality of the grains as a source of nutrients for human nutrition, but also it is very important to investigate the ability of different varieties for adsorption micro and macro nutrients in order to establish the most suitable production techniques.

ANDROGENESIS AND PLANT REGENERATION FROM TWO JAPONICA RICE (*Oryza sativa*) F₃ POPULATIONS IN TURKEY

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Abstract

In this study, two japonica rice backcross populations obtained from Trakya Agricultural Research Institute were used. F₃ plants of IR83260-1-1-2-1-22B/ Kızıltan (Genotype 1) and Kızıltan/IR83260-1-1-7-2-1-2B (Genotype 2) were grown in growth chamber at winter season. Panicles obtained donor plants were pre-treated at 4 °C for 2 weeks. Anthers were cultivated at plant tissue culture laboratory of Trakya University Havsa Vocational College. Gamborg's B5 nutrient medium supplemented with 4 different combinations of NAA, 2,4-D, BA and 30 g/l sucrose was used for anther culture. pH was adjusted to 5,8 after adding %3 agar and medium was autoclaved at 1 atm pressure and 121 °C for 15 minutes. 30 anthers were cultured for each combination and experiment was repeated 3 times. At the end of six weeks, the best androgenetic response (21,3 %) for Genotype 2 was obtained from medium includes 2 mg/l 2,4-D and 0,5 mg/l BA. No callus formation was observed from Genotype 1. Callus were transferred to MS nutrient medium contains different combinations of NAA, Kinetin and BA for regeneration. After five weeks, medium supplemented 2 mg/l Kinetin and 0,5 mg/l NAA was found suitable for regeneration. Shoots were transferred to rooting medium. From this study, it was found that the success of androgenetic response depends on the genotype. Although preliminary anther-derived shoots were albino, this is the first report for rice plants regeneration from anther in Turkey.

Key words: Rice Breeding, Haploid Culture, Anther Culture, Biotechnology

OVEREXPRESSION OF A SPECIFIC *P. VULGARIS* PvGSTU2-2 ISOENZYME IMPROVES CHLOROACETAMIDE HERBICIDE TOLERANCE OF TRANSGENIC TOBACCO PLANTS

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Abstract

Plant glutathione transferases (GSTs) have a major role in plant herbicide detoxification system. *PvGSTU2-2* has been isolated from leaves of *Phaseolus vulgaris* plants. The enzyme catalyses the conjugation of glutathione with chloroacetamide herbicides like alachlor and metalachlor. In order to study *in planta* the ability of *PvGSTU2-2* to detoxify chloroacetamide herbicides, we developed transgenic tobacco plants overexpressing *PvGSTU2-2*. The introgression of the transgene in the plant genome was confirmed by RT-PCR and the expression of *PvGSTU2-2* with q-RTPCR analysis. In addition, it was verified that the transgenes codes functional proteins by measuring GST enzyme activity towards NBD-Cl in transgenic lines. Three *PvGSTU2-2* overexpressing lines were assayed for their tolerance towards the herbicide dimethenamid (chloroacetamide). Under *in vivo* conditions, T0 lines exhibited increased tolerance at 0,5 and 1 mg/L dimethenamid, with significantly increased shoot and root elongation compared to wild type plants. These results confirm that overexpression of *PvGSTU2-2* in tobacco provides a way of conferring selectivity and enhancing crop safety and production.

THE COTTON BREEDING IN BULGARIA

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Abstract

Abstract: During 2011-2013 in comparative variety trials the latest Bulgarian cotton varieties - Helius, Boyana, Vicky, Perla-267, Vega, Colorit, Darmi, Natalia, Rumi, Dorina, Nellina and two standard varieties Chirpan-539 (for earliness and productivity), and Avanguard-264 (for fiber quality) were included. These varieties were obtained from two different targeted programs – for yield and for fiber quality with the application of different breeding methods. The results of the two-factor analysis (varieties-years) showed that the differences between the studied characters, except first picking, were significant, which means the varieties differed in them. Year conditions had the highest participation in the general variation of all characters (52.58 to 67.08%). The interaction (varieties × years) was significant for length and lint percentage of the fiber, less significant for the seed cotton yield and insignificant for the boll weight. The varieties Pearla-267 and Vicky had the highest seed cotton yield, exceeding the standard variety Chirpan-539 by 10.2 to 10.6%, average of three years. Best combination of length and lint percentage of the fiber was found for the varieties Darmi, Vega and Boyana. New achievements in the breeding of earliness and productivity are the varieties: Plovdiv, Philippopolis and Denitza (2012-2013); Isabell – brown cotton. Studies are still focused on: heterosis - creation and use of MS lines; creation of starting material with diverse germplasm; maintenance and use of the genetic resources; application of biotechnology; maintenance and seed production of the regional varieties.

CHARACTERIZATION OF GENETIC VARIABILITY ASSOCIATED TO THE PHOSPHORUS BIOAVAILABILITY IN PEANUT (*ARACHIS HYPOGAEA* L.)

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Abstract:

In Mediterranean areas, agricultural production and crop yields are highly dependent on the availability of water and nutrients at the convenient period time. Among these mineral nutrients, phosphorus limits plant production in many soils. This is true of most Mediterranean soils, especially carbonated. The peanut is a legume that can rely on symbiotic nitrogen fixation to meet its nitrogen requirements. However, the low availability of P in Mediterranean soils greatly reduces the yields of this crop. The results obtained during the two stages of crop development (flowering and harvest), confirmed the positive effect of the contribution of tricalcium phosphate (TCP) on the characters: agro-morphological (dry biomass, branching, leaf area and yield), physiological (P accumulation in organs) and chemical characteristics of the rhizosphere populations of cultivated peanut. We are able to distinguish among five ecotypes tested, efficiency of the South ecotypes to use TCP in the presence of strain of *Rhizobium* after a screening of five local ecotypes studied, with phosphorus use efficiency (PUE) and shoot biomass accumulation.

Key words: Phosphorus bioavailability, rhizosphere, *Rhizobium*, leguminous, peanut.

PRELIMINARY STUDY OF THE PHYSICO-CHEMICAL AND MORPHOLOGICAL CHARACTERISTICS OF 35 CULTIVARS OF SESAME (*SESAMUM INDICUM*) FROM DIFFERENT AREAS IN MOROCCO

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Abstract

Sesame, *sesamum indicum* L., is considered to be one of the first recorded plants for its seed and thought to have originated in Africa, it has been used extensively for thousands of years as a seed of worldwide significance for edible oil, paste, cake, confectionary purposes. The extensive usage of sesame may be due to its highly content of nutritious protein also, sesame seeds were found to possess antioxidant and health promoting activities, which can be highly correlated to their total phenolic. Many scientific studies were conducted to investigate the health-promoting effects of sesame in the world. In this study, our aim is to evaluate the quality of the 35 cultivars of sesame seeds from different area in Morocco while basing ourselves on physico-chemical analyzes relating to morphological parameters, total phenolic content, total flavonoids, antioxidants activities and total protein and sugar contents. The morphological result shows a variation in the lenght and the width of the seed with values ranging from 2.5-3 mm and 1.3-2 mm respectively, while the phenolic and flavonoids contents were in the order of 3,8- 3,9 mg/g and 0,13-0,14mg/g. The protein content value was about 27, 15 g/100g for the most cultivars. The seeds quality shows their highly wealth nutritional and antioxidant activity but more work is needed to improve the production of sesame in the area.

Key words: *sesamum indicum*, antioxidant activity, phenolic content, protein content, morphological parameters, sugar content.

POLYPHENOLIC CONTENT AND EVALUATION OF ANTIOXIDANT ACTIVITY OF MOROCCAN SESAME (*SESAMUM INDICUM* L) SEEDS OIL

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Abstract:

Most permitted antioxidants added to foods are synthetic. Antioxidants isolated from plants may eventually represent an alternative to the current choices of effective oxidation inhibitors, but for now they are very few applications. This study aims to investigate antioxidant activity of sesame oil (*sesamum indicum* L) in the region of Tadla Azilal. The oil extraction was carried out by Soxhlet with n-hexane. The study of the antioxidant capacity of these oils was performed by the method of 1,1-diphenyl-2-picryl-hydrazyl DPPH. Polyphenols were quantified spectrophotometrically using the Folin Ciocalteu reagent. The results of this study showed that sesame oil has a significant antioxidant effect toward the free radical. The value of the antioxidant activity ranges of 32 to 59, 1%. The polyphenols content polyphenol contents vary between 47, 1 and 60,1mg GAE /Kg oil. The antioxidant activity is based on the oil content and can be attributed to the phenolic compounds present in the oil. It is implicated as a causative factor indicating that the seeds of *Sesamum indicum* L can contribute significantly to the protective role of free radicals and may be considered effective nutraceuticals.

Key words: sesame oil, antioxidant activity, Polyphenols, DPPH, Folin Ciocalteu.

SCREENING OF SOYBEAN AGAINST WATER STRESS MEDIATED THROUGH POLYETHYLENE GLYCOL

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Abstract

Glycine max (L.) Merrill is the world largest cultivated pulse crop, rich in protein and oil. Soybean provides phytoprotein to more than half of the world's population and is desired wholesome and healthful food in many diet programs. In our days soybean global importance is growing up due to its multipurpose applications. It is a source of more than 200 industrial products like environmentally friendly solvents, lubricants, cleaners and paints which are not toxic. However, soybean production and grain quality suffer the problems of biotic and abiotic stress causing damages at all levels of cell and plant development. Hence, success in creating better adapted varieties depends upon the efforts of various scientific domains. Classical breeding have been enriched with up-to-date approaches and techniques of plant biotechnology and molecular biology. Selection on cell level became possible by simulation of the desired stress *in vitro*. DNA technologies allow identification and exploitation of genes for resistance. The objectives of the present study were to screen *in vivo* and *in vitro* soybean genotypes and find out relevant criteria for simple and quick identification of lines with higher drought tolerance. Different varieties and lines created by the authors by genetic and biotechnological methods were used in the research. Different approaches for field and laboratory screening were applied creating water deficit conditions. Germination of seeds and development in the field and *in vitro* were monitored. Data about the response of tested genotypes was obtained.

Key words: *Glycine max*, soyben, drought, *in vivo*, *in vitro*

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A STUDY ON INBREEDING DEPRESSION IN SUNFLOWER (*Helianthus annuus* L.)

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Abstract

This research was conducted to Banarlı, Tekirdağ to determine inbreeding depression having a great importance in hybrid breeding of sunflower. In experiment researched inbreeding depression in commercial hybrid varieties of sunflower was used F1 generation of five commercial hybrid varieties (Tunca, P4223, Sanay, Armada and Teknosol) and their F2 and F3 inbreeding generation, obtained inbreeding of the F1 and F2 plants of these varieties. A split plot arrangements of three generations (all the F1, F2 and F3 progenies of commercial hybrid varieties) and five commercial hybrid varieties were evaluated in a randomized complete block design with three replications at Banarlı, Tekirdağ. The generations were main plots and commercial hybrid varieties subplots. Action of inbreeding depression was observed on commercial hybrid varieties in the experiment. Data were recorded on yield and other important agronomic characters. According to the results of the research, it was defined that significant genetic differences were observed among between the F1 generation and F2 and F3 inbred progenies in the experiment for all the characters. Highly significant inbreeding depression was observed for seed yield and oil yield, two important characters measured in the study. Inbreeding depression in terms of seed yield and oil yield for the F1 to the F3 ranged from 49.6 % to 73.0 % (59.0 % on average) and from 56.4 % to 78.1 % (65.8 on average), respectively. As a result, highly significant inbreeding depression was obtained from the commercial hybrid varieties throught the first two- inbreeding generations in terms of yield and other important agronomic characters.

Key words: Sunflower (*Helianthus annuus* L.), inbreeding depression, yield and quality

SEED COMPONENT DIVERSITY OF HYBRID FORMS, ORIGINATED FROM WILD *HELIANTHUS* SPECIES

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Abstract

This study presents the evaluation of hybrid forms, obtained as a result of interspecific hybridization between four sunflower inbred lines and wild annual *H. debilis* and *H. petiolaris* accessions from the collection of wild *Helianthus* species at Dobroudja Agricultural Institute, on various indices related to their seed oil and protein content. The selected accessions, used as paternal parents in the crosses and the obtained hybrid material, were previously tested and evaluated as resistant to leaves pathogens. The indices 1000 seed weight (*g*), kernel and hull (%), oil content in kernel (%) and in seed (%) and seed protein content were evaluated. The results showed very good statistical authenticity of the analytical hypothesis that the investigated hybrid forms were with different genetic potential on the studied indices, pointing to the existence of high variability among the used wild germplasm. Hybrid forms, resistant to leaves pathogens, with high oil and protein content were obtained.

Key words: interspecific hybridization – *Helianthus debilis* – *Helianthus petiolaris* – seed oil content – seed protein content

**APPLICATION OF CLASSICAL METHODS AT SUNFLOWER BREEDING PROGRAM IN DOBROUDJA
AGRICULTURAL INSTITUTE-GENERAL TOSHEVO, BULGARIA**

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Abstract

Investigations were carried out in Dobroudja Agricultural Institute General -Toshevo, Bulgaria. Using classical approaches hundreds inbred lines were developed and collected, distinguished with their valuable agricultural characters and resistance to economic important diseases and parasite *Orobanche cumana*. Classical sunflower breeding methods applied in DAI-General Toshevo included intraspecific, intraline, interspecific and intergeneric hybridization, and experimental mutagenesis. Evaluation of resistance to diseases and the parasite broomrape as well as seed oil content were done on confirmed and adapted for the conditions of the institute methods. A lot of sunflower commercial cultivars and hybrids were created during last 30 years at DAI-General Toshevo. Hybrid Maritza, Mura, Veleka, Vokil, Gabi and Velko were widespread in abroad.

Key-words: *Helianthus annuus*, classical breeding, mutant lines, hybrids, resistance

PROMISING LINES AS A RESULT FROM INTERSPECIFIC HYBRIDIZATION BETWEEN CULTIVATED SUNFLOWER (*HELIANTHUS ANNUUS* L.) AND THE PERENNIAL SPECIES *HELIANTHUS CILIARIS* (M-092) VIA EMBRYOCULTURE

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Abstract:

Interspecific hybridization was done between cultivated sunflower *H.annuus* L. and the perennial species *H.ciliaris*, accession M-092. The embryo cultivation method was used for successful performance of the crosses. Crosses were realized between this species and sterile lines 2607 and HA-300. Different morphological characters were investigated. As a result of self-pollination and selection, hybrid materials in both F1 and F2 were obtained, and in advanced generations as well. Morphological, phenological and biochemical studies were carried out. Some of the progenies possessed higher seed oil content. Four lines among the selected, combined complete resistance to the pathogen caused downy mildew and the parasite broomrape. These were the lines 1171p, 1161p, 1151p and 1145p.

Key words: sunflower, *Helianthus annuus*, *Helianthus ciliaris*, disease resistance, embryo culture

SUNFLOWER LINES AND HYBRIDS, RESISTANT TO ECONOMIC IMPORTANT FOR BULGARIA PATHOGENS, DEVELOPED BY APPLYING CLASSICAL AND BIOTECHNOLOGICAL METHODS

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Abstract

Sunflower diseases are a limited factor for sunflower production not only in Bulgaria, but in all countries producers of this crop. This is the reason, a lot of explorers to direct their attention in solving the problem. The priority of research work in Dobrudzha Agricultural Institute is obtaining of sunflower seeds with high quantitative and qualitative value and observation of phytosanitary condition of the crop. Successful results for the last ten and more years, regarding the resistance to leaves pathogens (*Phomopsis helianthi*; *Phoma macdonaldi*; *Alternaria sp.*), downy mildew (*Plasmopara halstedii*) and to the parasite broomrape (*Orobanche cumana*) were achieved. As a result of purposeful breeding work, the hybrids San Luka, Musala, Mercuri, Maritza, Mesta, Mura, Magura, Biocvet, Dobrocvet, Rada, Yana, Valin, Alpin, Mihaela, Vokil, Veleka, Velko, Gabi and etc. were developed by scientists from DAI. Some of these hybrids were obtained applying classical breeding methods, others – by biotechnological methods and the third – by combining of both methods. Most of the hybrids were already included in seed production programs. Each of these hybrids possesses complex resistance to some leaves pathogens and obligatory resistance to downy mildew and to the parasite broomrape. In the Gene Bank of DAI a great number of lines, obtained by interspecific hybridization were preserved. These lines were included in breeding programs of the institute as donors for resistance.

Key words: Leaves pathogens, broomrape, downy mildew, resistance

CHARACTERIZATION OF THE YIELD COMPONENTS OF SUNFLOWER LINES UNDER THE CONDITIONS OF NORTH-EAST BULGARIA

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Abstract

The investigation was carried out on two mother lines with normal cytoplasm and their sterile analogs, and six fertility restorer father lines. The aim was to make as complete as possible characterization of the yield components of some of the most promising parental sunflower lines involved in the most recent sunflower hybrids of Dobrudzha Agricultural Institute – General Toshevo. The traits subjected to this investigation were seed yield, kg/ha, oil in seed, %, 1000 kernel weight, g, number of seeds per plant and weight of seeds per plant, g. The trial was carried out for two years, planting the sunflower lines on two dates; the first date was normal for the crop, and the second one – with 20-30 days later. Three sowing densities were tested: 40 000, 50 000 and 60 000 plants/ha. The mathematical processing was done with the help of the software BIostat, version 7. The parental lines used in this investigation are involved in the following hybrids: San Luka, Yana, Veleka, Vokil, Gaby and Divna. The four latter hybrids were released in 2013 and 2014 and were enlisted in the European Catalog of Field and Vegetable Crops. Among the mother lines, lines 217 demonstrated highest productivity and stability during both years of the investigation, at normal date of planting and crop density of 50 000 plants/ha. This mother line possesses excellent combining ability and can be successfully used for developing of new highly productive hybrids. Among the group of fertility restorers, lines 340R, 12003R and 166R showed highest values of the indices seed yield and number of seeds per plant on both planting dates and at the three crop densities.

Key words: sunflower, parental lines, productivity, planting dates, crop densities.

**DETERMINATION OF DIFFERENT DOSES OF ZINC ON FATTY ACID COMPOSITION OF SAFFLOWER
(*Carthamus tinctorius* L.) IN TEKİRDAĞ, TURKEY**

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Abstract

Safflower is a valuable and multipurpose oilseed; its oil has been containing high proportion of linoleic acid, high iodine value and characteristic pleasant flavor. Besides, from the oil is also widely used as the cooking and salad oil, hydrogenated fat, margarine, mayonnaise and in several types of processed foods. However the safflower oil is used in significant proportion such as industrial oil, colorless varnishes and paints in the developed world. The oil compositions of seed may be exchange with different causes as a soil structure, breeding regimes for obtaining the desired properties of the seed oil composition. This research was applied in Hayrabolu, Tekirdağ, Turkey. The one safflower variety (Yenice) was found from Eskisehir Institute of Agricultural Research. Hand planting was made on April 11, 2012 in plots of four rows 0.9 m wide and 5 m long. Harvest was made on August 8, 2012 by handling. Nitrogen fertilizer was applied to the plots after planting and in addition four different doses of zinc fertilizer (Control, 1500, 3000 and 4500 ml ha⁻¹) were pulverized to leaves as zinc sulfate (ZnSO₄·7H₂O) before flowering period of safflower. In this research, oil content and fatty acid composition of oil were examined. The highest oil content (30.88%) was obtained from control dose. In fatty acid composition, the highest linoleic acid content (81.20%) and stearic acid content (2.20%) were obtained from control dose. The highest oleic acid content (13.90 %) was obtained from 1500 ml ha⁻¹. The highest palmitic acid content (6.87%) was obtained from 4500 ml ha⁻¹.

Key words: Safflower, Zinc, Fertilizer, Oil Content, Fatty Acid

EFFECTS OF HUMIC ACID ON THE EMERGENCE AND SEEDLING GROWTH OF SAFFLOWER VARIETIES (*CARTHAMUS TINCTORIUS* L.)

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Safflower is an annual oil crop, which can be usually between 80 cm - 100 cm tall. It has spine and spineless forms with globular flower heads having yellow, red or orange flowers. Safflower is a branched and each branch develops flower heads containing seeds. The seed of safflower contain 30 to 50 percent oil. This research was carried out to determine the effects of different humic acid doses on the growth of safflower's seedling in 2012 at the greenhouse of the Department of Field Crops, Faculty of Agriculture, Ankara University. The experiment was arranged in a randomized complete block design with a split plot with three replications. Safflower's cultivars, cv. Dinçer, cv. Yenice and cv. Remzibey were used as plant materials. The seeds were treated with the different doses (0, 60, 120, 180 g HA /100 kg seeds) of Humic acid (Delta Plus 15 HA) and root length, seedling height, root and seedling fresh weight and root and seedling dry weight were investigated. In all applications, 100% emergences were obtained. Root length varied 5.878 to 7.156 cm according to HA doses and the maximum root length was obtained from cv. Dinçer with application of 60 g of HA. Significant differences were determined among cultivars in terms of seedling height and the maximum seedling height was measured in cv. Dinçer as 10.085 cm. Application of HA were increased the seedling height comparing to that of control seedling, and the maximum height was determined at dose of 60 g HA. Cultivars were showed almost similar response to HA dose in terms of fresh root weight. Among cultivars and HA doses, the highest fresh weight were measured in cv. Dinçer (7.526 g/plant) and in 120 g of HA application. On the other hand, dry root weights were measured highest in the cv. Remzibey (3.450 g/plant) and cv. Yenice (3.425 g/plant) with the application of 60 g of HA (3.467 g/plant). Regarding with seedling dry weight, cv. Remzibey was superior to the other cultivars and HA applications was more effective than that of control. According to the research out comes, significant differences were determined among the varieties in terms of seedling growth and the treatment of seeds with 60g HA/100 kg seeds before sowing affected seedling growth of safflower positively.

Key Words: Safflower, *Carthamus tinctorius* L., Humic Acid, Seedling Growth.

**PRELIMINARY RESULTS ON ISSR CHARACTERIZATION OF SAFFLOWER (*CARTHAMUS TINCTORIUS* L.)
GENOTYPES CULTIVATED IN MOROCCO**

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Abstract:

Inter Simple Sequence Repeat (ISSRs) analysis was used to evaluate the genetic diversity and variability present in 54 safflower genotypes (*Carthamus tinctorius* L.).ISSR analysis was carried out with 6 primers. After agarose gels analysis, ISSRs banding patterns were transformed into binary data of presence-absence and matrices were processed with GENPOP software. Genetic distances between all pair wise combinations of the cultivars were calculated using Jaccard's coefficient of similarity and dendrograms were constructed by the UPGMA method. All primers produced polymorphic bands. A high number of reproducible ISSR bands were observed, of high percentage that were polymorphic. Dendrogram similarity relationships revealed some clustering according to the different genetic pool.

Key words: *Carthamus tinctorius* L. — ISSRs Markers — safflower- Genetic diversity, Polymorphism

PHYSICOCHEMICAL PROPRIETY OF OIL EXTRACTS FROM *SESAMUM INDICUM* L SEEDS FROM THE MOROCCAN REGION OF TADLA

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Abstract:

The physicochemical properties of oils are among the most important properties which determine the quality and help to describe the current state of oil. In this study, we were interested in assessing the quality of the extracted oils of raw sesame seeds (*Sesamum indicum* L) of 12 cultivars from the region Tadla (Morocco). The oils were extracted by continuous reflux in a soxhlet apparatus for 8 h using hexane as solvent (1). The Different quality index of oils namely acidity, peroxide index, iodine were determined by colorimetric methods (2) and the measuring standard UV absorption values were also determined (3). The results of the physic-chemical analysis of the oil indicates that the physical condition of the oil is liquid with a golden yellow color and a characteristic odor, acid index ranges from 0.12 to 0.63 mg KOH / g of oil, the saponification index between 82-179 mg of KOH / g of oil, the iodine value ranges from 82.9 to 156.85 $\text{gd}^{\prime}\text{l}_2 / \text{oil } 100\text{g}$, peroxide, 1-4 meq O_2 / kg oil. The difference between cultivars for all quality index was considered significant ($p < 0.05$). Quality index had good physic-chemical properties which remain in the entire standard accepted by the codex Alimentarius. The sesame oil can be used as edible oils and for industrial applications.

Keys words: *Sesamum indicum* L, sesame oil, oil yield, quality index.

THE EFFECT IN THE YIELD AND SOME QUALITY CRITERIA OF THE PLANTING TIMES AND PRE-TREATMENTS TUBER IN THE EARLY POTATO (*Solanum tuberosum* L.)

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Abstract:

This study was conducted to determine the possibility of production of early potato in the coastal region of Middle Black Sea with respect to a line to line split-plot design with three replications in Bafra and Çarşamba locations in 2010-2011 cultivation period. In this study, Marfona and Marabel varieties were planted treating with different applications (Pre-shooting, Gibberellin acid-GA and control) at different dates (November, January, February, March). In Bafra and Çarşamba locations, while the highest tuber yield (kg/da) to per decare was obtained from the second and third planting dates, the lowest tuber yield was determined on the first planting date. It was determined when the planting time was retarded the correlation of tuber yield per decare and big tuber (>80gr) increased. In the result of study, in the locations of Bafra and Çarşamba, it was found the variety of Marabel (Bafra:1887.5kg/da; Çarşamba:1671.7kg/da)'s yield per plot was higher than the variety of Marfona (Bafra:1434.9kg/da; Çarşamba:1469.9kg/da). Any statistical effect of applications at the experiment year and locations was not determined; merely, pre-shooting led the increasing of tuber yield per decare. In the result of study, it has been concluded planting potato tubers which have been pre-shooted, will suitable in terms of tuber yield in the coastal region of Black Sea in January, February.

Key words: Sprouting, Gibberellic acid (GA₃), Planting time, Variety

HAPLOIDS IN THE IMPROVEMENT OF CRUCIFERS

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Abstract:

The production of doubled haploids (DH) in plants is a biotechnological tool useful in producing homozygous breeding lines and varieties. The production of haploids can be achieved either by gynogenesis or by androgenesis. The formation of haploids in the first case proceeds from the embryo sack (megagametophyte), in the second case microspores are used as target tissue. The use of haploids in producing new cultivars of crucifers (*Brassicaceae*) has widespread use. Biotechnological DH line production offers various advantages for plant breeders, including the possibility to obtain homozygous lines rapidly, as well as easy selection due to the absence of heterozygosity. It also facilitates genetic studies, particularly regarding quantitative traits. Furthermore, the use of DH progeny as mapping population(s) for the development of molecular markers is very advantageous since it enhances the efficiency of detecting markers, particularly for quantitative traits. Within the genus *Brassica*, most work for the development of DH lines has been devoted to *B. napus*. This is not surprising since it is one of the most important oilseed crops worldwide. Furthermore, *B. napus* is much easier to handle in tissue culture than other *Brassicaceae*. In this review the steps of producing DH lines using the microspore culture system will be described. Furthermore, the highlights regarding the creation of doubled haploids in crucifers and the role of haploids, more precisely of doubled haploids in breeding programs of crucifers will be explained detailly.

Key words: haploid, Brassica, rapeseed, biotechnology

USE OF BIOPREPARATES IN TOBACCO PROTECTION – CONTRIBUTION TO SUSTAINABLE AGRICULTURE

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Abstract:

Tobacco plays an important role in the social and economic life of our country. For that reason, efforts are made to develop strategies for development and application of the basic principles of sustainable agricultural production. Conventional tobacco production has numerous negative effects on the environment and human health. Therefore, the development of integral protection system will include all methods and means to control the harmful agents with minimum effect on the environment and with no economic consequences. Application of biopreparates is a good way to manage the environment in the process of achieving sustainable tobacco production. In terms of tobacco production, the main objective is application of these products in the control of economically important pathogens. Among the investigated preparations, the most promising results were obtained with biocontrol agent *Trichoderma sp.* Multifunctionality of certain microorganisms with stimulating effect on plants, along with some plant extracts, also provides a satisfactory effect in pathogens control. Efforts for the wide application of biopreparates is promoting of their beneficial effect and the greater utilization of resources. Scientific research in the field of tobacco production will continue to develop procedures and instructions for the most appropriate use of biopreparates.

Key words: sustainable agriculture, tobacco production, protection, biopreparates

OVEREXPRESSION OF A GLUTATHIONE S-TRANSFERASE GENE FROM *P. VULGARIS* IMPROVES SALT STRESS TOLERANCE IN TRANSGENIC TOBACCO PLANTS

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Abstract:

Glutathione S-transferases (GSTs) are multifunctional proteins and forms major part, of plant cellular detoxification system and antioxidant enzyme network. Previously, a novel GST gene *PvGSTU3-3* has been isolated from roots of *Phaseolus vulgaris* plants. The isoenzyme shows high antioxidant catalytic function and acts as hydroperoxidase, thioltransferase, and dehydroascorbate reductase. In the present study, with a view to investigate the biological function of *PvGSTU3-3* a constitutive plant expression vector of *PvGST3-3* was constructed and transferred into tobacco (*Nicotiana tabacum*. L. cv Xanthi) plants via of *A. tumefaciens*. The *PvGSTU3-3* gene was successfully integrated into the genome of the transgenic tobacco lines as confirmed by Real time PCR and expressed in the transformants, validated through quantitative reverse transcription PCR. Three tobacco transgenic lines overexpressing *PvGSTU3-3* tested for their salt tolerance (200mM NaCl) under *in vitro* conditions. All lines were more tolerant compared to no transgenic plants, as demonstrated by the increased root length. These results suggest that *PvGSTU3-3* isoenzyme can mediate physiological pathways that enhance salt stress tolerance.

**THE EFFECT OF PLANT DENSITY BASED COMPETITION AND STRESS ON MORPHOLOGIC,
PHYSIOLOGIC AND AGRONOMIC PROPERTIES OF FLAX (*Linum usitatissimum* L.)**

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Abstract:

This study was carried out during 2011-12 at the greenhouse and fields of the Department of Field Crops, Faculty of Agriculture, University of Ankara, to determine the effects of flax interaction, competition on plant morphologic, physiologic and agronomic characteristics. The seeds of cv. Madaras, 1886 Sel (fibre type) and Clark (oil type) flax were used as material that were obtained from Northern Science Laboratory of the Dakota state of USA. The seeds greenhouses were cultured at a distance on 0.5x 0.5 cm, 1 x 1 cm 1.5 x 1.5 cm and 2 x 2 cm using 4 replications. The field experiment made use of seeds sown in plots of 1.0 x 1.0 m at a distance of 5.0 x 5.0 cm, 10.0 x 10.0 cm, 15.0 x 15.0 cm and 20.0 x 20.0 cm in 3 replications during start of April and 10 plants each were tagged after 45 days for taking data. In the greenhouse, among all cultivars maximum root length was noted on 2 x2 cm sowing, seedling length at 0.5 x 0.5 cm sowing and chlorophyll contents at 2x2 cm sowing plan. Among all cultivars, the maximum values obtained under the field conditions showed technical stem length, plant height and yield on 0.5 x 0.5 cm planting distance; whereas, maximum number of lateral branches, number of capsules per plant and seed weight was obtained at of 2.0 x 2.0 cm planting distance. In conclusion, the stress due to reduction of average living space caused stress to plants by the substantial decrease in the characters studied, on the other hand, the increasing plant to plant distance resulted in no competition among plants and it also resulted in maximum reduction of yield components again. The behaviour of characters was defined describing competition conditions that show increase in the genetic potential of the plants to a specific threshold level.

Key words: Plant density, flax, competition, stress

STABILITY OF THE YIELD IN COMMERCIAL TOBACCO VARIETIES IN REPUBLIC OF MACEDONIA

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Abstract

Investigations were carried out with five commercial oriental aromatic tobacco varieties of the type Prilep: P – 23, PV 156/1, NS-72, P-66-9/7 and P-79-94, to study green mass yield per stalk. The trial was set up in the Experimental field of Tobacco Institute-Prilep in 2010, 2011 and 2012, in randomized block design with four replications. Traditional agricultural practices were applied for realization of the experiment. The aim of investigations was through biometric analysis of the above quantitative trait to evaluate the variability of the varieties, and thus give an assessment of their stability and guidance for their further expansion and maintenance. No significant differences were observed between the three years of investigation, which is an indication that green mass yield per stalk is highly heritable traits and varietal characteristic. Statistical parameters of variability are low, which is an indication of stable and homozygous genotypes, adapted to agroecological conditions of the region. Results on the standard deviation and variability coefficient were lower in 2012, because the seed sown in this crop was obtained from one stalk for each variant isolated in 2010 and again from one stalk isolated in 2011. Varieties PV156/1 and NS-72 have approximately the same average value for the trait, but the statistical indicators of the variability are lower in PV156/1. From the data, it is concluded that the investigated varieties are stable and the most stable is P-66-9/7, which is also with the highest yield. The findings of this paper imply a basis for further research in different locations and different application of statistical models for assessing interactions GxL (genotype x location) and GxY (genotype x year), which would have completed the image about stability of commercial varieties in Macedonia.

Key words: tobacco (*Nicotiana tabacum* L.), yield, standard deviation, variability coefficient.

COMPONENTS OF GENETIC VARIANCE FOR YIELD AND NICOTINE INHERITANCE IN TOBACCO

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ABSTRACT

Investigations are made with four tobacco varieties (6 oriental and 1 semi-oriental), with their six one-way F_1 and the same number of F_2 crosses to estimate dry mass yield per stalk and nicotine content in dry tobacco leaves. Crossings were made in 2010 and 2011 and the trial with sixteen varieties (parents and hybrids) was set up in 2012 and 2013 in the field of Tobacco Institute-Prilep, using randomized block design with four replicates. Common agricultural practices were applied during the growing season. The aim of investigations was to study the genetics of inheritance of dry yield and nicotine content in dry leaves through analysis of the components of genetic variance, in order to obtain reliable directions in selection of new higher-yielding and low-nicotine tobacco genotypes. The prevailing mode for the inheritance of yield was the intermediate, and for the nicotine it was partial dominance, followed by the intermediate mode. In some combinations, heterotic effect was observed. In both generations and for both traits, the additive genetic component had higher values than the dominant one (with the exception of F_1 generation for the inheritance of nicotine, in which both components had equal effect), indicating that major part of genetic variance is governed by the additive gene action. The interaction shows that in both F_1 and F_2 generations genes of the parent with lower nicotine content are overdominant. In F_1 genes of the parent with lower yield, and in F_2 those of the parent with higher yield are prevailing. The ratio between dominant and recessive alleles indicates the dominance of the latter. The heritability values point out to a limited impact of the environmental factors, which means that yield and nicotine are highly heritable traits.

Key words: tobacco (*Nicotiana tabacum* L.), yield, nicotine, mode of inheritance, components of genetic variance, heritability (h^2).

NEWLY CREATED PERSPECTIVE LINES OF THE ORIENTAL AROMATIC TOBACCO TYPE PRILEP

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ABSTRACT

The purpose of the investigations is to determine morphological, productional and quality traits of four newly created fertile inbred tobacco lines compared to the standard variety P 12-2/1 (Ø). The investigated lines were obtained by interspecific (intervarietal) hybridization. They are phenotypically uniform and consolidated with respect to plant height and leaf number, shape and size. Based on results of the comparative trials, the newly created lines are characterized by higher number of leaves per plant (49 – 59) compared to P 12-2/1 (37), higher yields (31.64 to 65.05%), better purchase price (up to 11.52%) and higher economic effect (38.80% to 84.06%). Three of the 5 varieties investigated were marked as very perspective and they can find their place in primary production of tobacco.

Key words: tobacco, oriental varieties, lines, type Prilep

NEW LINES OF YAKA TOBACCO AND THEIR MORFOLOGICAL CHARACTERISTICS

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ABSTRACT

Comparative trial was carried out in 2011, in the field of Tobacco Institute-Prilep with some Yaka tobacco varieties in order to study their morphological, productional and quality characteristics. The trial included 5 new lines of the type Yaka obtained by generative hybridization (Yk 65-82/1, Yk I.301-123/82, Yk I.11-46/65, Yk I.14-63/82, YK I.7-65/31) and the variety Yk 125/3 as a standard. Regarding the morphological properties (plant height, leaf number, largest leaf size), all of the investigated lines and varieties showed very low variability, which is an indication of morphological uniformity and stability. The share of Yaka tobacco in the total tobacco production of R. Macedonia is about 5%. We hope that the newly created Yaka lines and varieties will find their place in the mass tobacco production of the Republic of Macedonia.

Key words: tobacco, yaka, lines, morphological characteristics,

THERAPEUTIC AND TOXIC EFFECTS OF ALKALOIDS EXTRACTED OF *PAPAVER SOMNIFERUM*

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Abstract :

The wealth of their contribution to every painful or dangerous hour of the life of the man gives to the plants a choice place in the social representations. Nowadays in spite of the development of the chemistry of synthesis, the use of the medicinal herbs preserved a broad place because of their effectiveness in various therapeutic procedures thanks to their active ingredients which they contain. The opiates are the psychotropic substances resulting from the poppy with opium: *Papaver somniferum*, a plant known since more than four thousand years before J-C. The Greek doctor Galien prescribed opium in a receipt against various evils (cough, headaches, diseases of the gall bladder), after it was consumed as euphoriant from the 19th century. Opium is the latex exuded by the capsules of the poppy, it contains about thirty different alkaloids from which the structure is derived of phenanthrene (morphine, codeine, thebaine,...), or derived of isoquinoleine (papaverin, narcotin, narceine,...). Morphine is the most abundant alkaloid of the opium which contains 10% of them, this value can vary the simple one with the double according to the producing regions, it is also the most active alkaloid and that whose properties are searched by the opium addicts. In this context, the main aims of our communication are: Extraction, separation and identification of alkaloids of opium (opiates). Study of the therapeutic and toxic effects of alkaloids extracted of opium.

Key words: opiates, morphine, codeine, analgesics, alkaloid, psychotropic.

SCREENING OF SOME SOYBEAN ADVANCED LINES FOR THE OIL AND PROTEIN CONTENT AS A SECOND CROP IN THE CUKUROVA CONDITIONS

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Seed protein content and oil content is important for both food and feed utilization of soybean. Soybean (*Glycine max* (L) Merr), which contains about %18-24 oil and %40 protein in the seed is the major oilseed and protein crop in the world. In Turkey, Adana has the most suitable climate conditions for the soybean production as a second crop. Although a number of cultivars developed by public and private sector, we still need new early maturity soybean cultivars for the Cukurova conditions because of autumn rains. In this study, 27 F₉ breeding lines were used as materials which are derived from three different Agricultural Institute in Turkey. Experimental design was randomized complete block design. This one year experiment, the days to 50% flowering, days to maturity, 1000 seed weight, oil content and protein content were investigated and ranged from 22-36 (d), 98-108 (d), 118,9- 207.6 (g), 19.4-21.9 (%), 41,5-46.8 (%) respectively.

Key Words: Soybean, oil and protein content, second crop,

EFFECT OF DIFFERENT MIXTURE RATIOS AND CUTTING TIME OF INTERCROPPED CORN/SOYBEAN ON FORAGE YIELD SILAGE QUALITY UNDER ÇUKUROVA CONDITIONS

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Abstract

This research carried out in order to determine the effect of different mixture ratios and cutting stages of intercropping corn and soybean on fresh and dry-matter yield production under Çukurova conditions. The experiment was laid out in the summer-second cropping period in 2011, with the trials related to different mixture patterns (corn%100 and soybean %100, corn %100 +soybean %100, corn %50 +soybean %100, corn %100 +soybean %50) and different cutting stages (milk and dough) of the soybean and maize mixtures, will be conducted. The experiment was established in a split plot design with four replications in Çukurova Agricultural Research Institute in the Field Trial for two years. In trials, the mixture-ratios and cutting-stage are allocated as the main plots and sub-plots, respectively. In the experiment, fresh and dry matter yield, plant height, botanical composition and Crudu Protein, pH, NDF, ADF were determined. In this study, the soybean Yeşilsoy cultivar which is registered primarily as the silage type, and corn 31Y43 cultivar were used as a material.

Key words: Corn-soybean, mixture ratio, forage yield, silage quality, cutting stage,

PRODUCTIVITY AND ECONOMIC EFFECT FOR COTTON CULTIVATED UNDER DIFFERENT INTER- ROW SPACE AND IRRIGATION RATE

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Abstract:

Field trial on cotton (Vega cultivar) was carried out during 2007-2011 on leached vertisols under irrigation regime of sprinkling – 75 % of the field moisture capacity (FMC) for the soil layer of 0 – 40 cm. The trial included the following variants: factor A) Irrigation with lower rates: 1). Single irrigation of 600 mm/ha at the interphase period blooming-boll formations; 2). Two irrigations of 450 mm/ha – the first one at the blooming stage and the second – at the boll formations period; 3). Two irrigations of 600 mm/ha – the first one at the blooming and the second – at the boll formations period; 4). Non-irrigated variant – for standard. Factor B) Width of inter-row space: 1). 60 cm. 2). 80 cm. It was established that the best results were obtained at the variant where cotton cultivated of 80 cm inter-row space and with second time irrigation with 600mm - with 939 kg/ha more than non-irrigated control and with 11.9 % more than variant with irrigated norm 600 mm/ha. In reference of net profit of 1000 m³ irrigated water the best results were realized after single irrigation norm of 600 mm/ha. In respect of width of inter-row space the yield from a unit of area with inter-row space 80 cm we receive with 4.6 % more than sowing of 60 cm inter-row space.

Key words: cotton, irrigation rate, inter-row space, water deficit, cotton yield

MANAGEMENT OF AGROBIODIVERSITY IN ORGANIC FARMING

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Abstract

Organic farming is a system regulated by law for high quality and safe food production that contributes to the long-term conservation of the environment. One of the main objectives of organic production is the increase and proper management of biodiversity. Diversification of crop production and the formation of agrophytocenosis (intercrops) reduce the available ecological niches filled by weeds; prevents the occurrence of diseases, parasites and pests; and improves the use of available resources (water, land, nutrients, time and labour). Beyond that there are socio-economic benefits that are reflected in more secure income, greater system stability, and increase of the diversity of human and animal nutrition. Research conducted 2013/14 on the organic farm Predrag Koluvića located in the Pannonian Plain in Stara Pazova, Serbia shows that the basis of vegetable production is diversification of species and the varieties, which make specific agrophytocenosis. On 3.2 hectares of open field and 0.7 hectares of greenhouse 60 vegetable, medicinal-aromatic and floral species and varieties are grown and arranged in 50 different intercrops. Applying agroecological methods: intercropping and intensifies vegetable crop rotation beside increase of agrobiodiversity and phytosanitary protection, this satisfies the various requirements of the market throughout the year.

Key words: organic farming, intercropping, agrophytocenosis, agrobiodiversity

SOME QUALITY CHARACTERISTICS OF SUMMER AND WINTER RAPESEED (*Brassica Sp.*) TYPES AT THE CUKUROVA CONDITIONS

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Abstract

The aim of this study was to determine some quality characteristics of rapeseed types grown at the Cukurova conditions. Three summer and nine winter rapeseed types were used. In this a-year-long study, rapeseed types were planted in two different locations, Adana and Tarsus. Oil, protein and crude fiber contents of the rapeseed types were analyzed using Foss NIR System XDS near-infrared analyzer. Average oil, protein and fiber contents of the all rapeseed types were found to be 35.23, 16.89 and 9.05 %, respectively. When the quality characteristics of rapeseed types grown in two different locations were compared, rapeseed types grown in Adana had 34.28 % oil in average whereas the average oil content of the rapeseeds grown in Tarsus was found as 36.18 %. Average protein contents of the rapeseed types grown in Adana and Tarsus were 17.75 and 16.03 %, respectively. In the case of crude fiber contents, the rapeseed types grown in Adana had 8.81 % crude fiber. The rapeseed types grown in Tarsus, however, contained 9.29 % crude fiber. Each type of rapeseed was also evaluated for oil, protein and crude fiber contents. The highest oil content (38.04 %) was found for winter type “Elvis”. In contrast, “Sarry”, a summer type, had the lowest oil content (31.52 %). In contrast to oil contents, the highest amount of protein was (18.11 %) found in “Sarry” whereas “Elvis” had the lowest protein content (15.38 %). According to crude fiber contents, a winter type rapeseed “Es-Hydromel” had the highest amount of crude fiber (9.71 %). However, the lowest amount of crude fiber was found in “Elvis” (8.54 %). The four rapeseed types having the highest amount of oil with no statistical difference in their oil contents included two summer and two winter types. Three rapeseed types having the highest oil content had also the lowest amount of proteins. The oil content of the rapeseed was found to be inversely correlated with its protein content.

Key words: Crude fiber content, Quality, Rapeseed, Protein Content, Oil Content

ASSESSMENT OF GENETIC DIVERSITY BETWEEN AND WITHIN BRASSICA SPECIES AND THEIR WILD RELATIVE (*ERUCA SATIVA*)

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Abstract

Microsatellites primers were tested for their ability to distinguish genomic contributions of the central species of the U Triangle and *E. sativa*. Six Brassica genomes from U-Triangle along with their wild genome *Eruca sativa* were selected for exploring the diversity within and between from family Brassicaceae. For the insight of diversity within genomes, four accessions of each genome were selected from different ecological zones and were subjected to the SSR markers in order to detect variation between and within the selected genomes. For this study, 54 SSR primer pairs were selected of which 31 were polymorphic, while rest of primer pairs was categorized as single allelic polymorphic and monomorphic primers. These primer pairs depicted 97% polymorphism between Brassica and *Eruca* genomes with an average of 2.55 polymorphic alleles loci⁻¹. PIC values ranged from 0.40 (SSR primer Na14-DO7) to 0.79 (NA10-G09). For comparison within genomes and *Eruca*, all the genomes were grouped in three modules i.e. ABE, ACE and BCE. The responsive 32 polymorphic primer pairs amplified 76 alleles in ABE module. In case of ACE module, 31 primer pairs amplified a total of 76 alleles in which 73 alleles were polymorphic. Primer pairs NA10-B10, BRMS-001 and PBCE-B040 amplified single allelic polymorphism. In BCE module, 32 primer pairs amplified a total of 74 alleles in which 71 were polymorphic. For the estimation of relatedness within and among genomes, dice coefficient values were computed as a measure of genetic similarity matrix. On the basis of these genetic distances, dendrogram was constructed through cluster analysis. Two major clusters at coefficient of similarity level (0.47) were observed. One cluster comprised of all Brassica genomes and their accessions, while in the second cluster all accessions of *Eruca* genome were grouped. The cluster containing Brassica genomes was subdivided into four sub groups that contained diploid and tetraploid species in a way that tetraploid species were grouped in between their diploid parental species with varying genetic distances. Among Brassica genomes, *B. juncea* had genetic similarity 69-70% with its diploid parent *B. campestris*. *B. napus* had 94% genetically similarity with its diploid parent *B. oleracea*. Genetic similarity among *B. carinata* and its diploid parent *B. oleracea* was 87%. *E. sativa* was genetically 61% close to *B. juncea* and 55% to *B. oleracea*. Present findings reconfirmed the relationship among tested species by using SSR markers.

KARYOLOGICAL AND MORPHOLOGICAL VARIATIONS WITHIN *BASSIA HIRSUTA* (L.) ASCH. IN BULGARIA

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Abstract

Five populations of *Bassia hirsuta* (L.) Asch. have been karyologically and morphologically tested. The morphological analysis constitutes 16 quantitative characters and 7 qualitative ones. The variation statistical and the scanning electron microscope methods have been used. Intrapopulation and interpopulation variability have been traced. A chromosome number $2n = 18$ has been established. The relationship between morphological and karyological variability, the number, area, ecological, and geographic appurtenance of the studied populations has been explored. A detailed morphological characteristic of *Bassia hirsuta* (L.) Asch. has been made on the basis of data from its populations. The data are a supplement to the ones given about the species in Flora of the People's republic of Bulgaria and they can be used both for its correct identification and for getting familiar with its characteristics.

Key words: *Bassia hirsuta*, karyology, morphology, chorology

MAINSTREAMING BIODIVERSITY CONSERVATION AND SUSTAINABLE USE FOR IMPROVED HUMAN NUTRITION AND WELLBEING

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The project “Mainstreaming biodiversity conservation and sustainable use for improved human nutrition and wellbeing” will contribute to the improvement of global knowledge of biodiversity for food and nutrition and thereby enhance the well-being, livelihoods and food security of target beneficiaries in Brazil, Kenya, Sri Lanka and Turkey through the conservation and sustainable use of this biodiversity and the identification of best practices to increase the economic and social level of the local people. The Project Objective is to strengthen the conservation and sustainable management of agricultural biodiversity through mainstreaming into national and global nutrition, food and livelihood security strategies and programmes. The project will be conducted in 3 components: 1. Knowledge Base, 2. Policy and strategy frameworks and 3. Awareness. The Project activities in Turkey will be carried out in three regions (Aegean, Black Sea and Mediterranean Regions) on the selected 42 species of wild edible plants, land races and wild mushrooms which are commonly used for the local foods. Up to the present; In the Aegean region, 7 village questionnaires, 61 food consumption questionnaires and 17 collector questionnaires were gathered. In the Black Sea region 90 questionnaires (40 producers and 50 consumers) for Siyez (*Triticum monococcum*) and 90 questionnaires (40 collectors and 50 consumers) for other species were completed. In the Mediterranean region 5 Village questionnaires, 16 food consumption questionnaires and 14 collector questionnaires were completed. Based on survey results, 42 species from the project sites were prioritised for food composition analysis and botanical samples of these species were collected in 2014 using standardised procedures for sample selection, preservation and transformation.

Key words: Agricultural biodiversity, nutrition

THE IMPORTANCE OF PLANT GENETIC RESOURCES, STORAGE METHODS AND TURKISH SEED GENE BANK

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ABSTRACT

Turkey is quite rich country regarding habitat types as a natural result of having wide variability of topography, climate and geomorphology; therefore, that situation also reflects in number of plant species and endemic species rates. There are 12.400 plant species in Turkey and one third of them are endemics. The number of plant species in Turkey is almost as many as the whole Europe has. The plant genetic resources (PGR) are degraded and threatened for extinction due to increase in world population, rapid development of technology, the changes in agricultural research systems, careless and misuse of resources, climate change, degradation of habitats etc. Collection, conservation, characterization and use of PGR in plant breeding have big importance to ensure food security. Addition, affords to create public awareness for the importance, conservation and sustainable use of PGR have same degree of importance. Plant genetic resources are conserved either *in situ* or *ex situ* nowadays. *In situ* conservation is the conservation of PGR in their native habitats. The evolution of PGR continues in this conservation method. Seed samples of PGR are conserved in gene banks as seed, *in vitro* or cryo preservation within both base and active conservation samples. Some vegetative samples are conserved in field gene banks. Information about PGR in Turkey, methods using for conservation of PGR and seed gene banks activities of Turkey are presented in this paper.

Key Words: Plant genetic resources, conservation, Turkish Seed Gene Bank (TSGB).

STUDY THE EFFECTIVENESS OF TECHNICAL MANAGEMENT ON CEREALS SEED PRODUCTION OF WHEAT "WAHA" IN THE MIDDLE SEMI- ARID

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The seeds production is essential for agriculture, because it is the fundamental element that affects the production program. However, the use of seeds quality in a modern and efficient agriculture has become a priority. Improvement both quantitatively and qualitatively seeds production remains imperative to satisfy user demand. It requires careful planning, efficient and dynamics of the various components constituting the production program. The productivity of cereals seeds in M'sila (Algeria), is affected by environmental factors and bad practices of farming techniques by seed growers. The objective of our study is to analyse the cereals seed production and technical management on durum wheat (variety Waha) across three farms in the province of M'sila . The trial adopted is a completely randomized conducted in three farms. The measured parameters are height, yield and its components and the biomass at maturity. The results show that Seed multiplication is closely related to the application of technical routes by farmers and also to agro -climatic constraints of the region.

COMPARISON AMONG THREE BREEDING METHODS IN BREAD WHEAT

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Abstract

The objective of this study was to compare the effectiveness of pedigree (PM), modified bulk (MBM) and single seed descent (SSD) breeding methods for increasing grain yield in wheat. This study was conducted on the Experimental Farm of Sids Agricultural Research Station, Agricultural Research Center, Egypt, during 2007/08, 2008/09 and 2009/10 seasons. The final evaluation of the F₅ generation was conducted during 2009/10 season. The selected lines were sown in the nested design with three replications. The efficiency of the breeding methods was evaluated on the basis of the following parameters: mean performance results in the first cross indicated that, the differences between breeding methods. In the first cross the (MBM) gave the highest values for grain yield/plant, while, (SSD) method exhibited significant grain weight and (PM) gave the highest value for number of spikes/plant and number of grains/spike. It could be concluded that (MBM) is considered the best breeding method for grain yield/plant and number of spikes/plant, comparing to (PM) and SSD in this cross. In the second cross the (PM) expressed significant desirable values for number of spikes/plant and grain yield/plant, while, the best lines were number 4 (80g) in the (PM), number 12 (90g) in (MBM) and number 12 (69g) in SSD method. The SSD method exhibited highly significantly heavy grain weight and high number of grains/spike. It could be concluded that (PM) is considered the better breeding method for number of spikes/plant and grain yield/plant than those (MBM) or SSD method in this cross.

Key words: Breeding methods, Pedigree, modified bulk, single seed descent, wheat.

PROTEOMIC ANALYSIS OF THE MATURE KERNEL ALEURONE LAYER IN COMMON AND DURUM WHEAT

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Abstract

The aleurone layer (AL) is one of inner tissues removed from the grain with the wheat bran. It is the main source of vitamins, minerals and antioxidants of potential nutritional value in the wheat kernel. The AL of three varieties of each of the two main species of wheat, *T. aestivum* (ABD) and *T. durum* (AB), were manually dissected and analysed using two-dimensional gelbased proteomics. A total of 1258 and 1109 Coomassie stained spots were detected in the AL of representatives of the ABD and AB genomes. In two varieties (*T. aestivum* Chinese Spring and *T. durum* Bidi17), grown in two different years with full fungicide protection, no quantitative or qualitative (presence/absence) differences in spots were detected, suggesting that AL proteome is strongly genetically controlled. Comparison within and between species revealed a total of 339 AL significant protein spots. Among these spots, 30.8% differed within *T. aestivum* and 56.5% within *T. durum* varieties, whereas only 12.7% differed between the two species. Among the 142 AL proteins identified using MALDI-TOF and LC-MS/MS, 57% were globulin type storage proteins (Glo-3, Glo-3B, Glo-3C, Glo-2), 16.2% were involved in carbohydrate metabolism and 17.6% in defence/stress pathways. These variations in AL proteome are discussed.

Key words: Wheat species; Globulins; Aleurone layer; Metabolic pathway

RESEARCH OF THE TECHNOLOGICAL POTENTIALITIES OF THE ANCIENT ALGERIAN HARD GRAINS

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Abstract:

Winter wheat cereal crop remains still difficult as it is facing several technical and climatic constraints. All these constraints have a negative influence on yield and on quality of durum wheat in Algeria. In this complicated context, we only can point out priorities that have been identified by agriculture research field, which is naturally seed production of high quality by local varieties. These genotypes will be further of better grain and semolina level. For this purpose, a trial of a diversified germplasm has been studied. The quality parameters have been essentially qualitative ones (paste and semolina), by using a small amount of grains (NIRS, non-destructive method). The present research will discuss results on high variability which, by the way, seems to be linked to the interaction Genotype- Environment, but also to the genetic potential as well, capable to determine qualitative abilities of the varieties. This method, resolute and rapid at the same time, may constitute supplementary issue in the selection of quality criteria in wheat.

Key words: Durum wheat- Algerian varieties- quality – NIRS – genetic potential

INVESTIGATION ON THE EFFECT OF INCREASING WATER INSUFFICIENCY ON THE PRODUCTIVITY AND THE PHYSICAL GRAIN PROPERTIES OF COMMON WINTER WHEAT CULTIVARS

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Abstract

The trial was carried out in a specially constructed greenhouse. During the period of investigation (2011 – 2013), the experiment involved 11 common wheat cultivars in 4 replications. The cultivars were grown on Haplic Chernozems under two regimes of water supply – optimal (OWS) and increasing water insufficiency (WI) till the end of the growing season. The water regimes were imitated by watering and maintenance of 80-85 % of MSMA (marginal soil moisture absorption) and by causing of drought at 45-50 % MSMA. Under the optimal water regime, cultivars Bojana, Bolyarka, Rada and Bezostaya 1 formed maximal total shoot biomass. The water insufficiency sharply decreased the productivity of the cultivars with a mean of 35.52 % in comparison to the optimal water regime. Highest total shoot biomass was measured in cultivars Yantar, Bojana and Rada. Under both regimes of water supply, cultivars Bojana, Bolyarka, Lazarka, Rada and Yantar had highest productivity. The increasing water insufficiency during the growing season of the crop caused lower amplitudes in the variation of the investigated indices in cultivar Lazarka as compared to all other cultivars. This cultivar had the highest harvest index under severe drought. The working efficiency of a vegetation mass unit regardless of the water supply was highest in cultivar Bolyarka. Under severe water insufficiency the same was valid for cultivars Lazarka, Neda, Slaveya and Yantar. The water insufficiency contributed to the decrease of the absolute weight of the grain with 28.3 % and caused significant variation of the values depending on the cultivar. Cultivars Bojana, Bezostaya 1, Bolyarka, Dragana and Lazarka were significantly less affected by the severe insufficiency of soil moisture and possessed larger grain than the rest of the cultivars. Under optimal water supply in the course of the growing season, cultivar Bolyarka had the largest grain. This tendency was valid in all three years of the experiment, the differences with the other cultivars being within the range 5 – 19.9 g.

GROWING WHEAT (*Triticum aestivum* L.) BY THE METHODS OF ORGANIC AGRICULTURE UNDER THE CONDITIONS OF DOBRUDZHA REGION, BULGARIA

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Abstract

During 2011 – 2013 a field experiment with wheat (*Triticum aestivum* L.) was carried out in the trial field of Dobrudzha Agricultural Institute. The aim of the investigation was to determine what are the possibilities of growing common wheat in a main wheat production region (Dobrudzha, north-east Bulgaria) using the methods of organic agriculture. The results from the biological growing were compared to the respective results obtained by the conventional method. The following agronomy factors were investigated in both variants of production: three sowing dates (early, optimal and late) x three cultivars (Enola, Aglika and Galateya) x three sowing norms (550, 650 and 750 seeds/m²). In the conventional part of the experiment, suitable fertilizers and pesticides were applied. Wheat was rotated with fodder pea, grain maize and fallow. The soil in the trial field was slightly leached chernozem (*Luvic phaeozem*) with very good physical and chemical characteristics. The trial was designed according to the split-split plot method in four replications. Wheat productivity in both ways of production was significantly influenced by the tested agronomy factors. Averaged for the investigated period, the yield obtained in the conventional production exceeded the biological method with 11.94 %. The early sowing date was an important prerequisite for higher yields under organic growing. The sowing density was the factor with most variable effect on wheat productivity. Cultivar Aglika demonstrated highest mean productivity under both ways of production. The year conditions had significant effect on grain yield in both methods of growing.

**DIALLEL ANALYSIS OF HEADING TIME, KERNEL WEIGHT AND GRAIN YIELD IN BREAD WHEAT
(*Triticum aestivum*L.)**

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ABSTRACT

Diallel cross analysis provides early information on genetic effects and heritability in the F₁ generation. In an effort to increase wheat production, breeders are maximising the genetic potential of different germplasm to produce desirable combinations with higher yields. Various analytical techniques are employed to clarify the genetic mechanisms responsible for grain yield and yield traits to identify superior genotypes. This study sought to investigate genetic effects on heading time, kernel weight and grain yield using a diallel cross of six bread wheat genotypes as parents (Kırkpınar 79, Bezostaya, Gün 91, Marmara 86, Çukurova 86 and Genç 88). The parents were crossed in 6 × 6 half-diallel crosses to produce the 15 possible F₁ hybrids. General combining ability (GCA) was significant for heading time, kernel weight and grain yield, while specific combining ability (SCA) was significant for heading time and kernel weight. The parental lines of Genç 88 exhibited high GCA effects, while the cross of Gün 91 × Genç 88 showed the highest SCA effects for early maturity. In terms of thousand kernel weight, the offspring of Gün 91 had positive GCA effects and Bezostoya × Gün 91 and Bezostoya × Marmara 86 were favourable crosses. Gün 91 also bred desirable GCA effects for grain yield, and the crosses of Bezostoya × Çukurova 86 and Marmara 86 × Çukurova 86 displayed a high potential to improve new varieties. The resultant combining ability and heterosis for grain yield demonstrates which genotypes show the most potential for use in hybrid breeding programs.

Key words: Diallel, Bread Wheat, Combining Ability, Heterosis

ASSESSMENT OF QUALITY OF DURUM WHEAT BREEDING MATERIAL BY MEANS OF MIXOGRAPH

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ABSTRACT

The main objective of wheat breeding programs is in terms of yield for producers to lines to released cultivar. Twenty stable and high-quality durum wheat varieties were developed. Wheat trade and industry is very important for quality of wheat. Color, grain protein concentration, and gluten strength are key traits that influence end-use quality of durum wheat. Color, protein content, and gluten strength are evaluated throughout genotype development from early generation genotypes were grown in one years rainfed environments Konya 2012-2013 growing season at the Central Anatolian provinces in Turkey. The experimental layout was a randomized complete block design with 4 replications. Whole meal and refined flour samples were obtained with a Perten3100 mill (0.5 mm sieve) and with a Brabender Jr. mill (70 GG sieve) Wheat samples were analyzed two replication. Protein content of the flour was measured using a Leco FP 528 analyzer (Leco Inc, St Joseph, MI) AOAC 992.23. SDS sedimentation were determined AACC56-70. Flour of color (Yellowness) values b measured with (Hunterlab mini scan XEplus), Mixograph properties were determined according to AACC approved methods 54-40A (Anon, 2002). 35-g mixograph (National Mfg. Co.Lincoln, NE) was used to evaluate the mixing properties of flour samples. The six main characteristics of a mixogram; The mixograph has been used to help predicting functional dough mixing properties of durum wheat genotypes in durum wheat breeding programs. In this study, it was obtained that the relationships between SDS sedimentation; MMT ($p<0.01$), MPH($p<0.05$), MPW($p<0.05$) MPE($p<0.05$) MTE($p<0.05$) were significant and positive. According to the analyses results lines 18 and 1, Eminbey variety is high quality varieties. Mixograph is so useful in identifying lines with superior gluten strength and spaghetti making quality. Both the mixograph and SDS sedimentation test reliably identify strong gluten cultivars because neither are markedly affected by environment induced changes in protein content. To predict cooking quality of durum wheat pasta at the early stages of a breeding program, rheological properties are among the most useful parameters to assess or measure. Mixograph analysis results quickly because it is useful in breeding programs. The results of this study indicate that there is potential to identify quality of durum wheat genotypes by mixograph.

Key Words: Durum wheat, quality, mixograph, SDS sedimentation, protein

COMPARATIVE STUDY OF THE MECHANISMS OF RESISTANCE TO OXIDATIVE STRESS INDUCED BY CADMIUM IN TWO DURUM WHEAT GENOTYPES

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Abstract:

Cadmium (Cd) is a non-essential metal for living organisms. Its toxicity is a phenomenon found in most living beings. Its high mobility makes it easily absorbed by plants and therefore rapidly toxic. Cadmium can cause oxidative damage by increasing the cellular concentration of reactive oxygen species and reducing antioxidant power of the cell. Excess Cadmium disrupts several physiological metabolisms in the plant such as photosynthesis, the absorption of water and minerals, evapotranspiration or breathing. The result of mineral deficiencies, dehydration and oxidation of cellular components that cause chlorosis, browning roots and slower growth eventually leading to death of the plant. In this work, we set out to assess the impact of cadmium on plant growth, relative water content, as well as some of the antioxidant system enzymes such as catalase (CAT), guaiacol peroxidase (GPX) and ascorbate peroxidase (APX) and examine the differences in these parameters between two varieties of durum Simeto and Mohammed Ben Bachir. The results illustrate a stressful effect of cadmium on two varieties of durum wheat. On the one hand, we found an inhibition of plant growth: a decrease in the average length of roots and leaves as well as reduced water potential. On the other hand, the presence of cadmium in leaves resulted in two varieties studied increased enzyme activities (CAT, GPX, and APX).

Key words: Durum wheat, Cadmium, enzymes, oxidative stress, toxicity.

COMPARISON AMONG THREE BREEDING METHODS IN BREAD WHEAT

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Abstract

The objective of this study was to compare the effectiveness of pedigree (PM), modified bulk (MBM) and single seed descent (SSD) breeding methods for increasing grain yield in wheat. This study was conducted on the Experimental Farm of Sids Agricultural Research Station, Agricultural Research Center, Egypt, during 2007/08, 2008/09 and 2009/10 seasons. The final evaluation of the F₅ generation was conducted during 2009/10 season. The selected lines were sown in the nested design with three replications. The efficiency of the breeding methods was evaluated on the basis of the following parameters: mean performance results in the first cross indicated that, the differences between breeding methods. In the first cross the (MBM) gave the highest values for grain yield/plant, while, (SSD) method exhibited significant grain weight and (PM) gave the highest value for number of spikes/plant and number of grains/spike. It could be concluded that (MBM) is considered the best breeding method for grain yield/plant and number of spikes/plant, comparing to (PM) and SSD in this cross. In the second cross the (PM) expressed significant desirable values for number of spikes/plant and grain yield/plant, while, the best lines were number 4 (80g) in the (PM), number 12 (90g) in (MBM) and number 12 (69g) in SSD method. The SSD method exhibited highly significantly heavy grain weight and high number of grains/spike. It could be concluded that (PM) is considered the better breeding method for number of spikes/plant and grain yield/plant than those (MBM) or SSD method in this cross.

Key words: Breeding methods, Pedigree, modified bulk, single seed descent, wheat.

Abbreviations: PM, pedigree Method; MBM, modified bulk method; SSD, single seed descent; GY/P, Grain yield per plant (g); No. of S/P, Number of spike per plant; No. of G/S, Number of grain per spike; 1000GW, 1000 grains weight (g)

**PRODUCTIVITY OF FOREIGN COMMON WINTER WHEAT CULTIVARS (*TRITICUM AESTIVUM* L.)
UNDER THE CONDITIONS OF DOBRUDZHA REGION**

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Abstract

One of the main directions in common winter wheat breeding is toward achieving high results with regard to yield and production potential. An important prerequisite for this is the including in breeding of new gene plasm with variable origin adequate to the growing environments and the desired goal. **The aim** of this investigation was to study the productivity and the elements of yield of foreign winter wheat cultivars under the conditions of Dobrudzha region. The investigation was carried out during 2011 – 2013 in the trial field of Dobrudzha Agricultural Institute (DAI). Twenty-four cultivars of foreign origin were tested. Their yield was compared to two standards: Enola and Sadovo 1. The cultivars were planted in harvest plots each of 10 m² in two replications. The structural elements of yield were analyzed, as well as some traits and properties characterizing the variation of the separate wheat cultivars. The following traits related to productivity were investigated: vegetation period, plant height yield, number of productive tillers, grain weight per spike, number of grains per spike and 1000 kernel weight. Cultivars Kantata, Sonata, Sixtus and Podoima demonstrated highest production potential realizing a yield of more than 8 t/ha, averaged for the three years of investigation. Highest variation was observed in the traits grain weight per spike and number of grains per spike. The above mentioned genotypes are suitable cultivars which can be successfully involved in the breeding program of DAI with regard to the index yield.

Key words: winter wheat, productivity, elements of yield

A RESEARC ON THE DETERMINE OF YIELD, YIELD COMPONENTS AND QUALITY CRITERIA OF BREAD WHEAT (*Triticum aestivum* L.) VARIETIES WHICH SUITABLE FOR THE MIDDLE BLACKSEA COAST REGION

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ABSTRACT

Wheat has a strategic importance for many countries. It has a high potential as cultivation area and production in Turkey. The annual production is about 20 million tons. Wheat is a raw material of various products; bread, biscuit, pasta, bulgur and tarhana. This study was carried out to determine the yield, yield components and quality criteria of bread wheat genotypes, which are suitable for The Middle Blacksea Region conditions in 2009-2010 and 2010-2011 growing seasons in Samsun-Çarşamba and Samsun-Bafra. In the research, 9 checks and 16 lines, totally twenty five different bread wheat genotypes were used. The research was carried in randomized block design with 4 replications. In the research, plant height, spike length, number of spikelet per spike, number of seeds per spike, number of spikes per m², grain yield, 1000 grain weight, hectoliter weight, Zeleny sedimentation and gluten rate were examined. According to data, Canik 2003, Osmaniye, candidate line (registered as Altındane) and line-14 were determined as bread wheat genotypes, which are the most suitable as yield and quality for The Middle Blacksea Region conditions.

Key words: Bread wheat, Grain yield, Yield components, Quality.

EFFECTS OF NITROGEN APPLICATION TIMING ON YIELD AND YIELD COMPONENTS OF DURUM WHEAT IN A BED PLANTING SYSTEM

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This study investigated the effects of nitrogen (N) fertilization at different growth stages on durum wheat (*Triticum durum* L.) grain yield and yield components (with irrigated bed planting) in Diyarbakir, Turkey. N was applied at a rate of 140 kg ha⁻¹ distributed over one, two, or three applications at various combinations of five different growth stages (i.e., sowing, seedling growth, early tillering, stem elongation, and booting). The study included a total of 13 N treatments, including the control of no N. The N application timings (NAT) of the 50% sowing + 50% early tillering and 66% sowing + 33% early tillering treatments were most suitable for durum wheat. The NAT significantly affected the flowering time, SPAD readings of the early milky ripe stage, plant density, thousand kernel weight, grain filling duration, grain filling rate, grain N content, grain yield, harvest index, and grain N yield.

Key words: Durum Wheat, Nitrogen, Fertilization Timing, Grain Yield, Quality Traits, Bed Planting System

EVALUATION OF SOME QUALITY CHARACTERISTICS, YIELD AND YELLOW RUST DISEASE IN DURUM WHEAT ADVANCED LINES IN BREEDING PROGRAMS OF CENTRAL ANATOLIA REGION

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Abstract

The purpose of studies in durum wheat breeding highly efficient, high-quality, disease, especially the yellow rust resistant, cold-and drought-resistant varieties by developing country farmers and thus contribute to the country's economy. For this purpose, the selected 18 lines and 6 standard types of advanced breeding lines were grown in İközce, Ulaş, Altınova, Gözölü, Malya locations in Central Anatolia. Material grain yield, thousand kernel weight, flour yield, protein content, zeleny sedimentation and in the terms of yellow rust disease were determined. According to the location average grain yield of 5, 12 lines have above trial average yield, 15 lines has above average yield of standard varieties, too. Depending on the changed locations high grain yield was obtained in Ulaş, while the lowest yield was obtained Altınova location. In terms of grain yield 21, 18, 22, 15, 2, 3, 11 ve 13 numbered lines had the highest values. In terms of grain quality characteristics (thousand grain weight, flour yield, grain protein content, zeleny sedimentation) 23, 22, 8, 2, 10 ve 13 lines, came to the fore. With regards to grain yield, quality characteristics and yellow rust resistance, 13 and 2 lines were found promising.

Key Words: Bread wheat breeding, grain yield, protein content, zeleny sedimentation, yellow rust (*Puccinia striiformis f.sp. tritici*)

ADAPTABILITIES OF SOME DURUM WHEAT GENOTYPES OF FOREIGN ORIGIN IN SOUTHEAST ANATOLIAN REGION OF TURKEY

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ABSTRACT

The study was performed to identify durum wheat genotypes adaptable and having superior properties to use in breeding program in 2011-2012 growing season in Diyarbakır and Kızıltepe conditions that are two important parts of Southeast Anatolian Region of Turkey. In the study, in addition to 18 lines and 5 control varieties (Omrabi5, Younes1, Korifla, Waha, Miki2) obtained from ICARDA (International Center for Agricultural Research in the Dry Areas) and Zühre durum wheat variety cultivated in the region as local check were used. The trial established as a randomized complete block design experiment with three replications in two locations. Grain yield, thousand kernel weight, hectoliter weight, protein content, grain color and SDS value were evaluated in the study. According to the analyses of compound variances was observed between genotypes in point of all the parameters except hectoliter weight. Also it was determined significant differences in terms of grain yield and thousand kernel weight properties between the locations and in terms of grain yield, thousand kernel weight and protein content properties between the genotyp x location interaction. Biplot analysis method were executed to evaluate inter-traits and genotyp-traits relations. By means of this analysis, connected traits to each other and distinguished genotypes in terms of particular features visually were shown. According to the two-locations averages, promising genotypes in connection with both grain yield and quality characteristics were taken the advanced stage of breeding program.

Key Words: ICARDA, Durum Wheat, Adaptability, Yield, Quality.

AMINO ACIDS CONTENTS OF THREE MUTANTS OBTAINED FROM BREAD WHEAT CV. INIA-66

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Abstract:

Amino acids were determined of grains from three mutants: ZC115, ZA67 and ZB76. These mutants were obtained from stored and irradiated seeds by gamma rays of bread wheat cv. Inia-66. The results were compared with amino acids contents of grains of the parent cultivar Inia-66. The results indicated that the mutants ZC115 were surpassed its parent contents of amino acids (essential and non essential). A significant reduction in most of the amino acids was observed in the grain of the mutants ZA67 and ZB76 as compared with the parent.

RESULTS AND PERSPECTIVES IN THE SELECTION OF RESISTANCE TO LOOSE SMUT IN BARLEY

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ABSTRACT

The article presents the results of the selection of resistance to loose smut in barley during 1978-2012 year. Indicated methods and schemes of work. There are a significant number of breeding lines that can be used as donors in the selection of resistance.

Key words: Barley, Resistance, Breeding, Loose smut.

HERITABILITY, VARIANCE COMPONENTS AND GENETIC ADVANCE OF YIELD AND SOME YIELD RELATED TRAITS IN BARLEY DOUBLED HAPLOID LINES

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Abstract

A total of 23 doubled haploid lines of winter malting barley were grown in two successive seasons of 2011 and 2012 to study variability, heritability and genetic advance for grain yield and 5 yield related characters - spike length, spikelet number per a spike, grain number per a spike, grain weight per a spike and 1000 grains weight. Significant differences were observed among the varieties regarding all the traits studied. Genotypic and phenotypic coefficients of variability were higher in grain yield and grain weight per a spike than other traits. Estimates of heritability ranged from 73,0 % for spikelet number per a spike to 81,6 % for 1000 grains weight, while grain yield showed 78,3 % heritability. High heritability coupled with high genetic advance was observed for 1000 grains weight indicating the importance of this trait in yield improvement of winter malting barley.

Key words: Barley, Variability, Heritability, Genetic advance

RESPONSE OF BULGARIAN WINTER BARLEY VARIETIES TO DIFFERENT TYPES OF STRESS

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Abstract

The long phenological development of cereal is the reason for the exceptionally big diversity of factors that have influence on their vegetation and productivity. Depending on the growth stage of the plants, their mechanism of reaction is specific. General criteria for evaluation of the tolerance of a particular genotype towards adverse conditions of the environment is the yield. The aim of this investigation was to study the response of Bulgarian winter barley to different types of stress. The trial was carried out during 2010 – 2014 at Dobrudzha Agricultural Institute. Meteorologically, the years of investigations differed considerably. This allowed evaluating the tested varieties for their resistance to different types of biotic and abiotic stress. In six-row barley, the environment had a strong effect on the duration of the period prior to heading, on spike length, the percent of sterile spikelets and the hectoliter weight. In the two-row forms the correlation was similar, though weaker. The *genotype x environment* interaction increased in the total variation of the characters. Varieties Izgrev and Radul performed best among the highly productive fodder varieties. Among the malting varieties Asparuh, Orfej and new varieties Ahat and Deviniya possessed the favorable combination of mean yield and stability.

Key words: Winter barley - Yield – Abiotic stress – Biotic stress

HILAL BARLEY VARIETY

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Abstract:

Hilal barley variety was improved by Aegean Agricultural Research Institute. Breeding method is selection, spring, two rowed. Hilal was registered in 30.03.2010 by Cereal Committee. Hilal's growth form is semi erect, heading time very early, spike erect, plant height tall, spike form tapering, spike height medium, awn height long, hull grain, grain color white, resistant to lodging. Plant height is 90-115 cm and grain don't spill. When it comes to harvest maturity spike kind of structure that takes the form of a crescent, this name was deemed appropriate by the breeder. In this paper we present the results of registration trials Hilal barley varieties and kinds of features have been revealed.

Key words: Arpa, registration, seed

DETERMINATION OF HIGH MOLECULAR WEIGHT GLUTENIN SUBUNITS OF PURE LINES SELECTED FROM POPULATIONS OF SOME TURKISH LANDRACES BREAD WHEAT

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Abstract

Wheat gluten proteins consist of gliadins and glutenins. Polimeric glutenins are separated into two groups as high molecular weight glutenin (HMWG) and low molecular weight glutenin (LMWG) according to molecular weight. However HMWG proteins constitute 5% of total flour protein, they are the most important factors determining bread quality and reologic properties of dough. Allele combinations formed with presence or absence of HMWG subunits have been used to estimate bread quality for long years. In this study, 171 landraces bread wheat pure lines, selected from landraces bread wheat varieties collected during 32 year period (1962-1991) from all over Turkey according to one (pure line) selection, have been investigated. Extraction of HMWG proteins and Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis (SDS-PAGE) analysis have been done according to adapted method written in bread wheat variety property document of International Protection Union of New Plant varieties (UPOV). Extraction of glutenin proteins have been obtained by using one seed grain taken from one spike of each genotype. According to results obtained from the study, the most prevalent alleles have been 'N' subunits with ratio of 95% on Glu-A1 locus, 17+18 subunit with ratio of 78% on Glu-B1 locus and 2+12 subunit with ratio of 90% on Glu-D1 locus. Quality score has been assessed in only 5 genotypes of 171 as 10. While in one genotype quality score was 9, in 10 genotypes quality score was found as 8, it has been determined that quality score in 126 genotypes was 6 and also quality score in 29 genotypes was 4.

Key Words: High molecular weight glutenin (HMWG), landraces, SDS-PAGE, quality

Acknowledgement: This study was financed by TÜBİTAK 1001 programme (Project no: 111O255)

DETERMINATION OF GENETIC SIMILARITIES OF PURE LINES SELECTED FROM POPULATIONS OF SOME TURKISH WHEAT LANDRACES COLLECTED FROM ADIYAMAN BY THE METHOD OF GLIADIN ELECTROPHOREGRAM

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Gliadin proteins are not affected from environmental conditions and are only synthesised under the control of genetic structure. For this reason showing differences in wheat materials according to gliadin proteins means being different according to genetic structure as well. In this study, 21 landraces wheat pure lines selected according to pure line selection in between 2003-2005 collected from landraces wheat species in Adıyaman during the 32-year period (1962-1991) have been used. Gliadin bands have been determined by using A-PAGE method. Extractions of gliadin proteins used in electrophoresis have been prepared by using one seed and to determine the rational movement (Rm) values of protein bands 'Marquis' variety has been used as standard. According to results obtained from study it has been determined that Gliadin band numbers vary between 21 and 27 units and Rm values vary between 13.6 and 87 units. It has been found that analyzed 21 genotypes were separated into 9 groups and those groups consisted of 1-3-21, 2-4, 5-16, 7, 6-9-10-17-18-20, 8-12-13-14, 11, 15, 19 genotypes. When 5-16 group and 6-9-10-17-18-20 group were compared, it has been found that from the point of view of only one band there was difference on ω -gliadin region and on β -gliadin region but there was no difference on γ - gliadin region. For both groups on α -gliadin region no band formation has been determined. For 7 and 15 groups it has been found that from the point of view of only one band there was difference on ω -gliadin region. However it has been not determined any difference on γ , β ve α - gliadin regions. When 2-4 group and 8-12-13-14 group were compared it has been observed that from the point of view of only two bands there was difference on ω -gliadin region, on γ , β ve α - gliadin regions showed similar patterns with some differences. Gliadin proteins representative of genetic structure of wheat can be used to put forth the discrimination of genotypes and differences between them for consideration. In this way improvement studies can be ensured to be done faster and reliable.

Key words: Gliadin, landraces variety, A-PAGE, genetic similarity

Acknowledgement: This study was financed by TÜBİTAK 1001 programme (Project no: 111O255)

OPTIMIZATION of DNA ISOLATION METHODS for DETERMINATION of DROUGHT TOLERANCE in LOCAL DURUM WHEAT CULTIVARS by AFLP ANALYSIS

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Sustaining agricultural production under adverse environmental conditions, such as drought and high salinity, represents a major challenge. Drought is expected to cause serious plant growth problems for more than 50 % of the arable lands by 2050. Exposure of plants to those abiotic stresses result in many biochemical, physiological, and molecular changes. In general, stress regulated genes play important roles in plant stress tolerance. The products of these genes are thought to function not only in stress tolerance but also in the regulation of gene expression, such as ion homeostasis, detoxification, damage repair, signaling transduction, and transcriptional regulation. Hence, comprehensive understanding of plants adaptive and general protective mechanisms against abiotic stresses becomes such as drought stresses an important issue in stress physiology and is necessary to ensure optimal growth and productivity of plants. Amplified fragment length polymorphism (AFLP) technique is an efficient, sensitive, and reproducible technology for identify of an isolate or the degree of similarity among isolates which is used to visualize hundreds of amplified DNA restriction fragments simultaneously. To study the AFLP of any organism, high quality DNA is required to obtain highly reproducible results. So far there is no one common and simple procedure for genomic DNA extraction that can be used on a large scale for different eukaryotic organisms as well as durum wheat cultivars. The objective of this study was to optimize a fast and flexible DNA extraction protocol for high-throughput analysis in durum wheat cultivars giving enough yield and good quality for AFLP mapping from all material. In this study, five different nucleic acid isolation methods were used for extraction of DNA from durum wheat samples with two biological replicates. These techniques are included two different classical approaches with CTAB (Cetyl Trimethyl Ammonium Bromide) and three different commercial kit methods. As a result, high yields of DNA from local durum wheat samples, free of polysaccharide or other contaminants were obtained using classical DNA isolation method with 419,14 ng/µl average concentration and 90,13 ng/µl standard deviation.

Key words: Optimization, Durum wheat, DNA isolation, Drought tolerance.

PRODUCTIVE CAPACITY OF BULGARIAN AND TURKISH FEED BARLEY VARIETIES AND LINES UNDER CONDITIONS OF THE SOUTHEAST BULGARIA

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Abstract

The study was conducted in 2006-2009 in the experimental field of the Institute of Agriculture, Karnobat. The aim is to identify the productive capacity of the varieties and perspective lines feed barley. The results show that the test set promising winter feed barley lines with the highest yields are CRF 47, CRF 292 и CRF 146 в. In study group varieties and lines positively associated with the yield were fertile spikelets, grain weight per ear and the total number of spikelets.

Key words: barley, productivity

SUSTAINABILITY OF BULGARIAN AND TURKISH VARIETIES AND LINES OF WINTER BARLEY TO ABIOTIC STRESS

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Study of the sustainability of Bulgarian and Turkish varieties of winter barley lines to abiotic stress has important practical and theoretical importance. It allows for use in the selection of reliable sources to create barley varieties with high drought resistance and cold resistance. During the period 2008 - 2009 in the field and laboratory conditions was determined cold resistance, drought resistance and water and temperature regime of 43 seed varieties and lines Bulgarian and Turkish selection. It was found that over 50% of the materials have a good and high resistance to cold. The highest coefficient of drought resistance are 9 samples studied. The determination of the behavior of the plants in the crop plants to water and temperature conditions in the dry condition, an idea of the response of the individual materials in the aqueous, and the heat shock and a correlation between temperature and relative humidity. The obtained results allowed a sample to be studied in both directions that may be included in the breeding program of the two institutes.

Key words: barley, cold resistance, drought resistance

BREEDING EVALUATION OF SAME AGRONOMICAL AND BIOLOGICAL TRAITS IN WINTER TWO-ROW BARLEY

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Barley is one of the most important cereals, which is significant, in Bulgaria ranks after wheat and maize. The main selection requirements are directed at creating varieties with high and stable yield and high quality grain. For achieving these tasks, studies with large number of samples in different environments are carried out as well as study of various biological and agricultural characteristics. The application of multivariate methods for processing the results of such experiments and their interpretation allows breeders to plan better and make adequate decisions for their breeding programs. The aim of this study was to assess the grain yield and some agronomical and biological traits of newly created lines and to determine the best lines for future varieties or source germplasm for the winter two-row barley breeding. To achieve this aim a study in the Institute of Agriculture in Karnobat during the period 2011-2013, is carried out. Object of the study are 4 regional varieties and 6 newly created lines two-row winter barley, putted in competitive experience in the block method in 4 repetitions. Grain yield (t/ha), spike length (cm), number spikelet per spike, number grain per spike, grain weight per spike (g), 1000 grains weight (g) were evaluated. Two-factor dispersion analysis, PC and cluster analysis are used. As a result of studies establish significant interaction genotype X environment / years / all traits as most strongly is on grain yield (34.18%) and weight of grain per spike (33.64%), which makes selection process for these traits difficult. Graphical analysis of the principal components provide information about interrelationships between traits and genotypes relation with different traits. KT 2141 line has proven high yield and valuable agricultural traits complex, which makes it appropriate for testing as a variety.

Key words: Barley, Yield, PC, Cluster analysis,

PREDICTION OF SOLVENT RETENTION CAPACITY VALUES BY USING NIR SPECTROSCOPY TECHNIQUE

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ABSTRACT

In recent years, solvent retention capacity (SRC) test has been considered a reliable quality evaluation technique, especially by the soft wheat processing industry. Hence, the objective of this study was to test the potential utilization of NIR spectroscopy technique to predict SRC values quickly in flour samples. Fifty-four wheat flour samples, selected from material of Breeding Department of Central Research Institute for Field Crops (TÜBİTAK 1003 Project No: 113O115) were used. The samples milled by using Pneumatic Laboratory Mill (Bühler MLU-202, Uzwil, Switzerland) were analyzed for SRC with 4 different solvents (water, lactic acid, sodium carbonate and sucrose) according to the AACC 56-11 method. The same flour samples were also used in the NIR study. The flour samples were scanned by using NIR System model 6500 to obtain NIR spectra between 400-2500 nm in every 2 nm. The ISI scan and Win ISI III 161 programs were used to collect the data for spectra and perform the calibrations. The relationship between the results obtained by classical methods and NIR spectra were investigated by applying various mathematical models (1441, 1661, 1881, 2441, 2661, 2881, 3441, 3661, and 3881) and the model which had the highest R^2 value was identified. The SRC results obtained by classical method were in the range of 61.5-100.5%, 51.3-75.8%, 83.5-136.2% and 80.6-157.4% for sodium carbonate, water, sucrose and lactic acid solutions, respectively. The coefficients of determination (R^2) and cross-validation (1-VR) values of the mathematical models obtained from the calibrations were 0.986 and 0.874; 0.721 and 0.402; 0.957 and 0.762; 0.822 and 0.470 for SRC-water, SRC- lactic acid, SRC-sodium carbonate and SRC-sucrose, respectively. It can be concluded that NIR spectroscopy technique can be used reliably to predict solvent retention capacity values in flour samples.

Key Words: Wheat flour, SRC, NIRS, Soft wheat

**ASSESSMENT OF GENETIC DIVERSITY OF RESERVE ENDOSPERM PROTEINS IN SYNTHETIC WHEATS
(2N = 42, BBAuAuDD)**

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Abstract

The objective of this study are seven hexaploid synthetic wheats ($2n = 42$, BBA^uA^uDD), selected in Dobroudja Agricultural Institute, Gen. Toshevo by analogy with the mechanisms of the evolution of *Tr.aestivum* by crosses between tetraploid species (*Tr.turgidum*, $2n = 28$, BBA^uA^u; *Tr.timopheevii*, $2n = 28$, GGA^uA^u) and the diploid ancestor (*Ae.tauschii* cos., $2n = 14$, DD; *Ae.speltooides*, $2n = 14$, SS), following by chromosome doubling in the new hybrids. High- and low molecular weight glutenin composition are identified by SDS-PAGE electrophoresis with and without the addition of 4M urea and the gliadin patterns are identified by A-PAGE method. Genetic diversity in the Glu-D1 locus is larger compared to the Glu-A1 and Glu-B1 loci. This is due to the diploid parent *Ae.tauschii* cos., which in practice has many different alleles influencing the final bakmaking qualities . In four of the synthetic forms is identified a HMW glutenin pair *1Dx1.5 +1 Dy10*, controlling by *Glu-D1ah*, but it is absent in common wheat and binds with very good overall quality of the bread. Significant impact on the technological properties of the flour has alleles, which are inherited from tetraploid parents in Glu-A1 locus, while HMW glutenin fractions of B-genome are numerous, meet less frequently and do not significantly affect the best quality in wheat. Analyzed amphiploids № 531 and № 107 comprise in their HMW subunit configuration 1Ax1, which is associated with high quality. In four of the synthetic lines established 1Ax 1.1 subunit, which is not found in the A genome of common wheat and is an important reserve for the enrichment of the estate on the quality of wheat. The part of a synthetics possess the good quality marker γ -45. In contrast to the slight variations in the low molecular weight glutenins, established a high level of polymorphism of gliadins in the samples synthesized with the participation of *Ae. tauschii* can find significant application in breeding programs to improve the quality of *Tr.aestivum*.

STUDY THE INFLUENCE OF THE CLIMATIC CONDITIONS AND MINERAL NUTRITION TO THE QUALITY INDICIES OF THE WINTER WHEAT VARIETY ENOLA

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Abstract

In the article is studied the influence of the climatic conditions and mineral nutrition by two- field crop rotations monoculture to the quality indices of the winter wheat variety Enola . ANOVA 3 statistical procedure was applied for estimating the influence of the studied factors to the quality indices. Their influence was proved with different level of statistical significance. The optimal variants of mineral nutrition by this experiment are determined using principal component analysis.

GENETIC CONTROL ON DIFFERENT TRAITS OF WHEAT (*TRITICUMAESTIVUM* L.) USING HAYMAN'S PARTIAL DIALLEL CROSSES SYSTEM

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ABSTRACT

Ninebread wheat genotypes were crossed under a partial diallel scheme, in which group 1 was composed of five lines and group two of four lines. The 20 F₁'s and their parents were evaluated in randomized complete block design with three replications at the Field Crop Institute-Agricultural Experimental Station of Setif (Algeria) during the 2011/2012 cropping season. Significant genetic variability was observed for all traits studied. In the diallel analysis, the additive-dominant model was considered to be adequate for biomass per plant and the number of spikes per plant. The components associated with additive effects (D₁, D₂ and D₃) were more relevant than those associated with the effects of dominance (H₁, H₂ and h²) for these traits. Based on the K_D/K_R ratio, we concluded that the dominant alleles are present in greater frequency in the first group of parents, while the opposite is true for the second group. This result was confirmed with the estimation of the symmetry of parents (H₂/4H₁) which revealed an unequal distribution of dominant genes in both group of parents. The increases in the magnitude for biomass per plant and number of spikes per plant are determined by dominant genetic factors. Besides, parents P2 (Acsad₈₉₉), P3 (Acsad₁₁₃₅) and P6 (Mahon-Demias) had the highest number of dominant alleles among the two groups of parent. The highest number of recessive alleles was found in the parents P1 (Acsad₉₀₁) and P9 (Rmada).

Key words: *Triticum aestivum* L., Selection, Partial diallel, Genetic parameters, Heritability.

DIALLEL ANALYSIS FOR SPIKE LENGTH IN WINTER WHEAT

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Abstract

The mode of inheritance and gene effect for spike length of 5 x 5 full diallel crosses of wheat varieties was estimated in F₁ generation. The results indicated significant differences among the parents for general combining ability (GCA) and crosses for specific combining ability (SCA) for spike length. However, highly significant differences for the general (GCA) and specific (SCA) combining ability in the F₁ generation denoted that spike length had resulted from the genes with additive and non-additive, i.e. dominant impact. The absence of interallelic interaction between the genes determining the expression of spike length was concluded from the regression analysis. The regression line intercepts the W_r axis below the origin in F₁ indicating overdominance over an average of all arrays.

Key words: Winter wheat, spike length, diallel, gene effects, combining ability, regression analysis

RGB REFLECTANCE AS A PREDICTION TOOL TO ESTIMATE LEAF CHLOROPHYLL CONTENT OF DURUM WHEAT (*TRITICUM DURUM* DESF.) GENOTYPES UNDER SEMI ARID CONDITIONS.

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Abstract

The present study was led on the experimental site of ITGC (Technical Institute of Field Crops) station of Setif, Algeria during the 2010/2011 cropping year. The objective of this study is to evaluate the efficiency of using leaf RGB reflectance to estimate chlorophyll content. The leaf reflectance at RGB (Red, Green and Blue) and average senescence are measured using the numerical image analyses (NIA) and chlorophyll content (CC) is measured by SPAD instrument. The genotypic effect was shown highly significant for leaf reflectance at RGB, average senescence and chlorophyll content. The reflectance at Red and Blue were significantly correlated with Chlorophyll content ($r = -0.77$, $r = -0.66$; respectively). The results of this study prove the efficiency of using numerical image analysis for estimating leaf reflectance at RGB and the efficiency of using leaf reflectance to estimate chlorophyll content in durum wheat cultivars.

Key words: Durum wheat, leaf reflectance, chlorophyll content, senescence.

**BEHAVIOR GENETIC ANALYSIS FOR SOME YIELD CONTRIBUTING TRAITS IN DURUM WHEAT
(*TRITICUM DURUM* L.) UNDER SEMI ARID CONDITIONS**

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Abstract

Genetic components of variance were estimated in F₁ generation of durum wheat derived from 6 x 6 diallel cross (excluding reciprocals) following Hayman's diallel approach and Mather's concept of D (additive), H (dominance) genetic components of variation. The analysis of variance revealed highly significant differences among parents and F₁ crosses. Genetic components of variation revealed that, both additive (D) and dominance (H) gene effects were significant. However, higher magnitude of dominance genetic components "H₁ and H₂" over "D" for almost of traits advocated that predominance of dominant genes at most of the loci and preponderance of non-additive genetic component were important for governing these traits. This was well supported by the value of $(4DH_1)^{1/2} + F / (4DH_1)^{1/2} - F = 1.075$, which was greater than unity. Positive value of h² evidenced that the direction of dominance was towards parents. The proportion of genes with positive and negative effects (H₂/4H₁) was less than 0.25 indicated unequal distributions of positive and negative alleles among parent cultivars. The Wr/Vr graphs indicated overdominance for thousand kernel weight, while partial dominance was inferred number of grain per spike.

Key Words: *Triticum durum* Desf., Genetic control, Diallel analysis, Yield, quantitative traits.

**BREAD WHEAT (*TRITICUM AESTIVUM* L.) BREEDING RESEARCH IN TRAKYA REGION AND YIELD,
SOME PHYSIOLOGICAL AND AGRICULTURAL TRAITS OF THE DEVELOPED CULTIVARS**

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Abstract

Wheat breeding research began in Trakya Agricultural Research Institute in 1970. Varieties and candidate lines were used in the study developed by crossing and introduction method. Cultivars which were used in this research Pehlivan, Kate A-1, Selimiye, Aldane, Bereket, Gelibolu and Tekirdağ are produced both in Trakya and other region in Turkey. This research was carried out in experimental area of the institute to determine of the yield, some physiological and agricultural traits of the cultivars. This research was established with 15 genotypes in completely randomized blocks experimental design with 4 replications in 2012-2013 growing season. In this research grain yield, days to heading, plant height, thousand kernel weight, test weight, biomass, canopy temperature and chlorophyll content and correlations among these characters were investigated. According to the results it was found significant differences among cultivars in terms of yield, plant height, biomass, chlorophyll content and thousand kernel weight. Low rainfall and high temperatures in May caused yield losses of the genotypes. While mean yield of the genotypes was 571,4 kg/da, the highest yield was determined from BBVD16-2012 and Tekirdağ cultivars. In the study, the highest biomass and chlorophyll content were determined from Tekirdağ and Flamura-85 cultivar respectively, the lowest canopy temperature was measured in Bereket cultivar. The highest thousand kernel weight from Pehlivan and the highest test weight from Selimiye variety were determined. In this research it was determined that highly significant positive correlation between grain yield and biomass. It was determined that a negative correlation between canopy temperature with grain yield and chlorophyll content, a negative relationship is determined between chlorophyll content and biomass.

Key words: Wheat, genotypes, yield, physiological traits

DETERMINATION OF YIELD, STABILITY PARAMETERS AND SOME AGRICULTURAL TRAITS OF THE BARLEY (*HORDEUM VULGARE* L.) GENOTYPES IN TRAKYA REGION

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ABSTRACT

This research was carried out to investigate yield, stability, some agricultural and physiological characters of the some barley genotypes in Trakya Region. This research was established with 20 lines and 5 checks, in completely randomized blocks design with four replications and 3 locations in 2012-2013 growing years. In this research; grain yield, plant height, heading days, biomass, canopy temperature, thousand kernel weight and test weight were investigated. It was found significant differences among genotypes as to investigated characters in this research. The highest yield with 726,5 kg/da was determined at Tekirdağ location. While mean grain yield was 604,8 kg/da, highest grain yield was determined with 690,1 kg/da at Harman cultivar. It was measured that the highest biomass at Harman and Lord cultivars, the lowest canopy temperature at TEA1619-21 line. Earliness is very important trait in Trakya region to grow second crops in same year. TEA1770-11 and TEA1770-16 were early genotypes. According to lodging resistance plant height is considerable traits and short plant height was measured from TEA1765-6, TEA1765-7 and TEA1770-16 lines. The highest thousand kernel weight from TEA1676-3, and test weight from TEA1619-19 lines were measured. It was determined Harman variety and 5 advanced lines with pedigree number is TEA1765 and TEA1619 well adapted to all environmental condition. Sladoran cultivar and two sister line with pedigree number TEA1679 and TEA1619 are well adapted to good environmental condition.

Key words: Barley, genotypes, yield, stability, agricultural traits

STUDY OF SAMPLE COLLECTION NAKED BARLEY UNDER CONDITIONS OF SOUTHEAST BULGARIA

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Abstract

During the period 2011-2013 in the Institute of Agriculture-Karnobat, Bulgaria were studied 184 samples naked barley. The aim of the study is to identify samples with high productive capacity for the needs of breeding of naked barley. In the group of high productivity samples are 55, which yields in the range of 430 to 710 kg/da. With the highest yield is the line 6206S. It were selected donors with high yield and good grain quality.

Key words: naked barley, productivity

THE EFFECTS OF SALINITY AND ULTRAVIOLET RADIATION ON LIPID PROFILE OF WHEAT SEED

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Abstract

Salinity stress and UV radiation are the most adverse factors for plant growth and productivity. In the present study, the combine effects of UV radiation and salt stress on lipid profile including TAG, DAG, STE, MAG and PL was investigated in wheat seeds. A completely randomized factorial design with three replications was used in the experiment. Each replication contains 24 seeds in petri dish. There were two factors that are salinity stress (0 mM, 100 mM, 200 mM, and 300 mM salt solution), and UV radiation (1 hr and 2 hr). Application of UV radiation continued for 7 days using an UV fluorescence light source at a distance of 40 cm to plants for 1 and 2 hr. At the end of experiment, one gram of seed samples were mixed with solubilisation buffer and then homogenized at 5.000 rpm for 2' using a tissue homogenizer. Five hundred microliters of n-hexane-isopropanol 3:2 (v/v) mixtures was added to 1000 μ L of homogenized plant samples in an eppendorf tube. After vortexing vigorously, the tubes were centrifuged at 5.000 x g, +4°C for 5', and the upper phase was used for chromatographic analysis of wheat lipids. HPTLC silica gel 60 plates (20 x 10 cm) were used for separation and identification of lipids. Standard lipid and plant lipid extracts were spotted on the HPTLC plates. The lipids were developed with n-hexane: diethyl ether: formic acid; 80:20:2 (v/v) to 5 cm above the application point. After developing, the entire plate was dipped in charring solution (10% CuSO₄ (w/v) in 8% H₃PO₄ (v/v)), and lipid classes were visualized by incubating the plates at 180°C. HPTL chromatograms were scanned with Epson Perfection V700 Photo scanner at 600 dpi resolutions as 16-bit grayscale TIFF image format and analyzed with TL 120 software. Results were obtained as percentage of individual lipid class in total lipid composition of plant samples. It was observed that percentage of TAG in total lipids decreased in response to UV radiation, while increased in salinity. On the other hand, percentages of HC, FFA, and 1-2 DAG in total lipids increased under UV radiation, while decreased in salinity. Besides, percentage of 1-3 DAG in total lipids decreased in salinity. The percentages of MAG, STR, and PL in total lipids were not significantly affected by UV radiation and drought stress, neither solely nor in combination. Consequently, different lipid classes were observed as a response of applied salinity and UV radiation stress.

Key words: HPTLC, TAG, DAG, FFA, STR, PL

THE EFFECTS OF SALINITY AND ULTRAVIOLET RADIATION ON PROTEIN PROFILE OF WHEAT SEED

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Abstract

UV radiation and salinity are two of the most serious abiotic stress factors in arid and semi-arid climates, which may influence the quality and the yield of crops (Mittler, 2006; Mackerness, 2000). Plant adaptation to stress conditions is associated with significant changes in proteome composition. Since proteins are engaged in cell stress response, proteomics research might significantly contribute to identification of potential relationships between protein content and adaptation of plant to stress (Lee et al., 2007; Zaefyzadeh et al., 2009; Kosova' et al., 2011). The effect of the UV and salt stresses on the protein profile measured in wheat seedlings. A completely randomized factorial design with three replications was used in the experiment. Each replication contains 24 seeds in petri dish. There were two factors that are salinity stress (0 mM, 100 mM, 200 mM, and 300 mM salt solution), and UV radiation (1 hr and 2 hr). Application of UV radiation continued for 7 days using an UV fluorescence light source at a distance of 40 cm to plants for 1 and 2 hr. At the end of experiment, one gram of seed samples were mixed with solubilisation buffer and then homogenized at 5.000 rpm for 2' using a tissue homogenizer. Prior to electrophoresis the plant homogenates were diluted 1:1 with denaturing electrophoresis sample buffer and 20 ul of each mixture was applied in each well. The electrophoresis was carried out in tris-glycine-SDS running buffer (Trizma base 1.515 g, glycine 7.2 g, SDS 0.25 g/500 ml, pH 8.3) at 20 mA/gel constant current for 90' by using 4% stacking and 12% resolving gel (Laemmli, 1970). After electrophoresis proteins were stained with oriole. SDS-PAG electrophoretograms were visualized by BioRad GelDoc XR gel analysis system and analyzed with ImageLab ver. 4.1 software. In wheat seedlings total protein contents were decreased 9%, 33% and 41% at 100, 200 and 300 mM NaCl concentrations as compared with the control, respectively. Parallel to these results, total protein concentration were decreased 7.7% and 12.2% at 1 hr UV and 2 hr, respectively. However, when salinity combine with UV stress, decrease in the total protein concentrations were slow down and total protein concentrations of seeds that are more exposure to UV were higher than seeds only were exposed to salinity (0.3% and 3.9% increase at 100 mM NaCl + 1 hr UV, 100 mM NaCl + 2 hr UV; 32%, 26% decrease at 200 mM NaCl + 1 hr UV, 200 mM NaCl + 2 hr UV; 33%, 29% decrease at 300 mM NaCl + 1 hr UV, 300 mM NaCl + 2 hr UV). The reason for this situation was overexpression of 20, 58 and 61 kDa molecular weight proteins against increasing UV intensity in the presence of salt and concluded that under multiple stresses conditions some adaptive response may bring out to reduce the damage skilled by crops.

Key words: SDS-PAGE, Protein, Hexose, Phosphorus, Spectrophotometer, PSB

CHLOROPHYLL FLUORESCENCE AS A TOOL TO EVALUATE RESPONSE TO SALT STRESS IN DURUM WHEAT (*TRITICUM DURUM*) SPRAY BY *SARAGASSUM VULGARE*

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The aim of this work is to evaluate the effectiveness of Tunisian marine algae *Saragassum vulgare* on Moroccan wheat plants development cultivated under salt stress conditions. The development and the growth of one economic interest plant species, Durum wheat (*Triticum durum* Desf.v. Karim), cultivated under salt stress, was investigated after applying seaweed liquid extract by foliar spray. The group of plant grown in 0g/l of salt solution (NaCl) for irrigation water and not treated with seaweed extract served as control for the experiment. Seaweed liquid extracts (SLE) was used as foliar spray at different concentration (0%, 0.2%, 0.5%, 25% and 50%) and under salt stress conditions (moderated (2g/l) and severe salt stress (4g/l)). The results have shown that salt stress decreases growth of whole plants, leads to a leaf area and chlorophyll content reduction and a high proline accumulation. However, seaweed liquid extracts (25% and 50% *Saragassum*) decreased the salt deficit effect on leaf area of plants subjected to stress conditions and especially under moderate stress. The reduction of salt stress effect by seaweed extract was studied with chlorophyll fluorescence parameters and the decrease of proline accumulation under salt deficit. Analysis of photosystem II (PSII) fluorescence showed that maximum quantum yield Fv/Fm was not significantly affected by NaCl, indicating that PSII was not damaged under salinity. These results suggest that wheat plant has mechanisms of regulation allowing restriction of Na⁺ transport and accumulation in young leaves; these mechanisms were enhanced with the spray foliar extract. In conclusion we can note a seaweed extract importance in salt stress tolerance. Thus, it would be very interesting to study the biochemical and physiological origin of this stress tolerance.

Key words: Chlorophyll fluorescence, *Triticum durum*, salt stress, seaweed liquid extract.

STUDY OF THE MECHANISMS INVOLVED IN THE TOLERANCE OF DURUM WHEAT (*Triticum durum* Desf.) TO DROUGHT TO IMPROVE PRODUCTIVITY

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Abstract

Research and study of adaptation parameters to water deficit is a key work in any attempt to improve the safety and productivity of wheat governed by water deficits areas. The proposed work attempted to explain the adaptive functioning of ten genotypes of durum wheat (*Triticum durum* Desf.) under different water regimes. It attempted to elucidate the relationships and skills offered by the variability of the species cultivated in the process, the morphological remodeling of root and stem parts in drought tolerance and their relationship with productivity. The effect of water deficit on the strength of the meristem part was very variable depending on its intensity, the nature of the genotype and the parameter considered. The process of transmission and viability of tillers were more sensitive to water deficit statement in the different intensities. The results showed that all levels of water deficit adopted (55%, 52%) (ADH1, ADH2) in this study lead to a reduction in the length among all genotypes tested. The results obtained in this study showed that the number of tillers formed and preserved closely depended on the morphological characteristics of the adventitious roots.

Key words: Durum wheat, drought tolerance, productivity.

PERFORMANCE EVALUATION OF AQUACROP MODEL FOR DURUM WHEAT (*TRITICUM DURUM* DESF.) CROP IN SEMI-ARID CONDITIONS IN EASTERN ALGERIA

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This study was conducted on the experimental site of station INRAA in Setif, Algeria. The objective of this study was to adapt and test the ability of the FAO developed AquaCrop model (V 3.0) to simulate durum wheat production under semi-arid conditions in eastern Algeria. The AquaCrop model was evaluated with experimental data collected during three cropping seasons; the field experiments were conducted in Setif, Algeria. Results showed that durum wheat grain yield, Biomass and Harvest index can be simulated with relative accuracy using AquaCrop. Overall, the agreement between simulated and observed wheat grain yield was satisfactory with $r = 0.99$ ($p < 0.05$), RMSE and AAE of 1.86 and 1.77 ton ha⁻¹, respectively. Regarding Final above-ground biomass comparison of simulated to observed values for all growing seasons resulted in an $r = 0.98$ ($p < 0.2$), RMSE and AAE of 3.07 and 2.68 ton ha⁻¹, respectively. In addition, observed and simulated harvest index correlated giving an $r = 0.88$ ($p < 0.31$), RMSE and AAE of 5.75 and 4.70 %, respectively. Overall, the student's t-test showed that the simulated Biomass and Harvest index was not significantly different from the observed values, but the simulated grain yield was significantly different ($p = 0.047$) from the observed grain yield. Therefore, in cases of limited input data and under semi-arid conditions the AquaCrop could be a promising model for estimating crop productivity.

Key words: AquaCrop; Durum wheat; Semi-arid conditions; Grain yield; Algeria.

INVESTIGATION OF THE COLD RESISTANCE OF TWO-ROW WINTER BARLEY CULTIVARS (*HORDEUM VULGARE*, *SSP. DISTIHUM* L.)

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Abstract

The cold resistance of eleven Bulgarian and European varieties two-row winter barley (*Hordeum vulgare*, *ssp. distihum* L.) has been investigated in laboratory and natural field conditions. The laboratory trial has been conducted in Agrarian University - Plovdiv by express methods of Bojhanova and Petrova (2000) for determination of cold resistance based on the comparison of depression of root and shoot development in low temperatures. The accurate field trial from 2011 till 2013 took place on the experimental field of the Institute of agriculture – Karnobat. The differences in percentage of survived plants and the final grain yield in natural climate conditions have been assumed. All investigated cultivars has been clustered in two major groups- “tolerant” and “susceptible”, based on the achieved results. The analogy in cultivars behavior and their arrangement in identical groups in both methods prove the reliability of this express method and his possible use in the early stage of plant breeding process for barley tolerance to low temperatures. The best scoring cultivars with higher cold tolerance has been used in new breeding programs of winter barley.

Key words: malting barley, cold resistance, plant breeding, express laboratory methods

A STUDY OF PRODUCTIVITY ELEMENTS IN SPRING BARLEY THROUGH CORRELATION AND PATH COEFFICIENT ANALYSIS

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Abstract:

The study was conducted in the Institute of Agriculture - Karnobat, during the period 2010-2012. Explored are the connections between some elements of productivity in 45 spring barley varieties by applying correlation and path coefficient analysis. Analyzed are the characteristics productive tillers, spike length, number of grains, number of spikelets, grain weight per spike, 1000 grain weight. Though correlation and path coefficient analysis, it was revealed that among different characters which showed positive significant association with grain yield, are productive tillers, grain weight per spike and 1000 grain weight. Maximum direct contribution to productivity was made by weight per spike, followed by productive tillers. Therefore, these traits can be used as selection criteria to increase plant yield in barley.

Key words: spring barley, yield components, correlation and path coefficient analysis

INFLUENCE OF N MINERAL FERTILIZATION, PREDECESSORS AND PRECIPITATIONS ON TRITICALE (*X TRITICOSECALE* WITTM.) YIELD IN STARA ZAGORA REGION

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Abstract

The aim of present study was to establish the influence of nitrogen mineral fertilization, precipitations and different predecessors on triticale (*x Triticosecale* Wittm.) grain yield grown in Gleic Chromic Luvisols. The survey was conducted in the area the town of Stara Zagora, South Central Bulgaria during the period 2010-2012. The study was carried out with Triticale variety Rozhen. The N fertilization was applied according to the predecessors as follows: after predecessors Winter pea (*Pisum arvense* L.) and Spring pea (*Pisum sativum* L.) – N 0; 40; 80; 120 kg/ha; after predecessors Sunflower (*Helianthus annuus* L.), Wheat (*Triticum aestivum* L.) and Triticale (*x Triticosecale* Wittm.) – N 0; 60; 120; 180 kg/ha. The soil is characterized with slight acid to slight alkaline reaction and with low to moderate humus content. The highest grain yield of triticale was obtained in the wet 2010, a lower in the dry 2011 and the lowest yield - 2012, although that year was characterized as wetter in compare to 2011. The one of the reason could be irregular distribution of rainfall in that year. The nitrogen fertilization increased grain yield of triticale. Legumes predecessors have a positive effect on grain yield of triticale grown without fertilization with 2 % compared to non legume predecessors.

Key words: Triticale, grain yield of triticale, nitrogen fertilization, predecessors.

INVESTIGATION OF THE RELATIONSHIP BETWEEN GRAIN YIELD WITH PHYSIOLOGICAL PARAMETERS IN SOME BREAD WHEAT VARIETIES

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Abstract:

This study was conducted to analyze the relationships between grain yield with physiological parameters in some bread wheat varieties. Ten bread wheat genotypes were grown in randomized complete block design with 3 replications under rainfall conditions in experimental field of GAP International Agricultural Research and Training Center during 2012-2013 growing season. The most high yielding varieties in this study; Pehlivan, Kate A-1, Cemre and Anapo also showed highest spad values, leaf area index, grain filling period and flag leaf ash ratio values. The correlation analysis results of the study showed significant relationships among grain filling rate with leaf area index, between chlorophyll content of milk period with chlorophyll content of heading stage, flowering time, also strong and positive correlation between chlorophyll content of heading stage with flowering time. Between grain yield with NDVI reading in at the prior heading time and flag leaf ash ratio had positive and significant correlation. Because of relationships of physiological parameters with grain yield, this parameters should be investigated as comprehensively to use in breeding programs. The results showed that especially spad values, leaf area index, grain filling period and ash content in flag leaf can be used as a indirect selection criterion at wheat breeding in Southeast Anatolia conditions.

Key words: Bread wheat, physiologic, grain yield

DETERMINATION THE CHANGES IN FATTY ACID COMPOSITIONS OF BREAD WHEAT SAMPLES DUE TO THE GERMINATION OF GRAINS

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Preharvest sprouting in wheat is a very important problem in grain wheat breeding. The aim of this study was to determine the changes in fatty acid compositions of bread wheat samples due to the germination of grains. Fifteen different bread wheat types (Ozcan, Basribey 95, Kasifbey 95, Gonen 98, Ziyabey 98, Meta 2002, Alibey, Menemen, Seri 82, Osmaniye, Genc 88, Genc 99, Dariel, Galil and Sagittorio) were used. In this 2 years-long study, artificially irrigated plot and control plot were established for each wheat type. Control plots were harvested at the harvesting time. Plots to be artificially irrigated, however, were left for irrigation by mini spring irrigation system. These plots were irrigated periodically once at 6 hours during 7 days. At the end of 7th day, wheat in irrigated plots were left to dry and then harvested. Oils from the samples coming from control plots and plots of germinated grains were extracted by Soxhlet extraction. Fatty acid compositions of oils were analyzed by gas chromatography. Average oleic acid content of control samples was found to be 16,93 % where the average oleic acid content of the samples taken from plots of germinated grains was 14.77 %. Average linoleic acid content of control samples and samples from plots of germinated grains were found to be 56.76 and 57.5 %, respectively. In the case of linolenic acid, average linoleic acid contents were found to be 4.07 and 4.33 % for samples from control plots and plots of germinated grains, respectively. Palmitic acid contents of samples from control plots and plots of germinated grains were 17,13 and 17,27 % where the stearic acid percents were found to be 1.08 and 1.06 %, respectively. When the averages of two years-study were considered the most significant change was observed in oleic acid content. Oleic acid was found to decrease in all types of wheat except Seri 82 and Sagittario due to the germination of grains. The highest change in oleic acid was observed in type Genç 99 (from 20.49 % to 14.57 %) followed by Ziyabey (from 20.33 % to 15.12 %) and Menemen 19.76 % to 15.54 %). When the annual averages of linoleic and linolenic acids were taken into consideration, germination of grains was found to increase the amounts of these fatty acids, however, changes in linoleic and linolenic acid contents were not significant as the changes in oleic acid content.

Key words: Grain, Wheat, Germination, Fatty acid, Bread

GRAIN YIELD AND STABILITY OF WINTER MALTING BARLEY (*Hordeum vulgare* L.) LINE AND CULTIVARS

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Abstract:

This study was carried out to determine grain stability of some winter malting barley line and cultivars under Kırşehir, Konya, Ankara, Sivas and Eskişehir provinces of Central Anatolia and Transitional Zones during 2009 and 2010 seasons. The experiment was conducted under randomized complete block design with four replications and 20 advance lines from Central Research Institute for Field Crops' barley breeding program and 5 barley cultivars such as Aydanhanım, Zeynelağa, Tarm-92, Efes-98 and Başgöl were used as genetic material in the trials. General analysis of variance over 9 locations during the two successive seasons showed that genotype by environment interaction for grain yield was statistically significant ($P < 0.05$). Moreover, these nine environments were classified in to three different subgroups as the best, moderate and the lowest locations based on environment index and their stabilities were also bi-plotted. The line 11 was the highest yield level and highly stable in terms of grain yield and it was especially adapted to Kırşehir and Konya locations together with Aydanhanım cultivar and Line 18 in 2009 season. In addition to these, Lines 23, 1, 2 and 7 and cultivar Zeynelaga were also especially adapted to the best and moderate environments. In general, cultivar Zeynelaga and Lines 23 and 2 were determined as the most stable and the high yielding genotypes while Line 1 was especially adapted to the highest yielding environments of Eskişehir during 2009 and 2010 seasons and also Ankara location of 2010 season.

Key words: malting barley cultivars, grain yield, stability, Central Anatolia and Transitional Zones

GRAIN YIELD AND STABILITY OF WINTER FEED BARLEY (*Hordeum vulgare* L.) LINE AND CULTIVARS

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Abstract:

This study was carried out to determine grain stability of some winter feed barley line and cultivars under Kırşehir, Konya, Ankara, Sivas and Eskişehir provinces of Central Anatolia and Transitional Zones during 2009 and 2010 seasons. The experiment was conducted under randomized complete block design with four replications and 20 advance lines from Central Research Institute for Field Crops' barley breeding program and 4 barley cultivars such Tokak 157/37, TARM 92, Bülbül 89 and Çetin 2000 as were used as genetic material in the trials. General analysis of variance over 12 locations during the two successive seasons showed that genotype by environment interaction for grain yield was statistically significant ($P < 0.05$). Line 13 with 4,9 ton grain yield per ha was the high yielding genotype and was followed by Line 7 with 4.6 ton yield per ha and their yield was statistically significant from the other genotypes used in the trails. Out of 4 checks in the trial, the highest yielding barley cultivar was TARM 92 with 4,4 ton grain yield per ha. The stabilities of all genotypes over 12 locations were also bi-plotted. The line 13 was the highest grain yield level and it was followed by Lines 7, 19 and 16 respectively. Among the barley cultivars, TARM 92 and Bülbül 89 were the most stable cultivars with reasonable grain yield. In addition to these, Line 13 performed well under the best yielding environments.

Key words: feed barley cultivars, grain yield, stability, Central Anatolia and Transitional Zones

GENETIC CERTIFICATION - THE IMPORTANT CHARACTERISTIC OF WHEAT

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Abstract:

Last years are carried out in the Azerbaijan scientific research institute of Agriculture extensive genetic researches for the purpose of realization of genetic certification of common and durum varieties of wheat, making a gene pool of the Azerbaijan republic. In experiments the zoned and age-old varieties of both kinds of local selection, and also in republic the genotypes representing economic valuable importance are mainly involved. Genetic certification basically is spent to the morphological traits defining a botanical version of a kind. By present time the genetic passport of varieties is made on system of genes R, Rg, Hg, B b Hd, Ppd, Vrn, W, D and Ne.

DETERMINATION OF YIELD AND YIELD COMPONENTS OF SPRING BARLEY GENOTYPES USING BILOT ANALYSES

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Abstract:

Spring barley is the most important crop in Southeast Anatolia Region of Turkey. The yield potential and quality of spring barley are the most important under limiting factors (heat stress) for yield production in barley areas both in Turkey and also Middle East countries. Therefore, higher yield varieties will be demanded often in the next both in Turkey and also in Middle East. The research is covered the spring type of barley developed in Spring Barley Breeding Project conducted by International Center for Agricultural Research in the Dry Areas. The observation values were evaluated in spring type of barley in conducted yield trials in dry conditions at Diyarbakır in 2011-2012 season. The yield and yield components were tested in yield trials with 6 rows 2 replications as randomized completely block design. Grain yield, heading time, plant height, hectoliter weight, thousand grain weight, protein content, starch, seed humidity and lodging were measured. Mean values of the genotypes changed between 110 - 117 day for heading time; 100 - 125 cm for plant height; 66.3- 72.0 kg/hl for test weight; 32.6 - 42.9 g for thousand grain weight; 13.9 – 19.1% for grain protein content; 66.7 – 69.8% for starch value; 8.2 – 8.5% for seed humidity and 422.8 – 785.0 kg/ha⁻¹ for grain yield. Some genotypes showed higher performance than controls both for grain yield and yield component and promising candidate genotypes were selected to send regional yield trials. Based on yield trial G8, G9, G11, G12 and G16 showed higher performance in terms of grain yield than other varieties. On the other hand, some special genotypes were the best in terms of special parameters. In the evaluation using the Biplot graph, heading time, hectoliter weight, grain yield and seed humidity were involved in the group I, while starch in the group II, thousand kernel weight in the group III, plant height and lodging in the group IV and protein content were involved in the group V. According to the results of research, genotypes showing appropriate combination were selected for yield trials in terms of examined traits.

Key words: Spring Barley, Yield, Yield Components, Biplot Analyses, Southeast Anatolia Region,

QUALITY BREEDING OF DURUM WHEAT LINES BY EMPLOYING MOLECULAR MARKER SYSTEMS

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Abstract:

Durum wheat has been imported to Turkey in recent years due to the shortage in supply of proper quality wheat required by the pasta industry. Therefore, pasta processing quality of Turkish durum wheat cultivars must be improved using modern breeding methods without adversely affecting their yields. For durum wheat, quality means its suitability for pasta processing, that is pastamaking quality. The quality characteristics of durum wheat products are strongly correlated with physical and chemical properties of wheat. Durum wheat pastamaking quality is influenced by kernel vitreousness, hectoliter weight, protein content and quality (proper gluten strength), milling properties (semolina yield and ash content), yellow pigment content, and lipoxygenase (LOX), peroxidase (POD) and polyphenol oxidase (PPO) activities. Of those quality-associated parameters, protein content and quality, yellow-colored pigment content and activities of oxidative enzymes that adversely affect bright yellow color of pasta products are of vital importance in pasta quality as they overwhelmingly determine the so-called *al dente* cooking characteristics and bright yellow color of pasta products. Bright yellow color is a desired property in pasta products. The color of pasta is affected by grain pigment content, oxidative enzymes and pasta processing conditions. However, pigments can be easily oxidized leading to loss of color or bleaching in pasta products. Of the oxidative enzymes, LOX is the most affective one on oxidative bleaching of yellow pigments in durum wheat products. Thus, wheat cultivars that are high in yellow pigments but low in oxidative enzymes should be preferred for the production of pasta with bright yellow color. The aim of this study was to reduce the lipoxygenase (LOX) activities of three advanced durum wheat lines that were previously improved for their protein quality. For this purpose, three advanced lines with different parents (TMB1, TMB2 and TMB3) were used. Also, Gediz-75 wheat with low LOX enzyme activity was used as the gene source. In F1 and BC1 (back cross) generations, backcrossed plants carrying the targeted gene region were selected by marker assisted selection (MAS) method. MAS method was employed in combination with embryo culture and rapid plant growth in a controlled greenhouse conditions in order to shorten the duration of the transition between generations in backcross breeding. Each of BC plants will be backcrossed four times to the recurrent parent and backcrossed plants carrying the targeted OTLs in all of the generations will be selected by MAS. As a result, the study will be completed in three years instead of six years required in a classical backcross breeding study, meaning about 50% time saving, leading to the development of high-quality candidate varieties. Detailed quality analyses will be performed at the end of the study and efficiencies of the transferred gene regions will be assessed.

Key words: Durum Wheat, *Triticum durum*, Pasta Quality, LOX

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MAIN TRENDS IN OAT (*AVENA SATIVA L.*) BREEDING AT THE INSTITUTE OF AGRICULTURE IN KARNOBAT, BULGARIA

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Abstract

In the 1980s, under the influence of the worldwide breeding achievements, the Institute of Agriculture in Karnobat launched its program for breeding new oat varieties. 80 % of the breeding program included winter oats, and 20 % - spring oats. The goal of these two main directions has been to create genotypes combining high and stable productive potential, high quality grain, complex resistance to stressful effects from abiotic and biotic environmental factors. To realize the set goals it is necessary to make specialized collections, to create suitable source material; to adapt and apply new methods and approaches to assess the breeding material; to clarify some genetic and biological issues of theoretical and applied nature, which support the breeding process. The priority areas in the breeding programs focus on overcoming low winter resistance, drought tolerance and productivity; reduction of the vegetation period, high stem and poor lodging resistance; increased grain quality, and others. Conventional, biotechnological, physiological and biochemical methods were used to evaluate the created genotypes.

DETERMINATION OF HERITABILITY AND PHENOTYPIC AND GENETIC CORRELATIONS OF GRAIN YIELD AND SOME MORPHOLOGIC TRAITS OF BARLEY VARIETIES CULTIVATED UNDER CENTRAL ANATOLIA AND TRANSITIONAL ZONES

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Abstract:

This study was carried out to determine genetic variation for grain yield, plant height, spike height, spike number per m² biologic yield and harvest index of 20 barley cultivars cultivated under Ankara , Kırşehir and Sivas locations of Central Anatolia and Transitional Zones during 2007-2008 seasons. The experiment conducted under randomized complete block design with three replications and narrow sense heritability, phenotypic and genotypic variation coefficients and phenotypic and genotypic correlations were estimated for grain yield and morphologic traits based on variance and covariance matrix. The highest heritability was estimated for plant height with 74,75 % while the lowest one for biologic yield with 55.9 % . A new index value, total value, was constructed based on variance and covariance matrix and narrow sense heritability, then it was compared to analysis of variance for grain yield and these two analysis of variance showed that there was a significant difference among barley cultivars (P<0.05). LSD test results indicated that 15 barley cultivars was in the top high yielding group while the number was limited to 11 based on index analysis of variance for grain yield. Zeynelağa, Çumra 2001, Karatay 94 and Tarm 92 varieties was determined as highest value while they were the lowest value in terms of total value. Additionally, yield and total values of 20 barley cultivars under Esenboğa, Çiçekdağı and Ulaş locations were bi-plotted to demonstrate their stabilities. In terms of grain yield, Tarm 92 was high yielding and stable cultivar based on bi-plot graph while Başgül, Orza 96 and Yesevi 93 cultivars were high yielding but not stable and they were especially adapted to Sivas location. However, bi-plot analysis of total values showed that Aydanhanım, Orza 96 and Başgül cultivars had the highest total value especially at Kırşehir and Sivas locations and Efes 98, Kalaycı and Tokak 157/37 cultivars were determined as stable cultivars for total values , too.

Key words: barley cultivars, narrow sense heritability, genotypic and phenotypic correlations, index value, stability

RELATIONSHIP BETWEEN THE YIELD AND QUALITY OF GRAIN IN PERSPECTIVE LINES WINTERING OATS

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Abstract

The study was conducted between 2011 - 2013 in the educational and experimental base of the Department of Plant Production at the Agricultural University - Plovdiv. The observations were made in the field trial, which is set in a block method in three repetitions with size of the plots 10,5 m². We studied eight new wintering oat breeding lines from Bulgaria and Macedonia, compared with two wintering variety standards for production and quality in Bulgaria - Dunav 1 and Resor 1. Been established relationship between yield and grain quality in wintering oat genotypes for three years.

GROWTH AND DEVELOPMENT OF SPRING OATS CULTIVARS AND CORRELATIVE RELATIONSHIP WITH BASIC AGROMETEOROLOGICAL PARAMETERS

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Abstract

The study was conducted between 2006-2010 years in educational and experimental base of the Agricultural University - Plovdiv. The observations were made in the field trial, which is set by the method of fractional plots in four replications. Considered entry into the main phenological phases of three Bulgarian variety (Obrazcov chiflik 4, Mina, Prista 2), one American (HiFi) and one Serbian (Novosadski naked). There have been specific correlation between the length of the period between the phases and parameters of the main meteorological factors - average daily temperatures in the period and amount of precipitation.

EFFECT OF DROUGHT ON THE YIELD COMPONENTS OF COMMON WINTER WHEAT CULTIVARS

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Abstract

Drought is a typical frequent phenomenon for Bulgaria occurring with variable severity every 5 or 6 years. Since the end of the 20th century a tendency has been observed toward lower amount of rainfalls and warmer weather during the vegetation period. Therefore special attention is to be paid to the tolerance of the cultivars and their ability to preserve to a high degree their high productivity under drought as well. This investigation was carried out under greenhouse construction at the Laboratory Complex of Dobrudzha Agricultural Institute – General Toshevo (DAI). Fifteen common winter wheat cultivars were tested for three years in two variants – under conditions of severe and long-lasting drought and under regular watering. The plants from the drought variant were watered only once after planting and were grown under progressive drought till harvest. The check variant was watered at planting and during the vegetation soil moisture close to the optimal was maintained. The traits related to productivity were investigated: date to heading, stem height, number of spikes per row, number of grains per spike, 1000 kernel weight, weight of grain per spike. Using principal component analysis (PCA), the behavior of the cultivars under long-lasting drought, their productivity and the components determining it were studied. The yield from a row in the watered variant was determined mostly by the number of spikes per row, the grain size and the productivity of the spike. Under drought, the productivity of the spike became most important for yield, followed by number of spikes, grain size and number of grains per spike. The highest intensity of stress created almost linear relation between weight of grain per spike and weight of grain per row. Cultivars Ludogorie, Progress, Karat, Kristy, Antitsa and Galateya were referred to the category of the drought-resistant standard Yantar. Under watering, these cultivars gave yields exceeding the average value of the investigated group, cultivars Kristy and Ludogorie being with the highest production potential.

Key words: Common winter wheat, Drought, Productivity, Components of productivity

OBTAINING OF INTERSPECIFIC HYBRIDS BETWEEN DURUM WHEAT (2N=28) AND TRITICALE (2N=42) AND MOLECULAR EVIDENCE OF ALIEN INTROGRESSIONS IN ADVANCED BACKCROSS LINE

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Abstract

The hexaploid triticale is an amphidiploid obtained from the cross between durum wheat (2n=28) and rye (2n=14). It is characterized with high protein content, resistance to biotic- (powdery mildew and rust) and abiotic (cold and drought) stress factors. The hybridization between durum wheat and triticale is complicated and is rarely applied in durum wheat breeding improvement. Here, we report the results of long-standing experiments for obtaining of interspecific hybrids between Bulgarian durum wheat genotypes as mother plants and triticale (2n=42) lines from CIMMYT – Mexico. Although the crossability between two species was relatively high, hybrid plants were obtained only by means of embryo rescue method, due to endosperm degeneration. All regenerated F₁ hybrids were with low fertility and produced seeds with reduced endosperm and low viability. The F₁ hybrids were backcrossed to the recurrent durum wheat genotypes. Strict and repeated selection of plants with durum wheat phenotype was performed in the segregation populations. Thirty-three SSRs mapped on the A, B and D genomes and chromosomes of common wheat were used for molecular characterization of one of the obtained advanced backcross lines (*Tr. durum* (D-7192) x *Triticale*)F₁ x *Tr. durum* (Vazhod) BC₁ F₁ x *Tr. durum* BC₂F₁. The SSR markers showed introgression of 10 chromatin segments from triticale in the studied backcross line in loci on chromosomes of several groups - 1 (*Xwmc 24-1AS*, *Xgwm 136-1AS*, *Xgwm 268-1BL*), 2 (*Xgwm 95-2AS*), 3 (*Xgwm 5-3AS*), 4 (*Xgwm 165-4AS*, *Xgwm 165-4BL*) and 7 (*Xwmc 9-7AL*, *Xwmc 83-7AS* и *Xgwm 400-7BS*). In addition to introgressions, new recombinant alleles, which did not correspond correctly to the alleles of both parents, were detected in loci on chromosomes of 7 group (*Xgwm 282-7AL*, *Xwmc 83-7AS*, *Xgwm 46-7BS*, *Xgwm400-7BS*) and in loci on chromosomes 2AL (*Xgwm 312*), 5AL (*Xwmc 327*) and 6BL (*Xgwm644*). The phenotypic evaluation of the advanced durum wheat backcross lines, obtained by interspecific hybridization with triticale for agronomical important traits is in progress.

Key words: durum wheat, triticale, interspecific hybridization, embryo rescue method, advanced backcross lines, SSR markers, introgressions

STUDY OF SOME YIELD RELATED TRAITS IN WINTER FEED BARLEY LINES

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ABSTRACT

The study was conducted in the period 2006-2008 in the experimental field of the Institute of Agriculture, Karnobat. The aim of this study was to assess the of yield related traits of 16 lines of winter feed barley (8 from var. *pallidum* and 8 from var. *parallelum*). According to variance analyses, spike length was less affected by the weather conditions and was determined mainly by the genotype. Plant height, number of fertile tillers per plant, grain number per a spike, sterile spikelet number per a spike, grain weight per a plant and 1000 grains weight were more affected by the weather conditions of a particular year. Hence, these traits could not be considered as suitable selection criteria for the development of high yielding feed barley genotypes. Differences were observed among the var. *pallidum* and var. *parallelum* regarding the traits studied.

Key words: Barley, Yield related traits, Var. *pallidum*, Var. *parallelum*

DETERMINATION OF THE BOTANICAL COMPOSITION OF A PASTURE IN THE DERIK DISTRICT OF MARDIN

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Abstract

This study was conducted to determine botanical composition of a pasture in Derik-Bingöl. In the study, 53 plant species from 38 different genus of 16 plant families were detected. Results of the study showed that 53.25% of the pasture was vegetated. Percentages of grasses, legumes and other family plants in the total plant cover were 4.00%, 23.22% and 72.78%, respectively. The most widespread plants encountered in the pasture were: *Trifolium campestre* (%16.95), *Helianthemum ledifolium* (%13.75), *Bromus* sp. (%9.83), *Achillea aleppica* (%8.48) and *Anthemis wiedemanniana* (%7.13). The average plant height was determined to be 7.55 cm.

Key words: Pasture, Vegetation, Botanical Composition, Bingöl

FORAGE YIELD AND QUALITY DETERMINATION OF A PASTURE IN THE DERIK DISTRICT OF MARDIN

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Abstract

This study was conducted to compare herbage yield and herbage quality of a pasture in Derik-Mardin. In the study, the average green herbage yield and hay herbage yield were determined to be 185.69 kg/da and 57.32 kg/da respectively. Percentages of grasses, legumes and other family plants in the botanical composition were 0.61%, 4.78% and 13.88% respectively. Quality score of the pasture was determined to be 2.37 and pasture condition class was found to be "poor". Grazing capacity of the pasture was found to be 1.53AU. Average crude protein, crude protein yield, acid detergent fiber (ADF), neutral detergent fiber (NDF), digestible dry matter (DDM), dry matter intake (DMI), relative feed value (RFV), phosphor (P), potassium (K), calcium (Ca) and magnesium (Mg) values of the hay herbage were respectively determined to be as follows: 16.62%, 31.20 kg/da, 37.84%, 47.14%, 59.42%, 2.56%, 118.26, 0.26%, 1.87%, 1.59% and 0.36%.

Key words: Pasture, Herbage Yield, Herbage Quality, Bingöl

EFFECT OF COWPEA (*Vigna unguiculata* (L.) Walp.) SOWING TIMES APPLICATIONS ON THE YIELD AND YIELD COMPONENTS

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ABSTRACT

In this research, it was aimed to determine the most suitable sowing time for cowpea in Eastern Turkey. Two cowpea genotypes (Oba and Evci) were sown at three different sowing times (15 April, 30 April and 15 May). The trial was conducted in the experimental fields of Agricultural Faculty of Yuzuncu Yil University by using randomized split block design with the three replications in 2008 and 2009 years. Experiment was established genotypes as main plots and sowing times treatments as split plots. In the study were investigated the effect of sowing time on the plant height, numbers of branches, numbers of pod per plant and numbers of seed per plant, numbers of seed per pod, seed yield, harvest index, biological yield and 100 seed weight. While the highest mean seed yield was obtained from 30 April sowing with 1163 kg ha⁻¹, the lowest seed yield per area was obtained from 15 May with 1088 kg ha⁻¹. The results of the study indicated that sowing time (30 April) application increased significantly the seed yield. Oba population gave higher seed yield than Evci population.

Key words: Cowpea, Sowing Time, Genotype, Yield.

METABOLIC PROFILE OF HUNGARIAN VETCH AT DIFFERENT P LEVELS WITH OR WITHOUT BACILLUS MEGATERIUM INOCULATION

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Phosphorus (P) is the most limiting macronutrient required by crops in large amounts (Silber et al., 2002). The unique source of the phosphorus for crops is soil, and plants require sufficient P optimal crop yield (Grant et al., 2001). However, the concentration of crop available soil Pi is not adequate for growing crop tissues (Raghothama 1999). Applications of mineral or animal P fertilizers are the most common and fastest way to ensure P availability for crops (Adesmoye and Kloepper, 2009). Additionally, repeated applications of manure at P rates that exceed crop requirements will increase soil test P levels and may increase the eutrophication of waters (Mullins 2009). The establishing a new effective fertilization strategy based on providing adequate P for crops while reducing the harmful effects of fertilization on environment is essential. At this point soil microorganisms gain importance for sustaining crop production because of their role in P mineralization. The use of PSB with or without other P fertilizers, increases plant available Pi concentration and reduce P fertilizer application up to 50% with any significant decrease of crop yield. This study was carried out to evaluate the metabolic effects of *Bacillus megaterium* M-3 inoculation (10^8 CFU ml⁻¹) with or without two doses of poultry manure (0, 3 t ha⁻¹) and three doses of phosphorus fertilizer (0, 50, 100 kg P₂O₅ ha⁻¹) on the concentrations of glucose, total protein, and total phosphorus in Hungarian vetch. Plant samples were grinded and homogenized by using a tissue homogenizer. This homogenate used for the spectrophotometric analysis of metabolic parameters in vetch samples. Subsequently, all data were analyzed with ANOVA to evaluate the effects of different type of P applications on the metabolic parameters. The maximum P concentration was observed in BP1M (662.00±15.19 µg P/g dw), and the minimum P concentrations were observed at high P levels combine both with or without bacterial inoculation; BP2M, P2M, BP2, and P2 (558.00±8.01, 573.90±7.04, 562.93±13.29, and 584.10±8.90 µg P/g dw, respectively). On the other hand, the maximum protein concentrations were observed in BP1M, P1M, and BP1 (9.86±0.20, 9.70±0.35, and 9.70±0.35 mg TP/g dw, respectively), and the minimum protein concentrations were observed at high P levels combine both with or without bacterial inoculation; BP2M, P2M, P2, and BP2 (8.25±0.11, 8.38±0.25, 8.46±0.17 and 8.48±0.15 mg TP/g dw, respectively). Besides, the minimum Glc concentrations were observed in BP1M, P1M, and BP1 (1.80±0.07, 1.90±0.07, and 1.93±0.07 mg Glc/g dw, respectively), and the maximum Glc concentrations were observed at higher P levels combine both with or without bacterial inoculation; BP2M, P2M, BP2, and P2 (2.41±0.10, 2.40±0.07, 2.34±0.08, and 2.26±0.11 mg Glc/g dw, respectively). Due to significantly improvement in the metabolic parameters without showing any negative effect, BP1M (~80 kg ha⁻¹ P with 10^8 CFU ml⁻¹ PSB) was considered optimum dose or combination for Hungarian vetch.

Key words: Protein, Hexose, Phosphorus, Spectrophotometer, PSB

LIPID PROFILE OF HUNGARIAN VETCH AT DIFFERENT P LEVELS WITH OR WITHOUT BACILLUS MEGATERIUM INOCULATION

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Phosphorus (P) is a major mineral nutrient for plants and required in many compounds in cells and organelles (Silber et al., 2002; Manitoba 2013). P plays significance role by contributing directly to metabolic pathways (carbohydrate metabolism), by creating intermediate substance required in metabolic pathways (protein, lipid and nucleic acid metabolism) (Functions of phosphorus in plants) or involved in the control of the many enzymatic reactions which regulate different metabolic processes, and crop growth. Applications of chemical P fertilizers and manures into soils are to promote plant growth, and increase crop yields (Mullins 2009). On the other hand, there are known problems such as increasing prices and environmental pollution related to chemical phosphorus fertilizer. Thus, alternative and environmental friendly phosphorus resources are required. This study was carried out to evaluate the metabolic effects of *Bacillus megaterium* M-3 inoculation (10^8 CFU ml^{-1}) with or without two doses of poultry manure (0, 3 t ha^{-1}) and three doses of phosphorus fertilizer (0, 50, 100 kg P_2O_5 ha^{-1}) on the lipid profile and triglyceride concentration in Hungarian vetch. Plant samples were grinded after harvest and sieved through a 2 mm sieve. Then, one gram of plant samples were mixed with solubilisation buffer and homogenized by using a tissue homogenizer. This homogenate used for the analysis of lipid profiles. HPTLC silica gel 60 plates (20 x 10 cm) were used for separation and identification of lipid classes, and colorimetric GPO assay was performed to determine TAG concentration of vetch samples. Subsequently, all data were analyzed with ANOVA to evaluate the effects of different type of P applications on the lipid parameters. The highest TG concentrations were observed in BP₁M, BP₁, and P₁M (1.16 ± 0.07 , 1.15 ± 0.06 , and 1.12 ± 0.04 mg TG/g dw, respectively) while the lowest was at the highest P levels combine with bacterial inoculation (BP₂M, 0.80 ± 0.05 mg TG/g dw) ($p < 0.05$). Besides, the highest DAG and PL and the lowest FFA and STR rates in total lipids were determined in BP₁M. On the other hand the highest FFA rate in total lipids were determined in BP₂M. Likewise, the lowest DAG rate in total lipids was determined in BP₂M, BP₂ and the lowest PL rate in total lipids was determined in BP₂M, P₂M, BP₂, and P₂. The changes in TG concentrations and lipid profiles were indicated that proper P supplementation increase lipid biosynthesis and fatty acid incorporation to DAG and TG, and decrease PL degradation. On this basis, BP₁M (~ 80 kg ha^{-1} P with 10^8 CFU ml^{-1} PSB) was considered optimum dose or combination in terms of lipid metabolism for Hungarian vetch.

Key words: HPTLC, TAG, DAG, FFA, STR, PL

COMPARISON OF YIELDS AND QUALITIES OF TWO DIFFERENT “PROTECTED AND NON-PROTECTED” NATURAL AREAS

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Abstract

This research was conducted to compare yield and quality of two different “protected and non-protected” areas in the central district of Bingöl. In the protected area; green herbage yield was 781.28 kg/da and hay herbage yield was 203.70 kg/da. Percentages of grasses, legumes and other family plants in the total plant weight were 38.33, 31.94 and 29.73, respectively. Pasture’s quality score was determined to be 4.34 and condition class was good. Grazing capacity of the pasture was determined to be 5.43 AU/ha and required pasture area for 1 AU was calculated to be 18.40 da. Other important ratios calculated for protected area are the following; Crude protein ratio: 19.69%, Crude protein yield: 30.45 kg/da, ADF: 29.48%, NDF: 43.31%, DDM: 65.93%, DMI: 2.77%, RFV: 141.93, Phosphorus: 0.32%, Potassium: 2.77%, Calcium: 1.48% and Magnesium: 0.28%. In the non-protected area; green herbage yield was 288.68 kg/da and hay herbage yield was 106.85 kg/da. Percentages of grasses, legumes and other family plants in the total plant weight were 26.53, 23.65 and 49.80, respectively.. Pasture’s quality score was determined to be 3.39 and condition class was poor. Grazing capacity of the pasture was determined to be 2.84 AU/ha and required pasture area for 1 AU was calculated to be 35.10 da. Other important ratios calculated for non-protected area are the following; Crude protein ratio: 15.40%, Crude protein yield: 21.18 kg/da, ADF: 37.76%, NDF: 50.86%, DDM: 59.48%, DMI: 2.40%, RFV: 111.85, Phosphorus: 0.28%, Potassium: 2.04%, Calcium: 1.17% and Magnesium: 0.25%.

Key words: Pasture, Herbage Yield, Herbage Quality, Bingöl

RESEARCH ON THE YIELD HERBAGE AND GRAZING CAPACITY OF A RANGE IN ÇIÇEKYAYLA VILLAGE, CENTRAL DISTRICT BİNGÖL

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Abstract

This study was conducted to compare of rangeland vegetation in Çiçekyayla Village, Center-Bingöl, as well as herbage yield and grazing capacity. In the study, the mean green herbage yield and hay herbage yield were determined 178.14 kg/da and 46.49 kg/da. Percent contributions of grasses, legumes and other family plants of the hay yield were 29.61%, 4.08% and 66.31% respectively. The mean quality scores of the pastures it was determined 2.59 and pasture condition class found "poor". Grazing capacity of the pasture found 1.24 BBHB. The mean crude protein and crude protein yield of the hay herbage yield were determined 16.08% and 7.33 kg/da.

Key words: Pasture, Herbage Yield, Grazing Capacity, Bingöl

THE EFFECTS OF DIFFERENT HARVEST TIMES AND SILAGE ADDITIVE MATERIALS ON YIELD AND QUALITY OF SILAGE GROWN AS DOUBLE CROP

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Abstract

This research was carried out to investigate the effect of different harvest times and additive material on silage yield and quality for silage maize cultivation in the Çanakkale conditions. In this study, the maize samples, which are purposes of the silage production, were harvested at flowering, milky and dough stages. As the additive materials were used the barley folded and bacterial solution. Barley folded were used with the ratio 5%, 10% and 15%, while bacterial solution was applied 40 ppm, 80 ppm and 120 ppm per tons with three replicates. The highest green herbage and dry matter yield were obtained from the harvest in the time of dough stage. In the dough stage which has the highest dry matter yield, the highest quality values were obtained from added the % 15 barley folded silage samples. It was determined that silage quality improves when the 2 ppm bacterial solution added.

Key words: Maize, silage, bacteria, barley grain.

**EFFECT OF DIFFERENT PHOSPHORUS DOSES FOR FORAGES YIELDS AND QUALITY OF ALFALFA
(*Medicago sativa* L.) UNDER ÇUKUROVA CONDITIONS.**

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Abstract

This study was conducted to determine of different phosphorus doses (0, 5,10,15 and 20 kg da⁻¹) on forages yields and quality from alfalfa (Cultivar Nimet) under Çukurova conditions. Field trial was established at the Eastern Mediterranean Agricultural Institute according to randomized split blocks design with four replications in 2011-2013. According to results of three years green herbal yields of alfalfa ranged from 8584.6 to 8025.5 kg da⁻¹ hay yields ranged from 2137.6 to 2014 kg da⁻¹. On the other hand, according to quality analysis of three years, ADF, NDF, Crude Protein and Relative Feed Value was determined and these values ranged from 31.92% to 27.56%, 41.94% to 34.78%, 19.63% to 17.74% and 184.2 to 142.1 respectively.

Key Words: Alfalfa, Phosphorus Doses, Forages Yields, Quality.

FORAGE YIELD PERFORMANCE OF SOME FORAG PEA (*Pisum sativum spp. arvense* L.) GENOTYPES IN KIZILTEPE PLAIN CONDITIONS AND ASSESMENTS WITH GGE BIPLLOT ANALYSES

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Abstract:

This study was conducted to determine fresh forage yield performance and its affecting components in some forage pea (*Pisum sativum spp. arvense* L.) genotypes under ecological conditions of Kızıltepe Plain, Mardin, Turkey. Field trials were performed during 2007-08 and 2009-2010 growing seasons with winter sowings. Experiments were arranged according to randomized blocks design with three replications. According to the averages of the combined two years; the investigated traits had ranges as follows: days to 50% flowering – 147.5-162.5 days; natural plant height – 45.58-72.75 cm; main stem height – 52.52-100.42 cm; main stem numbers per plant – 1.28-1.66 stems plant⁻¹; main stem thickness – 2.91-3.70 mm; fresh forage yield – 1043-2383 kg da⁻¹ and dry matter yield – 252.5-589.1 kg da⁻¹. In conclusion; results of the study showed that 88P00-1-4-9-661 and P101 lines and Kirazlı cultivar respectively were found as the most productive genotypes in terms of both fresh forage yield and dry matter yield in Kızıltepe Plain ecological conditions. Also; GGE Biplot analyses showed that the two growing season were found different each other, when evaluated for all of the investigated traits, and the investigated traits made up two main groups.

Key words Forage Pea (*Pisum sativum spp. arvense* L.); Fresh Forage Yield; Dry Matter Yield; Kızıltepe Plain; Genotype x Year Interaction; GGE Biplot Analyses

RESPONSE OF ORCHARDGRASS (*DACTYLIS GLOMERATA* L.) ECOTYPES IN MOROCCO

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Abstract:

In Morocco, there are about 400 species of Fabaceae and 300 species of Poaceae. Poaceae is a family, among those of the vegetable kingdom, has received considerable attention, not only by the number of species, 9000, but its ubiquity, its distribution and its human, historical as economic. Grasses provide the necessary elements for food, either directly through their grain, their sugar varieties or indirectly by forage species. Under the increasing climate change and global warming, Orchardgrass is one of the perennial grasses used to reduce inputs and erosion, improve soil fertility. Hispanica is a dormant Moroccan variety of orchardgrass, characterized by its capacity to survive the summer drought but Medly is a summer active variety. Summer dormancy, defined as an absence of growth in the summer despite irrigation, is a very effective adaptation to drought which has been observed in cocksfoot. Nevertheless, summer dormancy in cocksfoot is associated with low vegetative productivity. In our study we search the response of the progeny generated between *Dactylis glomerata ssp hispanica* and *Dactylis glomerata ssp glomerata* under Mediterranean climate, the phenotypic characteristics were evaluated in hybrid plants. This multidisciplinary work has evaluated the impact of the Mediterranean climate on orchardgrass progeny and suggestions regarding needed improvements and future research directions are provided based on the current field of available bibliography.

Key words: perennial grasses, orchardgrass, hybrids, summer dormancy

PATH COEFFICIENT AND CORRELATION ANALYSIS BETWEEN SEED YIELD AND ITS AFFECTING COMPONENTS IN COMMON VETCH (*Vicia sativa* L.)

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Abstract:

The study was held to evaluate simple correlation coefficients between seed yield and its affecting seven components and to determine the direct and indirect effect of the components on seed yield in common vetch (*Vicia sativa* L.) genotypes by using simple correlation coefficients and path coefficient analysis over the three consecutive growing seasons data. Field trials were performed in the research areas of GAP International Agricultural Research and Training Center (GAP IARTC) in Diyarbakır, Turkey during the 2008-09, 2009-10 and 2010-11 growing seasons with winter sowings. Experiments were established according to randomized blocks design with three replications. Results of simple correlation coefficients analysis showed that except for the number of pods per plant trait, which correlated with seed yield (SDY) positively and at 0.05 level significant, there were positively and highly significant ($P < 0.01$) correlation between the all of the investigated traits and seed yield. In addition, path coefficients analysis showed that biological yield (BLY) (3.7455 and 55.76%) and straw yield (SWY) (-3.0385 and 45.34%) had the strongest direct effects on seed yield. The traits were highly effective on seed yield indirectly as well. However; direct and indirect effect of days to physiological seed maturity (DPM), the number of pods per plant (NPP), the number of seeds per pod (NSP) harvest index (HTI) and thousand seed weight (TSW) traits on seed yield were very low and negligible. Consequently, biological yield and straw yield traits should be used as the primary selection criteria for improving seed yield in common vetch.

Key words: Common vetch (*Vicia sativa* L.); Correlation Coefficient; .Seed Yield Components; Path Analysis

EVALUATION OF DIFFERENT ALFALFA (*MEDICAGO SATIVA* L.) CULTIVARS FOR FORAGE YIELD AND QUALITY UNDER ÇUKUROVA ECOLOGICAL CONDITIONS

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Abstract

Alfalfa, *Medicago sativa* L., is one of the most important forage crop in the world and used primarily as dried hay, pasture, or green chop for a wide variety of livestock. It is grown throughout Turkey. The old area of cultivation has a continental climate, but recently the cultivation has extended into the subtropical costal region. The importance of alfalfa is rapidly increasing and every year more alfalfa is grown in Southern Anatolia, so cultivar recommendation for growers has received emphasis from public or private agencies to maximize yield and quality. Therefore this research was conducted to determine performances of 7 alfalfa cultivars (Calfa, Kalender, MA 525 HQ, Verdor, Nimet, MA 414 and Magnum-5) in terms of dry matter yield and some quality parameters under Çukurova conditions throughout the years of 2007-2011. In the study, cultivars were evaluated for dry matter yield (DMY), crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF) concentrations, digestible dry matter (DDM) and dry matter intake (DMI). Correlation coefficient analysis for the traits studied was also performed to determine relationships between dry matter yield, and quality traits. According to average of three years results, there were significant differences among alfalfa cultivars in terms of above mentioned components. Significant positive correlations were found between DMY and ADF, while negative correlations existed between NDF and DMI. The highest DMY averaged over three years was obtained from Cultivar Nimet as 2345 kg da⁻¹, while the lowest was obtained from cultivar Magnum 5 as 1861 kg da⁻¹. Cultivar Magnum 5 was superior in terms of CP content, had lower in ADF and NDF content than the other alfalfa cultivars. From the results of the study, it was concluded that Cultivar Nimet with highest DMY and relatively similar quality traits could be recommended as high yielding recently developed cultivar for establishment new areas in the region.

Key words: Alfalfa, cultivars, dry matter yield, herbage quality

CUTTING FREQUENCY IMPACT ON ALFAALFA (*MEDICAGO SATIVA* L.) HERBAGE YIELD and YIELDS COMPONENTS UNDER CENTRAL ANATOLIAN CONDITIONS

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Abstract

Alfalfa (*Medicago sativa* L.) maturity at the time of harvest greatly influences forage quality. The main objective of this research was investigation on effects of phenological stages (five different cutting time) on values of herbage yield and yield components indices of Alfalfa. Bilensoy, Gözlü, Kayseri and Plato variety of Alfaalfa (dormant cultivars), Elçi, MA 414, Mırna and Posovina (normant cultivars) variety of Alfalfa were used as materials. Samples were collected from Research Field of Ankara university in Ankara. They were dried, grained and analyzed in Laboratory. The results showed that forage quality indices values including hay yield, green grass yield were significantly different culture variety and five different cutting time $P < 0.01$. The maximum green grass yield was observed first cutting in 2007, 775.5 kg/da on Plato cultivar and minimum green grass yield was observed 5th cutting time in 2008, 247 kg/da on Gözlü cultivar. The maximum yield for fodder yield was determined first cutting in 2008, 181.5 kg/da on MA 414 cultivar. Crude protein (CP), Crude Cellulose were significantly different culture variety and five different cutting time $P < 0.01$. For all culture variety CP decreased and Crude cellulose increased with plant growth development. The highest crude protein (CP) rate was determined on Kayseri cultivar (21.44) and Bilensoy cultivar (21.29). Gözlü and Plato cultivars has the highest crude cellulose rate and lowest crude cellulose rate was observed on Posovina cultivar.

Key words: Fodder yield, Green grass yield, Growth stage, Crude protein, Crude cellulose,

USE OF GRAZING STICK FOR DETERMINING CARRYING CAPACITY AND QUALITY OF PASTURE

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Abstract

Grazing-based livestock production depends on the quality and carrying capacity of pasture. Therefore in practise, determining the quality and capacity of pasture is important. Using the grazing stick, starting time of grazing, duration of grazing, carrying capacity, botanical composition, rotation lengths and the amount of available dry matter per decare can be determined. The grazing stick researchers working about pasture management .In this review, it was focused on grazing stick which is used for this aim. Furthermore, it was given knowledge about use of grazing stick and evaluation method of obtained data.

Key words: Grazing Stick, Pasture Capacity, Pasture Quality

CHARACTERIZATION OF SOME SPECIES OF *LATHYRUS* GENUS USING PHENOLOGIC, AGRONOMIC AND MORPHOLOGIC TRAITS

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Abstract

Lathyrus (Leguminosae, Fabaceae) is a broad genus that includes over 160 species and 45 subspecies. Genetic diversity of this genus is of great importance throughout the world. Phenologic, agronomic and morphologic traits were studied on 11 species comprising 33 accessions of the genus *Lathyrus* in Algeria from different geographical origins (France, Spain, Turkey, Algeria, morocco...). Our results showed a wide genetic diversity between and within species tested for all the traits studied. This study also classify species according to the character set most favorable and those related to the yield highlighting *L. sativus* top ranking. The multivariate analysis (principal component analysis) has brought together these species into three groups based on the characters studied. The first group has the least productive species with flowers and small grains namely *L. annuus*, *L. Aphaca*, *L. inconspicuus*, *L. sphaericus* and *L. stenophylus*, the second group includes the most productive species and earliest to bloom as *L. articulatus*, *L. odoratus*, *L. ochrus*, *L. sativus* and *L. clymenum* and the last group included one species *L. tingitanus* which is the latest with the highest level of vegetation. Our results provide a basis for a better understanding of the structure and the genetic diversity of species in the genus *Lathyrus* in Algeria.

Keys words: *Lathyrus*, genetic diversity, phenologic, agronomic and morphological characterization.

ECOLOGICAL-ANATOMICAL CHARACTERISTIC AND VOLATILITY OF *RANUNCULUS ARVENSIS* VAR. *SPINOSUS*, GENUS *RANUNCULUS* L. (*RANUNCULACEAE* JUSS.)

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Abstract

Ranunculus arvensis var. *spinosus* is a cosmopolitan species distributed in Europe, the Mediterranean, Southwest Asia, and North Africa. In Bulgaria, the species grows in the damp meadows and grassy areas along roads and ditches from 0 m above sea level to 1000 m. altitude. *Ranunculus* species found along the Black Sea coast, Thracian Lowland, Vitosha, Rodopi. *Ranunculus arvensis* var. *spinosus* is pungent and poisonous. They contain alkaloids and belong to the noxious weed meadow. *Ranunculus arvensis* var. *spinosus* bloom from May to July. Cultivated plants in Plovdiv compared with that of Targovishte (where they come), are characterized by volatility, which characterizes them as a mesophyte. These have a larger basic epidermal cells and larger stomata. These plants are approach in anatomical features to plants in Ahtopol, where the climate is more humid than the Northeastern Bulgaria.

FOOD SCIENCE

RELATIONSHIPS BETWEEN FARINOGRAPH PARAMETERS AND BREAD VOLUME, SOME PHYSICOCHEMICAL TRAITS IN BREAD WHEAT FLOURS

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ABSTRACT

The farinograph has been a standard tool of the cereal chemist for many years, giving information concerning absorption and mixing characteristic of flours. With the introduction of new short-time baking processes the baker has an increasingly wider range of methods available to him, and the cereal chemist must be able to determine the suitability of a particular flour for a variety of different processes. The objective of the present study was to investigate farinograph parameters of bread wheat flours. In this study One hundred bread wheat genotypes were grown under rain fed conditions in 2012-2013 growing season in Konya of the Central Anatolian provinces in Turkey. Refined flour samples were obtained with a Brabender Jr. mill (70 GG sieve) wheat samples were analyzed two replication. Protein content of the flour was measured using a Leco FP 528 analyzer (Leco Inc, St Joseph, MI) AOAC 992.23. Zeleny sedimentation were determined ICC standard number:116, Bread making were determined basic straight dough bread baking method AACC10-09(Anon. 2002), Farinograph properties were determined according to AACC approved methods 54-21, 50 g mixing bowl (Brabender AT model 50) was used to evaluate the mixing properties of flour samples. Farinograph device, farinograph.lnk software has been studied in conjunction with the computer. Results were calculated by the computer the five main characteristics of a farinograph are; DDT:Farinograph development time(min), WAC:Water Absorption capacity (%), STB: Farinograph stability(min), SFT12:Farinograph softening degree (farinograph unit FU), FQN: Farinograph quality number(mm). In this study, it was obtained that the strong correlative relationship between Bread Volume and PRT, ZLN, DDT,WAC, SFT12, FQN. STB,The farinograph is a widely used predictive test with which end-use quality of many genotypes can be assessed in a short period of time in bread wheat breeding program. Rheological testing included two empirical rheological methods, farinograph results showed that a wide range of rheological properties was present among the wheat cultivars. The industrialists and millers, in determining the quality of flour and in bread volume in the flour production is a of the farinograph device useful and effective.

Key Words: Bread wheat, Quality traits, Farinograph.

THE USE OF BEAN SEEDS (*Vicia faba*) IN RABBIT DIET

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Abstract

This study made possible the acquisition of knowledge about the chemical composition and nutritional value of bean seeds (*Vicia faba*) and the valorization of this grain legume by growing rabbits. Bean seed includes a high starch content (67.9% DM) and fiber content of the seed and the pod of *Vicia faba* are respectively: NDF: 3.92 and 38.83%; ADF: 13.38 and 22.79% and ADL: 8.6 and 15.23%. Crude proteins (30% DM) of this seed are characterized by a high contain of lysine and a low level of sulfur amino acids and tryptophan. The bean seeds have totally replaced soybean meal in pelleted diet. The experimental diet containing 26% of bean seeds, distributed to growing rabbits of local population during 7 weeks, permit to the rabbits to achieved similar growth performances than those allowed by rabbits fed with the diet containing 15% of soybean meal: average live weight: 2125 vs 2148 g; daily weight gain: 30.83 vs 31.65 g/d; feed intake: 98.17 vs 92.09 g/d; feed conversion ratio: 3.5 vs 3.19. Nutrient digestibility of both bean seeds and soybean diets are close, with respectively: 75.76 vs 79.89% for dry matter; 82.97 vs 82.27% for crude protein and 77 vs 80% for gross energy. Faba bean appears as an alternative protein source to completely replace soybean meal in the diet of rabbits, without impairing the nutritional value or the growth performances of rabbits.

Key words: grains legumes, faba bean, proteins, rabbit diet.

RICE QUALITY OF İPSALA DISTRICT (EDİRNE, TURKEY)

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Abstract

Edirne City is on the first place with the production of rice in Turkey and 35% of total rice production of Turkey is being provided from the İpsala District. As it is known that use of pesticides and fertilizers in agricultural activities in order to increase the productivity may increase the toxic element accumulation in soil. This study was carried out to determine the toxic element bioaccumulations in rice and to evaluate the rice quality of İpsala District in terms of human health. For this purpose, rice samples were collected from 42 stations in spring season of 2012 and manganese (Mn), iron (Fe), cadmium (Cd), lead (Pb), chromium (Cr), copper (Cu), zinc (Zn) and nickel (Ni) concentrations were investigated. Also some statistical methods including Cluster Analysis (CA) and Pearson Correlation Index (PCI) were applied to the results in order to assess the data properly and all the detected data were evaluated according to Turkish Food Codex. According to data observed, order of element concentrations in rice of İpsala District found as Zn > Cu > Mn > Fe > Ni > Cd in general and heavy metal contents of rice produced in İpsala District did not exceed the limit values specified by Turkish Food Codex and did not pose any risk for human health in terms of investigated parameters.

Key words: İpsala District, Heavy Metal Bioaccumulation, Rice Quality, Pearson Correlation Index, Cluster Analysis

ANTIOXIDANT ACTIVITY OF METHANOLIC LEAF EXTRACTS OF *QUERCUS ILEX* L. (FAGACEAE)

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Abstract

The aim of this work is to determine the polyphenols content and evaluate the antioxidant activity of methanolic extract from *Quercus ilex* leaves collected at three different sites in Jbel Zaghouan, Tunisia. Total phenolic and flavonoids content were determined according to the Folin–Ciocalteu and aluminum chloride colorimetric method. The antioxidant activity of methanolic extract was evaluated by 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging method. The yield of methanolic extract (0.98 to 11.32%) varied greatly with the plant harvesting site. The content of phenolic (mg/g), in gallic acid equivalents (GAE), was from 2.37 for the site1, 1.91 for the site 2 and 1.51 for the site 3. The content of flavonoids (mg/g), in quercetin equivalents (QE), was from 1.97 for the site 1, 1.40 for the site 2 and 1.11 for the site 3. The methanolic extract of *Q. ilex* leaves obtained from the site1 exhibited strong radical scavenging activity (89%).

Key words: Antioxidant activity, DPPH, Flavonoids, phenols, *Quercus ilex* L.

EFFECT OF COMMERCIAL LIPASE AND PROTEASE ENZYMES FROM MICROBIOLOGICAL SOURCES ON PROPERTIES OF WHITE CHEESE

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Abstract

In this study, effect of addition of commercial lipolytic (Piccantase A) and proteolytic (Fromase TL) enzyme preparation derived from *Mucor miehei* on the accelerated ripening of White cheese was investigated. Lipolytic and proteolytic enzyme preparation was added to cheese milk after rennet addition at the level of 0.5, 1.0, 1.5 and 1.0, 2.0, 3.0 g 100 kg⁻¹ of milk, respectively. White cheeses were ripened at 4±1 °C for 30 days. WSN, NPN contents and ripening indice were significantly affected by the addition of different enzyme levels and especially using proteolytic enzymes. Cheeses P2 and P3 displayed the fastest ripening rate compared with control cheese. Enzyme treatments markedly increased the total VFA content of cheeses during ripening, particularly when lipase was used. It was determined that ripening period had no effect on the main chemical constituents of the cheeses, but caused significant increase in titratable acidity, WSN, NPN, CN, PPN, TVFA contents and ripening indice. It was concluded that White cheese could be produced with a high acceptability when acid fungal protease, was used at level of 2 g 100 kg⁻¹ and lipase, was used at level of 1.5 g 100 kg⁻¹.

Key words: Protease, lipase, enzyme, cheese, ripening period

FOOD DYES EFFECTS ON SACCHAROMYCES CEREVISIAE GROWTH AND CELL MORPHOLOGY

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Abstract

Recent studies showed a significant and documented impact of food additives in general and the food dyes in particular on the human health (hyperactivity, allergies, genotoxicity, the embryotoxicity and teratogenicity, carcinogenicity...). However, In spite of worldwide use of these food additives, a little informations, and very limited studies on their effect on micro-organisms were found. The aim of this work was to evaluate the effect of food dyes (purple (E122/E132), green (E104/E122), blue (E132), yellow (E102), red (E110); Curcuma) on the growth and cell morphology of the yeast *Saccharomyces cerevisiae* as simple model of eukaryotic cells. The analytical methods used were, plate counting, filtration discs a well cut diffusion methods and microscopic examination using different concentrations of synthetic food dyes and Curcuma as wide used natural dye. The results reveal the influence of the dyes on cell growth by decreasing the total viable count number of *Saccharomyces cerevisiae* and affect the its cultural characteristics (variations in colony form ,size ,color and consistency)as well as the microscopic study revel in tangible changes in cell morphology depends on the dye type and concentration (considerable variation in cell size , shape ,color ,and presence or absence of storing microbodies for example somme of dyes were bioaccumulated inside the cell) .In conclusion all the tested synthetic food dyes showed moderate effect on *Saccharomyces cerevisiae* growth, cultural and cell morphological characteristics according to the following descending order, with predominance of E122/E132 food dyes. purple (E122/E132)> green (E104/E122)>blue (E132)>yellow (E102)>red E110>Curcuma. These findings not only elucidate the moderate effect of synthetic food dyes effect on *Saccharomyces cerevisiae* yeast cells but opens further perspectives in the search for more efficient and precise methods such the molecular approach to test their mutagenicity and carcinogenicity to the human health .

Key words: food dyes, *Saccharomyces cerevisiae*, effects, growth, cultural characteristics, cell morphology

BROTH DILUTION AND DISC DIFFUSION METHODS IN THE SUSCEPTIBILITY TESTING OF ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL FROM OLEORESIN OF *PISTACIA VERA* L AND *PISTACIA ATLANTICA* DESF AGAINST CERTAIN PATHOGENS

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Abstract

This study deals with the valorization of medicinal and aromatic plants of the Algerian flora, in order to find new bioactive natural products. The essential oils from the gum of *Pistacia atlantica*. Desf and *Pistacia vera* grown in Algeria were obtained by the hydrodistillation method. These oils were screened for antimicrobial activities against the growth of *Escherichia coli* using the agar disc diffusion and the liquid phase method. Subsequently, minimal inhibitory concentration (MIC) from oils was determined. The results of the study revealed that resin oils of the two *Pistacia* specie have antimicrobial activity against *Staphylococcus aureus* as well as *Escherichia coli*. Resin oils of *Pistacia* can be a good source of antibacterial agents.

Key words: resin oil - antimicrobial activities - clinical isolates.

EFFECT OF ESSENTIAL OILS OF *ARTEMISIA ARBORESCENS* ON *ESCHERICHIA COLI*, *STAPHYLOCOCCUS AUREUS* AND *PSEUDOMONAS AERUGINOSA*

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Abstract:

This study was carried out to investigate the potential use of *Artemisia arborescens* as a source of antimicrobial agents against pathogens. Essential oils of *A. arborescens* were collected by hydrodistillation. The antibacterial properties of *A. arborescens* essential oil was studied on the standard gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*), and *Staphylococcus aureus* (gram-positive bacteria), then agar disk diffusion, minimal inhibition concentration (MIC) and minimum bactericidal concentration (MBC) were detected. The results of agar disk diffusion tests showed the inhibition zones as follow: *S. aureus* 00-18 mm, *E. coli* 00-16 mm and 08-14 mm for *P. aeruginosa*. However, their antibacterial activities were lower than those of Gentamicin. The MIC for *S. aureus* and *P. aeruginosa* was between 33 and 66 mg/ml, and for Gram-negative bacteria of *E. coli* was between 66 and 132 mg/ml, while the MBC values of this oil against the tested bacterial strains were between 132 and 264 mg/ml.

Key words: *Artemisia arborescens* essential oil, *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, minimal inhibition concentration (MIC), minimum bactericidal concentration (MBC).

INHIBITOR POTENTIAL OF LACTIC ACID BACTERIA ISOLATED FROM ALGERIAN FOOD

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Abstract:

The foods are appropriate habitats for contaminant bacteria or pathogen bacteria. The other type of bacteria isolated from some food can be interesting to food technology as lactic acid bacteria. These bacteria have largely been exploited in industry to obtain food with characteristics such as taste and texture. The antibacterial effect of these bacteria is appreciated for the ability to extend the shelf life of many foods. Usually, two products from lactic acid bacteria are used as a preservative lactic acid and bacteriocin. In our study we isolated lactic acid bacteria from different milk origin (cow and goat), from butter and from brine olives. When the sample was milk we incubated at 30°C till coagulation. To isolate lactic acid bacteria from butter we used sterile skim milk (10 ml) previously heated at 45°C added to 1 g of butter. To select among lactic acid bacteria the inhibitor strains and the sensitive strains we used the method of Fleming et al (1975). We also tested the capacity of the selected lactic acid bacteria to inhibit some bacteria from food origin and pathogen bacteria. We used the method described by Sepplhaug and Harlander (1989) with modification to select bacteriocinogenic bacteria. We changed the buffer used by phosphate sodium (0.1 M, pH 7.2). The selected bacteria were identified by API 20 Strep and by PCR identification using a specific primer for amplification of conserved enterococcal sequences. The inhibitory strains were grown in M17 broth and the supernatant were tested for the susceptibility to some enzymes. We isolated 29 strains of lactic acid bacteria whose 13 strains inhibited the sensitive strains *Streptococcus sp.* Three of these strains were probably bacteriocinogenic. We observed that BR02, LO4 and LO12 strains inhibit in the presence of buffer *Staphylococcus aureus*, *Pseudomonas sp* and *Proteus sp* respectively with diameter of inhibition comprised between 15-20 mm, 9-13 mm and 9-14 mm. The phenotypic identification revealed that these bacteria BR02, L04 and L012 are lactic acid bacteria. The three strains are *Enterococcus faecium*. The amplification of the enterococcal specific sequences (733bp) confirmed that these bacteria are *Enterococcus*. The supernatant present a sensitivity to α chymotrypsin, trypsine, proteinase K and pronase E. This result confirmed that these bacteria produce an extracellular substance with protein nature.

Key words: lactic acid bacteria, *Enterococcus*, antibacterial activity

THE EFFECTS OF CAROB EXTRACT POWDER AND SUGAR LEVEL ON THE SOME PROPERTIES OF ACIDOPHILUS YOGHURT

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Abstract:

In this study, the effects of carob extract powder and sugar level on the some properties of acidophilus yoghurt were investigated. For this purpose, carob extract powder was added to acidophilus yoghurt, which contain at 8% and 10% sugar, as a rate of 0% (as control), 0.5%, 1% and 2%. Physicochemical, sensorial and microbiological properties of acidophilus yoghurt were determined at 1st, 7th and 14th days of storage. The rate of sugar, the rate of carob extract powder and storage period significantly affected all properties (physicochemical, sensorial and microbiological properties) of yoghurts. As the sugar level increased pH, viscosity, whey separation, taste and aroma, texture and general acceptability scores of yoghurts increased, titratable acidity (%L.A.), *S.thermophilus*, *L. delbryeckii* subsp. *bulgaricus* and *L. acidophilus* counts of the samples decreased. With the increase in carob extract powder content, pH, viscosity, whey separation, antioxidant capacity and *L. delbryeckii* subsp. *bulgaricus* counts were increased, but titratable acidity (%L.A.) and *S.thermophilus* counts of the samples decreased. Addition of carob extract powder had no prebiotic effect on the *L. acidophilus*. On the other hand, the samples contain carob extract powder had 2 or 3 times higher antioxidant capacity than control yoghurt. According to the results of the physico-chemical, microbiological and organoleptic analysis, addition of 10% sugar and 0.5% carob extract powder can be recommended for yogurt production.

Key words: Acidophilus yoghurt, carob extract powder, sugar level

THE EFFECTS OF APPLE AND LEMON FIBER ON THE SOME PROPERTIES OF KEPHIR

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Abstract:

In this study, the effects of addition of apple and lemon fiber on the some properties of kefir were investigated. For this purpose, five different kephirs were produced (A is control, B, C, D and E: contain 0.25 % apple fiber, 1 % apple fiber, 0.25 % lemon fiber and 1 % lemon fiber, respectively) and stored for 20 days at $4\pm 1^{\circ}\text{C}$. pH, titratable acidity, water holding capacity, viscosity, sensorial analysis, total lactic bacteria and mold and yeast counts of kephirs were determined at 1st, 10th and 20th days of storage. The kind of fiber, the rate of fiber and storage period were found statistically significant for all properties (physicochemical, sensorial and microbiological properties) of kephirs ($p < 0.01$). As the fiber level increased titratable acidity, water holding capacity, viscosity and total lactic bacteria counts of kephirs increased, but pH, taste and aroma, texture, general acceptability and total scores, mold and yeast counts of the samples decreased. During storage titratable acidity, water holding capacity, viscosity values of kephirs increased, pH, taste and aroma, texture, general acceptability and total scores, total lactic bacteria and mold and yeast counts of the samples decreased. According to the results of the physico-chemical and organoleptic analysis, the best sample was sample B, which contain 0.25% apple fiber. On the other hand The best sample was sample C according to the microbiological analysis results. Consequently, addition of 0.25% or 1% apple fiber can be recommended for kefir production.

Key words: Kefir, apple fiber, lemon fiber

EFFECTIVENESS OF UV LIGHT PASTEURIZATION OF SKIM MILK

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Abstract:

The UV-C technology of milk treatment is an innovative and emerging method of nonthermal pasteurization. Our study showed the effectiveness of UV-C irradiation of the inactivation of bacterial cultures of 3 strains; *Staphylococcus aureus* (ATCC 6538), *Escherichia coli* (ATCC 25922) and *Pseudomonas aeruginosa* (ATCC 9027), inoculated in skim milk (0,1 % fat). The treatment chamber was made in stainless steel and provided with 3 UV-C. The treatment was carried out at different distances from the light source: 5, 15, 25 et 45cm at several periods (from 5 up to 15 minutes) and average ambient temperature of 26.5 ± 2 °C. The different treatments reached for the 3 strains up to 1,8, 1,95 and 2,05 log reduction respectively for *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa*, on their respective media. The latest showed to be the more sensitive to UV-C light followed by *Escherichia coli* then *Staphylococcus aureus*. Consequently, the UV-C treatment of milk appears as a promising technique to develop and improve or to combine it with conventional thermal techniques in order to reduce the temperature and energy involved and required for such methods, so as to preserve the milk qualities in on one hand and reduce the energy used in the other hand.

Key words: *Staphylococcus aureus* - *Escherichia coli* - *Pseudomonas aeruginosa* - Milk - Ultraviolet - Inactivation - Nonthermal treatment.

HIGH PRESSURE PROCESSING OF MILK AT SUBZERO TEMPERATURES

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Abstract:

High-pressure processing (HPP) is being increasingly used by the food industry to extend the shelf life and to improve the quality and safety of food products. HPP is well established for cold pasteurization of high acid foods such as fruit juices. However, pasteurization of low acid foods such as milk by HPP has not been considered viable due to safety concerns. Recently, it has been reported that the bacterial inactivation is enhanced when the food material is frozen prior to pressurization. In this study, we investigated the enhanced inactivation of bacteria in unfrozen and frozen milk by HPP at subzero or low temperatures. For this purpose, frozen and unfrozen milk inoculated with *Escherichia coli* strain ATCC 25922 and *Listeria monocytogenes* ATCC 13932 were exposed to a pressure of 310 MPa for 5 to 15 minutes at varying temperatures between -5°C to 5°C. Compared to pressure treatments at room temperature, reduction in number of *E. coli* in unfrozen milk was enhanced by pressure treatment at subzero temperatures. An average of 4.3 log cycle reduction in number of *E. coli* in unfrozen milk was obtained after a 5 min pressure treatment at -2.5°C. No survival was detected when the inoculated milk was frozen at -21°C for overnight prior to pressure treatment, corresponding to a minimum of 6.5 log cycle reduction in number of *E. coli*. Lesser extent of reductions were observed in number of *L. monocytogenes* in frozen milk after pressure treatments at all temperatures employed. The maximum reduction in number of *L. monocytogenes* in frozen milk was 3.0 log cycle after a 15 min pressure treatment at -3°C. Compared to *E. coli*, the lesser extent of inactivation observed in number of *L. monocytogenes* could be accounted to Gram-positive bacterial cell wall structure of *L. monocytogenes*. Our results suggest that HPP of frozen milk at subzero temperatures could significantly improve the bacteriological quality of milk and could give new insights for pasteurization of milk by HPP.

Keywords: high pressure processing, pasteurization, milk, subzero temperature, *Escherichia coli*, *Listeria monocytogenes*

TEXTURAL PROPERTIES OF SET YOGURT MADE FROM ULTRA-HIGH PRESSURE HOMOGENIZED COW MILK

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Abstract:

Homogenization is widely used in the dairy industry to reduce the creaming of milk or cream, and to increase the stability of food emulsions, stabilization is achieved by the size reduction and structure changes of fat globules. For the manufacture of yogurt, milk is generally homogenized at 15-20 MPa and heat-treated to reduce microbial load, to increase the yogurt stability, consistency and texture, and also to decrease whey separation during storage. When milk is homogenized, caseins and whey proteins form the new surface layer of fat globules, which increases the number of possible structure-building components in yogurt made from homogenized milk. High pressure homogenization is an alternative food processing technique. Ultra-high pressure homogenization (UHPH) technique subjects liquid and solid food to pressures from 100 to 350 MPa, which is on the aim of microbial inactivation. In general terms, increasing pressure and number of passes through the homogenizer has an additional effect on microbial reduction. In addition, some advantages of UHPH have been demonstrated such as uniform dispersion of agglomerates, changes in protein conformation, increase of emulsion viscosity and stability. The aim of this study was to compare the texture analysis parameters of set yogurts obtained from ultra-high pressure homogenized milk. Yogurts were manufactured from UHPH-treated cow milk preheated at 30°C at 100 and 150 MPa (two stage), and compared with the base product (untreated sample). The TA-HD plus texture analyser was used to measure the textural properties (firmness, consistency, cohesiveness, and index of viscosity) of set yogurts. Samples treated at 150 MPa showed higher gel firmness in texture analysis compared to 100 MPa treated samples. Yogurts from milk untreated or treated 100 or 150 MPa had similar results of consistency, cohesiveness, and index of viscosity. The results of this study showed that the increase in homogenization pressure significantly increased the texture analysis values of set yogurts from milk UHPH treated.

Key words: Yogurt, ultra-high pressure, homogenization, UHPH, firmness

FRUIT-FLAVORED YOGURT - A REVIEW

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Abstract:

Yogurt is a basic fermented milk product that has been consumed for centuries as a part of the diet. At present there are many different types of yogurt produced worldwide and yogurt are subdivided into different groupings based on the aspects such as fat content, physical nature of the product, post fermentation processing, and flavours (plain/natural, fruit or flavored). The popularity of yogurt is due to various health claims and therapeutic values. Along with these, the flavour of yogurt has played an important role in increasing its consumer demand. Sweeteners (for example, sugar and honey), flavourings (for example, vanilla and coffee), and other ingredients (for example, fruits and flavors) are added that modify the flavour of yogurt. Fruits are generally perceived as healthy by the consumer. Fruits and vegetables are good sources of vitamins, minerals, fibres. Also, some fruits such as blueberry contain high level of anthocyanin, which are flavonoids that have potential health benefits functioning as antioxidants. Fresh fruits or concentrates such as blueberry, blackberry, strawberry, banana, apricot and peach can be used in yogurt production for improving their nutritional values and sensory properties. Fruit and flavors are added at different steps depending on the type of yogurt. For set style yogurt the fruit is added in the bottom of the cup and then the inoculated yogurt is poured on top and the yogurt is fermented in the cup. For swiss style yogurt the fruit is blended with the fermented, cooled yogurt prior to packaging. Per capita consumption of yogurt in Turkey is about 30 kg in 2013 and this is higher than in EU countries (20 kg) and US (10 kg). The Turkish total yogurt market is valued at an estimated USD 1 billion but only about 5% of all total yogurt market is fruit-flavored yogurt. Although there have been significant differences in types of yogurt product but global per capita consumption of yogurt has been steadily increasing over the past twenty years. The increasing yogurt consumption trends in many countries have been attributed to increase the variety of fruit-flavored yogurt in markets.

Key words: Yogurt, fruit-flavored, consumption

THE SATIR ET OF KEŞAN FROM GEOGRAPHICAL INDICATIONS OF TURKEY

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Abstract:

“Keşan Satir Et” was discovered in 1960s in Kesan. The main feature of Keşan Satir Meat that differs from the other meat styles is its tender ness and taste. Keşan Satir Meat is made from regional type of sheep as is called Kivırcık. Kivırcık sheep weighs is about 40 kgs grown in the region of South Trakya. All Kivırcık lambs feed in pastures of natural environment. The meat that is used to make Satir Et has stored in there frige rator about 2 days at the degree of 4 Celsius. After that, meat of lamb has processed by a special knife on a oak wood. There is only 5 gram of salt added into the 1 kg of Keşan Satir Meat. There is nothing included that other than salt in order to the Keşan Satir Meat. 250 gram of Keşan Satir Meat has grilled with a two sided barbecue and served as it is. Keşan Satir Meat is served with famous Ipsala Rice to the customer. Keşan Satir Meat also is advised to get sheep yoghurt or olive oil salad with. "Keşan Satir Et" has approved by Turkish patent office and registered as a brand by Kesan Chamber of Commerce. It has been getting a Geographical Point Document for "Keşan Satir Et". Kesan Chamber of Commerce has set standards for marketing of butchers and restaurants to Keşan Satir Meat.

Key Words: Keşan Satir Et, Geographical Indications, Kivırcık sheep, Meat was grilled

INFLUENCE OF MICROWAVE POWER ON DRYING OF TOMATO SLICES

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Abstract:

Drying is one of the oldest methods of preserving foods that reduces food moisture content to inhibit the growth of microorganisms and reduce the rate of physical and chemical changes. The drying of tomatoes is a process commonly used to preserve the product and to prolong its shelf-life. However, tomatoes dried under natural conditions may be exposed to dust, rain and high temperatures. In these conditions some problems can determine a worsening of the quality of the final products. These problems are: crack of the structure, bleaching, hard texture, loss of flavour and nutritional properties, low rehydration capacity, non-enzymatic browning. In recent years, microwave drying has gained popularity as an alternative drying method for a wide variety of food and agricultural products. Therefore, the present study was aimed at the microwave drying of a fixed thickness of tomato slices. The objective of this study is determination of drying time required to reduce the moisture content of tomato slices to 17.65 % wet basis moisture content from an initial of 94.47 %. The influence of different microwave power levels (120, 150 and 180 Watt) on drying time, vitamin C loss, shrinkage and rehydration of dried slices of tomato was studied. Drying time reduced from 650 to 350 minutes as the microwave power increased from 120 to 180 W. The vitamin C levels of the fresh tomatoes significantly decreased from an initial value of 422.45 ± 39.81 mg ascorbic acid/100 g dry solids to 122.02 mg/100g, 139.44 mg/100g, and 143.15 mg/100g when dried at 120, 150 and 180 W, respectively. About 86.66 ± 4.39 % shrinkage was observed on dried slices. Rehydration capacity of samples dried at different power levels were about 140 %. As conclusion, it was shown that increase in microwave power significantly reduced the drying time of tomato slices and less vitamin C destruction. However, shrinkage and rehydration capacity of tomato slices were not affected from change in microwave power.

Key words: Microwave, Drying, Tomato Slices, Vitamin C

THE EFFECT OF FINING PROCESS ON SOME QUALITY PROPERTIES OF HARDALIYE

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Abstract:

Hardaliye is a traditional beverage that is non-alcoholic and refreshing astringent properties. It is produced from red grapes with the addition of crushed mustard seeds, sour cherry leaves and benzoic acid, especially in Thrace region around Kırklareli. Hardaliye contains viable lactic acid bacteria and phenolic substances as flavonoids and tannine. For the production of hardaliye, grapes are washed, crushed and placing into wooden or plastic barrel, having a tap 10 cm from bottom. One time crushed grape (1 kg), one time crushed black mustard seeds + potassium benzoat (2+1 g) mixture, then a layer of sour cherry leaf. Barrel is filled layer of layer in this way. Mustard seed and potassium benzoat are used to prevent alcohol fermentation through prohibiting yeast activity. Also isothiochyanates oil prevents formation of some microorganisms and helps for the storage of product. Aroma is given with addition on mustard seed and sour cherry leaf. The barrels are closed and incubated at room temperature for 10-20 days. After incubation, the mixture is filtered and stored at cold place, preferably +4 °C. In this study, we aimed to determine the effects of fining process with various fining agents on some properties of hardaliye. For this purpose, hardaliye made from Papazkarası grapes according to traditional methods. Manually pressing to separate from the marc, obtained turbid hardaliye. At this stage, hardaliye clarification was conducted by adding fining agents such as bentonite, gelatin and pectolytic enzyme into hardaliye as individually and triple combination, also unclarified sample as control. Brix value, total acidity, pH value, total phenolic, total flavonoid, total anthocyanin content, color intensity, polymeric color, percent polymeric color values and clarity were determined in the hardaliye samples were examined. Compared with the control sample, brix, the total phenolic content, total flavonoids total anthocyanin color density polymeric and polymeric color ratio values decreased in all of fining practices. Highest clarity and lowest total phenolic content, color intensity and polymeric color has been dedection in the bentonite practice. While the most losses in the amount of total flavonoids in the enzyme practice, the most losses in the amount of total anthocyanin in the triple combination practice. Gelatin practice and control sample with regard to total phenolics, total flavonoids, anthocyanins and clarity values was found significant closest.

Key words: Hardaliye, Traditional beverage, Fining agents, Clarity

DETERMINATION OF SUITABLE DRYING MODEL FOR COMBINED MICROWAVE-FAN ASSISTED CONVECTION DRYING OF STRAWBERRY

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Abstract

Strawberry slices with 100 (± 0.04) g weights and 91.62% (± 0.02) initial moisture content on wet basis were dried in microwave oven until moisture content fell down to 15.12% (± 0.05) on wet basis. In this study, the effects of microwave drying (180, 360, 540, 720 and 900W); fan assisted convection (100, 150, 200°C); combined fan assisted convection (100, 150, 200°C) and microwave (180 and 360 W) on drying time, drying ratio of strawberry slices have been investigated. The drying data were applied to seven different mathematical models, namely, Newton, Page, Henderson and Pabis, Midilli-Kucuk, Wang and Singh, Two Term, Two Term Exponential Equation Models. The performances of these models were compared according to the coefficient of determination (R^2), standard error of estimate (SEE) and residual sum of square (RSS), between the observed and predicted moisture ratios. The Midilli-Kucuk model showed a better fit to experimental drying data as compared to other models.

Key Words: Strawberry, Drying, Microwave, Modelling.

SELECTION AND EVALUATION OF THIN LAYER DRYING MODELS FOR MICROWAVE DRYING OF MUSHROOM

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Abstract

The effect of treatments on microwave drying characteristics of mushroom was investigated. The experiments were conducted on mushroom samples with mass of 100 g at different microwave powers. Mushroom samples 93,4%(±0,02) humidity on wet basis were dried in microwave oven with 180, 360, 540, 720 and 900W microwave powers until the humidity fell down to 9,27%(±0,06) on wet basis. In this research, the drying data were applied to eleven different mathematical models, namely, Newton, Page, Henderson and Pabis, Midilli-Kucuk, Wang and Singh, Two Term, Two Term Exponential, Diffusion Approach, Weibull Distribution, Logistic and Alibas Equation Models. The performances of these models were compared according to the coefficient of determination (R^2), standard error of estimate (SEE) and residual sum of square (RSS), between the observed and predicted moisture ratios. The results showed that Weibull Distribution and Alibas models were found the better to describe the drying of mushroom samples.

Key words: Microwave, drying, mushroom, mathematical modeling

THE MOST FAMOUS TURKISH HONEY, ANZER HONEY

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Abstract:

Turkey is located at the junction of three continents Asia, Europe and Africa and has a great beekeeping potential with rich flora, suitable geographical structure and different climate conditions. Therefore a wide range of honey, differing in taste and texture are produced in the country. The most famous, expensive and favorite honey in Turkey is produced at an altitude between 2200m and 3000m in Anzer plateau near İkizdere, and Rize in the East-Black Sea Region and called Anzer honey. Because of the rainy weather conditions, limited sunny days and low average temperature, total honey production in the Anzer plateau is low (nearly 600 kg/year) and thus, the price of the produced honey is very expensive (300 \$/kg). The unique taste, high quality and curative effects against many illnesses make Anzer honey desirable for consumers. Very high levels of proline, diastase and high antioxidant activity are the most prominent characteristics of Anzer honey. Major vegetation type of the Anzer plateau is alpine meadows located above tree line. Because of its high species richness and high levels of endemic plant species, Anzer plateau is the one of the most critical regions for biodiversity conservation in the country. Anzer honey contains pollen grains from the many varieties of honey plants that grow naturally in the Anzer plateau such as *Lotus spp.*, *Trifolium spp.*, *Astragalus spp.*, *Thymus spp.*, *Cirsium spp.*, *Myosotis spp.* To accurately determine the quality and origin of Anzer honey, honey samples collected from beekeepers in Anzer plateau are checked by melissopalynological analyses.

Key words: Honey, Anzer Honey, Honey Quality, Palynology

EFFECT OF MEMBRANE FILTRATION ON PHYSICAL PROPERTIES OF CHEESES

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Abstract:

In cheese production, membrane separation techniques take places since cheese-making is actually a kind of concentration process. Microfiltration (MF) and ultrafiltration (UF) are the major ones employed in cheese industry. Although UF and MF have some benefits in cheese manufacturing such as improvement in hygienic capacity, minimal heating, higher plant capacity, increased cheese yield, homogeneity of the quality of final products, and decreased rennet usage compared to traditional practices, they also have some negative impacts on cheese quality. The review points out effects of MF and UF processes on physical properties of cheeses. Both separation processes are used to produce cheese from highly concentrated milk retentate but these two different membrane systems have unique properties to have effects on composition, microstructure, texture and rheology. During reversion of milk to cheese there are numerous physical changes. However, rheological and textural changes are the most important ones due to their dramatic impacts on cheese quality. From scientific point of view, change in rheological character of Newtonian milk to viscoelastic cheese draws significant attention. Moreover, consumer acceptance for cheese products depends on its physical attributes such as visual appearance, rheological and texture that contribute to the sensorial and functional characteristics and they are the result of a complex combination of microbiological, biochemical, and technological processes.

Key words: Ultrafiltration, Microfiltration, Cheese Technology, Texture, Rheology

AMINO ACID, MINERAL AND ORGANIC ACID CONTENTS OF INDUSTRIALLY MANUFACTURED PEACH PULPS FOR AUTHENTICITY ASSESSMENT

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Abstract:

Characterization of the intermediate products used in the manufacturing of fruit juices and nectars has gained importance in detecting possible adulterations. In this study, the amino acid, mineral and organic acid profiles were determined for the characterization of the peach pulps manufactured industrially. Samples were supplied directly by a fruit juice company. They were manufactured from fruits coming from two different regions (Ereğli and Çarşamba) at different times of the season. Totally 20 samples were analyzed for each region. The Phenomenex EZ:faast GC/FID amino acid kit was used for the determination of amino acid profiles of the samples. Mineral contents were analyzed using an inductively coupled plasma–optical emission spectrophotometer (ICP–OES), while an HPLC method was used for the determination of the organic acids. pH, brix, titratable acidity, formol number and ash contents of the samples were also evaluated. Totally the levels of 19 different amino acids were namely alanine, glycine, valine, leucine, isoleucine, threonine, serine, proline, asparagine, aspartic acid, methionine, glutamic acid, phenylalanine, glutamine, lysine, histidine, tyrosine, tryptophan and sistein were investigated in pulp samples. Asparagine was found at the highest level in all samples (Çarşamba and Ereğli), followed by aspartic acid, alanine and serine. In general, methionine and tryptophan contents were found at the lowest level while sistein was not determined. The five major elements (sodium, potassium, calcium, magnesium and phosphor) were studied and potassium was found at the highest level in all samples, followed by phosphor, magnesium, calcium and sodium. However, the amounts of the minerals were found to be differed between two regions. Citric and malic acid contents of pulp samples obtained from the fruits of Çarşamba region were found as 2.4 – 4.2 g/L and 2.6 – 4.0 g/L, respectively. Similarly, it was found that samples obtained from the fruits of Ereğli region contained 2.0 – 4.7 g/L citric acid and 2.5 – 4.6 g/L malic acid. The results showed that the amino acid, mineral and organic acid profiles of peach pulps may change according to the region that the fruits were obtained from as well as the time of the fruit season. Therefore, the results of the study may be helpful in both the characterization of peach pulps and the detection of adulterations in the manufacturing of commercial peach nectars.

Key words: Peach Pulp, Amino acids, Minerals, Organic acids,

KINETICS OF NON-ENZYMATIC BROWNING IN TOMATO PASTE DURING STORAGE

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Abstract:

During storage, tomato products such as tomato puree or tomato paste undergo both nutritional and sensorial quality changes. Non-enzymatic browning is one of the main causes of quality degradation in tomato products. In this study, the effect of storage temperature on non-enzymatic browning of tomato paste was investigated. Formation of 5-(hydroxymethyl)- 2-furfural (HMF), an intermediate compound of the Maillard reaction, degradation of ascorbic acid and color changes were studied to evaluate the non-enzymatic browning in tomato paste. For this purpose, tomato paste samples were stored at 20, 30 and 40°C for 12 months and analyzed each month for ascorbic acid, HMF and color changes. As expected, the degradation rate of ascorbic acid increased with increasing storage temperature. Analysis of kinetic data suggested a zero-order reaction for the degradation of ascorbic acid in tomato paste during storage. The activation energy for the ascorbic acid degradation was 34.41 kJ/mol and Q_{10} values were 1.58 and 1.54 at 20-30°C and 30-40°C, respectively. The formation of HMF and color change during storage was also fitted to a zero-order kinetic model. The activation energy values for the HMF formation and color changes were 63.91 kJ/mol and 74.52 kJ/mol, respectively. Q_{10} values for the HMF formation were 1.94 at 20-30°C and 2.77 at 30-40°C, while Q_{10} values of 2.84 and 2.49 were found for the color change at 20-30°C and 30-40°C, respectively. Results from this study showed that the HMF content of paste samples increased while the ascorbic acid content and color quality decreased significantly as the storage temperature increased. Thus, the storage temperature of tomato paste and other tomato products should be as low as possible in order to protect their quality.

Key Words: Tomato paste, Non-enzymatic Browning, Kinetics, Ascorbic Acid, HMF, Color change

YOGURT, YOGURT-BASED PRODUCTS AND THEIR GENERAL USAGES

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ABSTRACT

Yogurt is one of the most consumed dairy products over the world. It has healing power and very important properties on human health. Especially for this reason, it is widely used in different forms as different products and meals. In Europe, USA and some Asian countries yogurt is generally consumed as a dessert. Fruity yogurt, yogurt drinks, fruity ayran and frozen yogurt are preferred in these countries. However in the homeland of yogurt, in Central Asia, yogurt has a special meaning. From past to present, yogurt technology and variety have shown major improvements and both traditional and technological methods are still used by Central Asian people. For this reason, very rich diversity about yogurt is present in this region. Yogurt is consumed as plain yogurt, ayran, fruity yogurt, flavored yogurt, buttermilk, strained yogurt, salty yogurt, tulum yogurt, winter yogurt and frozen yogurt. Generally it is used in meals such as soup, main courses, cold appetizers and desserts and alongside with main courses. In this work yogurt-based products are summarized and different usages of yogurt in meals in Turkey are explained.

Key words: Yogurt, Yogurt-based Products, Yogurt Meals

CONTRIBUTION TO A BETTER UNDERSTANDING OF THE RELATIONSHIP BETWEEN THE PROTEIN COMPOSITION OF SOFT WHEAT FLOURS AND THEIR ALVEOGRAPHIC CHARACTERISTICS.

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Abstract:

The objective of this study is to determine the alveographic characteristics of 43 soft wheat samples representing 39 genotypes in total, extraction and quantification of soluble and insoluble protein fractions in order to elucidate the relationships between them and alveographic characteristics. For sequential fractionation, the monomeric proteins were solubilized and separated from polymeric proteins by the method of Li and *al.* (2008), then soluble glutenins were extracted from the residue by the method of Wang and Kovacs (2002), finally gliadins were precipitated from monomeric proteins according to the method of Dupont and *al.* (2005). Total proteins and protein levels of the different obtained fractions were assayed by the Kjeldahl method. The results of biochemical analyzes revealed that genotypes present the following average levels: 13.09 ± 2.48% total protein; 53.81 ± 5.14% monomeric proteins, 32.09 ± 3.99% gliadin, 21.71 ± 3.75% albumin-globulin, 13.62 ± 2.76% soluble glutenin, 32.34 ± 3.04% insoluble protein residues, 67.43 ± 3.68% soluble proteins and finally 45.96 ± 4.64% polymeric proteins. Statistical analysis of the results revealed that: the insoluble proteins and polymeric proteins (relative to total protein and dry matter), soluble glutenins and soluble proteins (relative to the dry matter), with the total protein fraction, are the most closely associated with the baking strength and tenacity W, P.

Key words: soft wheat, protein fractions, alveographic strength.

STUDIES ON DEVELOPING OF GRAPE JUICE PRODUCTION IN TRAKYA

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ABSTRACT

Wine grapes are generally grown in Trakya side of Marmara Region. Mid or late season table grapes are grown in Anatolia side. Wine grape production is common in Trakya and these grapes are marketed to wine factories. On the other hand, grapes produced in small family enterprises are used to supply the consumption of the family as fresh grape, pekmez (grape molasses) and bulama (solid molasses). Despite good ecological conditions and marketing facilities in the region, the volume of food industry and industrial business based on viticulture has never reached the desired level except for trading of wine production. The alternative way in evaluation of grape can be the production of grape juice. Grape juice which contains many of the nutrients, is a product with healing properties against diseases, nourishing, restorative. We conducted a research project between 2006-2010 at the Viticulture Research Station in Tekirdağ. In this research, we determined the grape varieties suitable for the production of grape juice and found the criteries of these juices quality. Also the pilot scale grape juice factory was founded in 2007 with the financial support of Tekirdağ Governor's Office. Although having the small capacity, this facility is good model for the investors. In this study, It was evaluated the work and stages on the production of grape juice.

Key words: Viticulture, Grape juice, Trakya

SOME CHEMICAL PROPERTIES AND VOLATILE PROFILES OF STRUGA ARTISANAL CHEESE

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Abstract:

Artisanal Beaten cheese is an authentic product according to its hard consistence and exceptionally salty taste (5-10%), and with its properties to be maintained even in ordinary conditions. The higher percentage of salt in this type of cheese is not considered a disadvantage, but a property of its technology which allows easier maintenance and long lasting of the product considering its primitive technology of production. It originates from the territory of Mariovo's, where it was manufactured a very long time ago on the pasture land exclusively from sheep's milk. It is emphasized that the production of cheese has been carried out since the times of the Ottoman Empire. This kind name was given after referring to the manufacturing process of the cheese: the cheese curd is beaten to expel excess of water in it. Raw ewe's milk is used in the manufacture of artisanal Beaten cheese. Following the coagulation of milk at 34 °C for 45 min by using animal rennet the curd is stirred and beaten manually with a wooden stick approximately for 30 minute until a homogenous compact structure is obtained. After the drainage, the curd is cooked in a hot water at 80 °C for 30 min. Following the cooking, the curd is beaten again for 5 to 10 minute. The curd is molded into balls (4-6 kg) which are then transferred to a cotton cloth for draining by a weight pressure (4 kg per kg curd) for about 24 h. Then the curd is pre-ripened for 2 days in sunlight. During this period, the curd gains a specific yellowish color, a hard texture and visible holes. In this study, the chemical composition and volatile aroma profile of a type of important cheese for the Struga dairy sector in Macedonia was characterized. The ranges for gross composition were from 38.08 to 39.87 (w/w) for moisture, 24.01 to 26.58 (w/w) for total protein, 41.99 to 45.32 (w/w) for fat in dry matter, 6.11 to 6.26 (w/w) for salt content. Proteolysis showed various levels of water-soluble nitrogen (WSN-SN) ranged from 3.15 to 9.99 and from 1.11 to 2.56 for soluble nitrogen in 12 % trichloroacetic acid (TCA-SN). Forty four volatile compounds were identified in the cheeses by solid-phase microextraction combined with gas chromatography-mass spectrometry and the results are discussed based on their chemical classes (10 esters, 7 ketones, 10 acids, 5 alcohols, 6 terpenes, and 6 miscellaneous compounds). Acids and alcohols were the most abundant classes identified. The results suggest that each cheese from Struga had different volatiles profile and that the manufacturing technique as well as ripening conditions of the cheeses played a major role on the individual volatile profiles.

Key words: Beaten cheese, Volatile compounds, SPME, GC-MS.

GENISTEIN

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Abstract:

Genistein (4',5,7-trihydroxyisoflavone) is the simplest form of isoflavonoids that is biosynthesized from Leguminosae and it is a major intermediate in biosynthesis of complex isoflavonoids. The main sources of genistein are soy bean and soy products, it can be synthesized chemically or biologically from flavanone naringenin which is found in plants. Genistein has many important health benefits, such as decreasing body mass and fat tissue, altering concentrations of insulin, leptin, thyroid hormones, adrenocorticotrophic hormone, cortisol and corticosterone, prevention of osteoporosis, lowering risk of breast and prostate cancer and cardiovascular diseases, attenuation of human cancer cell by inhibiting DNA topoisomerase and protein tyrosine kinase. Additionally, genistein can exert both estrogenic and antiestrogenic activity via the ability of binding estrogen receptors, disturbed glucose transport into cells and affected on lipid metabolism. In this study; biological activities of genistein, as well as its chemical and biological synthesis and effects on health were reviewed.

Key words: Genistein, Isoflavone, Metabolism, Hormones, Cancer chemoprevention

CURRENT PROBLEMS IN RAISIN PRODUCTION AND EXPORT

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Abstract:

The yearly export revenue of Turkey has almost fourfold in the past 10 years making it 151 billion 707 million dollars in 2013. In the same period Manisa's yearly export revenue has increased more than ten-fold making it more than 4 million dollars. It is important for us to remedy the problems about raisin the sector that we occupy %40-45 in world market and earn 300-500 million yearly foreign exchange income. In this study we interviewed with manufacturer, experts and the officials of the process and exports companies about problems of raisin's production and export. We tried to evaluate it by its steps and order of priority, then we examined the most asked questions. One of the most important problems is inadequate traceability from field to table and the other one is chemical residue level is not enough for the recipient country standards. Another important problem is manufacturers' false usage of hormone preparations and dipping solution making quality and price decrease because of failure to achieve uniformity of color and size. The products from cluster that early harvested, removed without being properly dried and the cluster that has been dried with healthy and rotten altogether influences export in a bad way. The false usage of tossing machine cause a large cluster waste in final product that damage to berries and these cluster pieces cannot separate by sieves in factories. Another problematic step in raisin grape exportation is the problems of export companies and country standards. There were still big crises even though the raisin grape exportation is doing according to EU standards. In raisin production it has been thought that it would be a good alternative to consider the quality parameters including size, skin, moisture, etc. will be more accurate than evaluation by only color parameter. In marketing, it is also important to create new local markets and increase consumption. In raisin sector that we are second in production and world leader in export, we need to solve our current problems and decrease the risk to make sure that our country earns more and every participants get what they deserve.

Key Words: Raisin, Export, Product, Problems.

CHANGES IN COMPOSITION OF GOAT COLOSTRUM DURING FIFTEEN DAYS POSTPARTUM

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Abstract:

Saanen crossbred goats are the most productive and preferential dairy goats in the Mediterranean coast line of Turkey. Milk obtained by small ruminants make a little contribution to the whole milk production. The annual milk production from goat in Turkey is 257 thousand tones, contributing 2.3 % to the total milk produced in the country. Colostrum is very rich in fat and protein as compared to the normal milk. It is very important to feed the offspring to get transferred the maternal immunity. The present study was undertaken to estimate the chemical composition of goat colostrum during 15 days after parturition. Data from 35 Saanen x Hair (S) crossbred goats during 15 days were used to determine colostrum composition. Goats were chosen of 2 years old with single-dropping. The animals were fed 500 g/day concentrate (16% crude protein and 2500 kcal metabolisable energy/kg/dry matter) in addition to pasture during the experiment. The first colostrum samples (400 ml) were taken after birth before suckling and sample collection was repeated with 24 hours interval during 15 days. Milk samples were analyzed for total solid (TS), solid non fat (SNF), fat, protein, lactose, casein, urea, density, acidity, free fatty acid (FFA), citric acid, freezing point depression (FDP) by MilcoScan FT120 (FOSS). The level of total solid, fat and protein contents were the highest on day one and decreased gradually from the first day to 15 days postpartum whereas citric acids increased. Results of the statistical analyses indicated significant day effects on the contents of total solid, fat, protein, casein, freezing point depression ($p < 0.01$), citric acid and titratable acidity ($p < 0.05$). After postpartum, TS, SNF, fat, protein, lactose, casein, urea, density, FFA, citric acid and FDP content of goat milk were found to be 23.86 ± 0.926 %; 10.42 ± 0.935 %; 12.97 ± 1.572 %; 6.18 ± 0.732 %; 3.58 ± 0.085 %; 4.822 ± 0.507 %; 71.61 ± 4.68 mg/dl, 1.025 ± 0.004 g/cm³, 11.41 ± 3.122 mmol ffa/100g fat, 0.027 ± 0.010 %, -0.683 ± 0.039 whereas normal milk is 11.13 ± 0.588 %, 9.40 ± 0.243 %; 1.57 ± 0.285 %; 3.79 ± 0.093 %; 4.59 ± 0.164 %; 2.687 ± 0.082 %; 61.17 ± 1.428 mg/dl, 1.036 ± 0.001 g/cm³, 7.41 ± 0.993 mmol ffa/100g fat, 0.113 ± 0.008 %, -0.525 ± 0.021 . It is concluded that during the first three days of colostrum was the most useful to transfer the immunity, it took 8-10 days to produce normal milk.

Key words: Saanen goats Milk production, colostrum, postpartum

FEASIBILITY OF VEGETABLE DRYING TECHNIQUE BY GEOTHERMAL HEATING AT CITY OF KIRSEHIR

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Abstract:

Demand for healthy food products has risen dramatically in recent years in the world. The findings that indicate that some major diseases such as cancer and obesity are triggered by food products which do not satisfy the necessary sanitation conditions have lead the consumers use organic and decontaminated products. Experts indicate that vegetables should be consumed after dring them whether on their natural growing season or out of season. In that case, the demand for dried vegetables would always be high since the drying sector is a preferred field of bussiness and has great contributions to economy. Consumers not only make use of the dried vegetables directly, but also they can benefit from the dried vegetables in instant soup, infant food and additive food flour. The first geothermal fruit and vegetable drying facility has been established at Karakurt state in the city of Kirsehir with the contributions of Kirsehir Municipality and Special Provincial Administration. Drying of banana, palm, quince, orange, pineapple, pear, kiwi, peach, watermellon and yellow mellon is currently practised in that facility. However, the drying facility at Kirsehir is not currently serving with full productivity. In the city of Kirsehir, 39 different kind of vegetable is grown at 30057 different area. The proper selection of vegetable type according to climate conditions and proper irrigation techniques would yield the city to become more productive in field of vegetable growing. Among countless vegetables; tomato, water mellon, yellow mellon, pepper, cucumber, eggplant, onion, green beans, white cabbage, lettuce, spinach, garlic, leek and carrot would take the first place to grow. The research that we are presenting would shed light on the sector of vegetable and fruit drying, specifically on vegetable drying. The process of drying that will be used is also explained technically step by step.

Key words: Vegetables, pre-processing, drying, packaging, storage.

ANALYSIS THE EFFECT OF DIFFERENT PRETREATMENT SOLUTIONS AND APPLICATIONS ON RED SPICE PEPPER DRYING TIME PERIOD

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Abstract:

Pepper, grown in various countries around the world is an important cultivated plant for the food industry. Powder and flakes of red pepper produced by grinding of dried spice red pepper, have high economic value and is consumed commonly in the world. The most urgent health and marketing problem about the spice red pepper is aflatoxin. This toxin has carcinogenic effect for human. High moisture content of fresh pepper and air temperature during their harvesting period, supply ideal situation in order to grow *aspergillus* genus molds and toxin production also. Drying of fresh red peppers in a short time after harvesting can reduce mold formation and toxin production. They are dried as whole or cut by sun and/or industrial dryer. This study was conducted in 2012 and Maras-1 spice red pepper *Capsicum annuum* L. breded by Agricultural Research Station of The Eastern Mediteranean Crossing Region was used. Fresh peppers were immersed in 3 different pretreatment solutions (potassium carbonate+ethyl oleate, potassium carbonate+olive oil, control), than cut into pieces and dried in an oven at 70 °C. The effect of pretreatment solutions and 4 different applications (wash+immerse fresh solution, wash+immerse old solution, immerse fresh solution without washing, immerse old solution without washing) on moisture losses of pepper were analysed. There was significant differences among applications about moisture losses but pretreatment solutions have not. As a result, suitable pretreatment solution usage and applications may increase the dryer capacity and decrease drying time so drying cost and aflatoxin risque may be decreased.

Key words: Spice red pepper, spice, pretreatment solution, drying, aflatoxin.

TRADITIONAL FERMENTED MILK PRODUCTS IN TURKEY

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Abstract:

The aim of this review is to introduce product techniques and to describe compositional characteristics of fermented milk products that have rich nutrient content and transferred industry in traditional producing in many provinces of Turkey. A better knowledge of their characteristics would support the improvement of the production technology and help to obtain a constant quality product capable of being successfully introduced into national and international markets. **Strained yoghurt**, a traditional fermented milk product, is widely consumed in Turkey. It is made by concentrating plain yoghurt into a specified total solid content in a cloth bag. Strained yoghurt has a better keeping quality than normal yoghurt due to higher total solids and concentration of lactic acid. **Tulum Yoghurt (Tuluk Yoghurt)**; Tulum (Tuluk), yogurt fermented product which is preserved in sheep or goat leather in Mediterranean Region. **Salted Yoghurt**: Salted yoghurt is a traditional fermented of dairy product that is produced in Hatay region. The salted yoghurt has a unique properties that has salty, sour aroma and can be stored for a year without spoilage and consumed in almost every meal among other yoghurts. It is important a natural substance like salt and heat to be used in the production of salted yoghurt in a period when chemical protection methods became widespread. **Winter Yoghurt**: Yogurt is a very popular food in winter, in the construction of various soups and pies are used in construction. **Kurut**: After manufacturing yoghurt, taking into cloth bags made from linen to soar, filtration process continues 10-20 days. Thoroughly strained yogurt into a large container of salt to be obtained is kneaded. 20-60 g of yogurt to desired consistency in size from hand-shaped be divided into pieces, put on clean cloths on the terraces or on a flat surface to dry 1-2 weeks are left until it is dried in the sun. It must be kept dry in a cool dry place. **Ayran**: Ayran, which is a traditional Turkish beverage made from yoghurt, is manufactured traditionally by adding water and salt into yoghurt or industrially by fermentation of diluted milk with water and further dilution with salt containing water after fermentation.

Key words: Strained Yoghurt, Tulum Yoghurt, Salted Yoghurt, Winter Yoghurt, Kurut, Ayran

PREVALENCE OF IRON DEFICIENCY ANEMIA AND PROTEIN-ENERGY MALNUTRITION IN A GROUP OF ALGERIAN CHILDREN AGED LESS THAN 5 YEARS.

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Abstract:

The present study was undertaken to discover the extent of the problem of protein-energy malnutrition and iron deficiency in children under 5 in Algeria. A total of 150 apparently healthy children were selected for investigation, in accordance with thresholds used by WHO, anemia is present in 36 or 24% of children ($Hb < 11g/dl$), and 52 or 34.6% have completely depleted iron stores ($Ft < 12\mu g / l$). The technique of combining biological indicators of nutritional iron status is used to refine the diagnosis of iron deficiency, the results show that 33 or 22% of children have iron deficiency ($Ft < 12\mu g / l + CS < 15\%$) and 22 or 14.6% of children meet the criteria for iron deficiency anemia ($Ft < 12\mu g / l + CS < 15\% + Hb < 11g/dl$). A statistically significant relationship found between age, breastfeeding and increase the frequency of iron deficiency anemia. Based on WHO recommendations, assessment of nutritional status was done by calculating the Z scores, overweight and stunting are the most answered shapes with respective frequencies of 9.3% and 12%, the frequency of wasting and underweight are 4% and 12% respectively. No statistical relationship between age, sex, iron deficiency anemia and malnutrition. From this work it emerges that protein-energy malnutrition and iron deficiency anemia remain topical in Algerian children. An extensive outreach program and food fortification are the most effective at different levels to disorders caused by these types of deficiencies means.

FOOD SAFETY AND ORGANIC FARMING APPLICATIONS: THE EFFECTS OF BACTERIA INOCULATIONS ON ANTIOXIDANT ENZYME ACTIVITIES IN TEA LEAVES

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Abstract:

To meet the food needs of a growing world population, some chemical and biotechnological methods as well as traditional agriculture have also been being used. Crop productivity has been increased by using chemical fertilizers, hormones, pesticides, hybrid seeds, and genetic modification techniques. But, a question which we interrogate to and are concerned with both as individual and as a society has arisen in recent years; how much healthy and safe are the foods that we consume? The answer to this question is gaining more importance day by day. About 400 million tons of chemicals are produced and used per year in the world. Among the most insidious and terrible risks affecting human health and safety are chemical risk factors. The cause of many diseases and especially occupational diseases are chemicals. The chemicals are often used in procedures applied to improve productivity. This condition ruins ecological systems and constitutes a threat to agricultural workers and consumers. Organic farming defined as a form of agricultural production, performed without using chemicals and under control from production to consumption in all phases and aiming the elimination of chemical risks and creating sustainable agro-ecosystems, is a friendly farming method for human and environment. In our study, we have investigated the effects of some bacteria inoculation on antioxidant enzyme activities as part of a project aiming to increase productivity with organic farming methods of tea which is Turkish society's national drink. For this purpose, glutathione reductase and glutathione S-transferase, two enzymes of glutathione metabolism, are important in antioxidant defense system and glucose 6-phosphate dehydrogenase and 6-phosphogluconate dehydrogenase, the enzymes catalyzing the irreversible reaction of the pentose phosphate metabolic pathway, were examined. Tea plant was grown by inoculating of *Bacillus atrophaeus* RC55, *Pseudomonas putida* 3/10, *Paenibacillus polymyxa* RC05, *Bacillus pumilus* 39/4, *Bacillus lentus* 29/6, *Bacillus megaterium* RC07, *Bacillus subtilis* RC63, *Pseudomonas fluorescens* T26, *Bacillus subtilis* 3/3, and *Pseudomonas fluorescens* RC77. Leaf samples, harvested from bacteria inoculated tea and control tea, were homogenized in the appropriate buffer, and enzyme activities were determined. Inoculation of all bacteria except for *Bacillus pumilus* 39/4 and *Bacillus lentus* 29/6 raised glutathione reductase activity ranging from 81% to 33%. GST activity was increased by seven bacteria except for *Bacillus atrophaeus* RC55, *Bacillus subtilis* 3/3 and *Pseudomonas fluorescens* RC77. While all agents except for *Bacillus lentus* 29/6 were upgrading G6PD activity, 6PGD activity was the most affected by *Pseudomonas putida* 3/10 (+36%). These results indicate that the mentioned bacteria inoculated into tea plants may strengthen the antioxidant defense system and facilitate to cope with stress factors.

Key words: Tea, Microorganisms, Antioxidant Enzymes

COMPARISON OF TURKISH, GREEK AND BULGARIAN BREAKFAST

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Abstract:

Breakfast is considered the most important meal of the day and people, can benefit from breakfast consumption in several ways. Turkish, Greek and Bulgarian breakfast is exceptionally diverse and delicious. All of them include the high nutritional value and the quality of the Mediterranean products. Turkish breakfast included butter, cheese, olives, the vegetables as tomato, green pepper and cucumber, pasties, simit (savory roll covered with sesame seed), savory pancakes, flakies, biscuits, cookies, fresh fruits such as apple; pear, orange, watermelon or melon, several jams and honey, sucuk (spiced sausage similar to pepperoni), pastırma (beef that has been smoked or dried in the sun after being treated with spice), salami and sausages, grilled bread, Eggs (boiled, fried, omelets), Another feature of Turkish-style breakfast, tea is served by brewed in Turkish style. Greek breakfast ingredients are classified as follows: Bread, pastries, buns cheese, yoghurt, traditional yoghurt, butter, sour milk, etc., cold cuts, meat, honey, sesame bar, tahini, local traditional marmalades, olive oil and olives, eggs (boiled, fried, omelets), Pies (cheese pies, green pies, etc), local sweets fresh fruit, juices, fruit salads, seasonal vegetables, local or biological warm traditional soup (frumenty, pulses, etc), cereals (wheat, frumenty, etc) herbal drinks, Greek coffee. A typical breakfast tends to consist of an espresso coffee in Bulgaria. One of the most famous and most popular breakfast items in Bulgaria is banitsa. It is made of dough with various fillings, such as cheese, spinach, rice, and meat. Other popular breakfast dishes include pancakes, buhtas (fritters), mekitsas (fried dough pieces), and fried bread slices. All of these are particularly delicious when served with jam, marmalade, honey or Bulgarian yogurt. All three countries breakfast are nutritionally, some of these for the most part are protein-rich and starchy as they were based on traditional eating habits of these countries people years ago, who needed a hearty breakfast to get them through a day of hard work. With that in mind, this type of breakfast can act more as a brunch and keep you full until dinner.

Key words: Turkish, Greek and Bulgarian breakfast

CONTRIBUTION TO THE STUDY OF BIOACTIVE MOLECULES MASTIC

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Abstract:

Since ancient times, plants have always been exploited by man they constitute an important source of food intake and have some interest in the pharmaceutical and cosmetic fields. The origin of our current drugs coincides with the origin of knowledge of medicines plants is with the origin of herbal medicine. this therapy, ancestral orally transmitted over the centuries Advances in the identification and extraction chemistry allow to obtain the active ingredients in a pure state and their effect can be tested physiologically by modern methods of pharmacodynamics. It is in this context that the present work has as its object the purification of active molecules (tannins) and identified by TLC and a pharmacological evaluation. The study was conducted on leaves *Pistacia lentiscus* L mos harvested in March 2011 in the region of Ain Ashir (Annaba), which is a 6.64% moisture) and meets the standards described in bibliographies between 12 and 15%, followed by photochemical tests have shown that this plant is rich in tannins, which also includes the leuco anthocyanins, flavonoids, saponins them, coumarins and alcamoides with average quantities for the presences of glicosides the presence of anthocyanins aves amounts more or less low, which shows that almost all existing secondary metabolites mastic are phenolic compounds The quantitative study of the active molecule tannins plant gave a yield equal to 33.03% in the leaves of mastic argued by analyzing the quantitative results of tannins pat CCM could reveal and confirm that the tannin is a tannin gallic concluded these tests show that the mastic contains various secondary metabolites whose tannins dominate. The results of pharmacological tests which confirmed that mastic has the following effects: Anti diarrhea since the nationalization of the plant increases the free phase diarrhea 81.66 minutes to 433.33 minutes for a 1 g / 1 kg dose and slow intestinal transit which is 39.22%

INHIBITION OF LIPID OXIDATION IN FISH OIL BY USING POMEGRANATE PEEL (*Punica granatum*) EXTRACT

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Abstract:

Effect of pomegranate peel extracts and synthetic antioxidant (butylated hydroxytoluene, BHT) on lipid oxidation of fish oil was investigated during accelerated storage at 60°C for 12 days. Fish oil was extracted from flesh of European anchovy (*Engralis encrasicolus*) by using diethyl ether solvent extraction method. Pomegranate peel extract (PPE) was obtained from dried peel powder by using ethanol solvent (containing 10% water) in ultrasonic bath at ambient temperature for 60 minutes. Ethanolic pomegranate peel extracts were added into preheated (50 °C) anchovy oil at concentrations of 100, 500 and 1000 ppm. Synthetic antioxidant (BHT) was employed at its legal limit of 100 ppm to compare the efficacy of pomegranate peel extract as a natural antioxidant. Aliquots of fish oil (1.5 ml) containing different concentrations of antioxidants (PPE and BHT) and anchovy fish oil (control) were placed in brown colored glass vials and stored in a laboratory oven at fixed temperature of 60 °C for 12 days. The total phenolic content and antioxidant activity of PPE were determined as 141.6 gallic acid equivalents mg/g and 23.18 mmol trolox eq/100 g, respectively. Inhibitor effect of 500 ppm concentration of PPE on peroxides formation was similar to 100 ppm of BHT throughout the storage, but their efficiency was significantly lower than that of 1000 ppm concentration of PPE ($P<0.05$). While the highest TBARS value was found in control sample (9.47 ± 0.51 mg MA/kg), the lowest TBARS value was determined in the 1.0 PPE as 5.71 ± 0.73 mg MA/kg at the end of the 12 days of storage. Pomegranate peel extract at concentration of 500-1000 ppm has retarding effect on the lipid oxidation in fish oil, while lower concentration than 500 ppm is less effective than conventional synthetic antioxidants, i.e. BHT at its legal limit. Results of this study suggest that bioactive compounds such as natural antioxidant can be extracted from byproducts of pomegranate juice processing fabric.

Key words: Anchovy oil, lipid oxidation, Pomegranate peel, phenolic compounds, PV, TBARS,

EFFECTS OF APRICOT KERNEL FLOUR AND FIBER-RICH FRUIT POWDERS ON LOW-FAT COOKIE QUALITY

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Abstract:

Reducing fat in diet has become a public health concern for consumers. Several fat replacers have been in use in bakery products. Apricot kernels are rich in lipid. The apricot kernel is generally added to bakery products and also consumed as appetizers. Apricots and apples among the most promising foods with the physiologically important constituents such as dietary fiber. In order to investigate the effects of fruit powders addition on low-fat cookie quality, apple or apricot powder (APL-P and APR-P) were used to replace wheat flour in the formulation of cookies at the levels of 10, 20, 30 and 40% (w/w) with 15% apricot kernel flour to replace shortening. Results indicated that there were no significant differences between spread ratio values of the cookies supplemented with different levels of APL-P up to 30% and control and they were all acceptable. However, APR-P supplemented cookies generally had a gradual increase in spread ratio values compared to the APL-P supplemented cookies above 10% level ($p<0.01$). The hardness values of the cookies generally increased significantly ($p<0.01$) with increasing APL-P levels. APL-P supplemented cookies generally had lower hardness values than APR-P supplemented ones. Overall sensory scores of the cookies supplemented with APR-P were not significantly different from those of the control. APL-P supplemented cookies generally had higher L^* and lower a^* than APR-P supplemented ones. Total dietary fiber contents of the cookies increased with increasing fruit powder supplementation level. APR-P appeared to be a more suitable replacer than APL-P up to 30% level.

Key words: Apricot Kernel Flour, Apple Powder, Apricot Powder, Cookie Quality, Dietary Fiber

APPLICATION OF ULTRASOUND TECHNOLOGY ON MEAT PROCESSING

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Abstract:

Ultrasound (US) is a vibration energy varying from 20 kHz to 10 MHz. These frequencies cannot be heard by human ear. Devices that produce US waves convert alternating current to mechanical vibrations. When these vibrations are conducted in a medium some bubbles occur and these bubbles absorb energy from the medium. These bubbles implode when they cannot absorb more energy. In this way large amount of energy is spread out in medium. US technology is used in mining science, machine technology, chemical and biochemical technologies, environmental technologies, oil-gas industry, energy technology, textile technology and medical sciences. Food technology is also one of these sciences using US technology. In food engineering US is applied in filtration, defoaming, degassing, depolymerization, cooking, cutting, freezing, drying, tenderization, brining etc. Especially in meat technology US is used for tenderization, brining, monitoring, drying and extraction. When US is applied, meat quality is found to develop. This review summarizes application of US technology on meat processing.

ISOLATION OF PECTIC POLYSACCHARIDES FROM CELERY (*APIUM GRAVEOLENS VAR. RAPACEUM D. C.*) AND THEIR APPLICATION IN FOOD EMULSIONS

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Abstract:

Celery (*Apium graveolens var. rapaceum D. C.*) is rich source of biologically active substances, widely used worldwide in human nutrition. In the current research, pectic polysaccharide has been isolated from celery tubers by ultrasound-assisted extraction with an aqueous ammonium oxalate. The obtained pectin has been characterized as highly methoxylated (HM) with degree of esterification (DE) 75 % and anhydrouronic acid content (AUAC) 57 %, respectively. Furthermore, the rheological properties of this pectic polysaccharide have been investigated. The effect of pectin concentration - 0,4; 0,6; 0,8 and 1% and oil phase 30, 40 and 50 % on dispersibility and stability of the resulting emulsions have been evaluated. It has been found that isolated pectic polysaccharide from celery tubers influence significantly on the rheological behavior of the emulsion and they characterized as non-Newtonians fluids. Because of the impressive emulsion stabilization properties of celery pectin as dietary fiber, we recommend its application for preparation of food emulsion with improved nutritional value and health benefits.

Key words: Pectic Polysaccharides, Celery tubers, Ultrasonic extraction, Emulsions, Rheology

BIOACTIVE SUBSTANCE AND FREE RADICAL SCAVENGING ACTIVITIES OF FLOUR FROM JERUSALEM ARTICHOKE (*HELIANTHUS TUBEROSUS* L.) TUBERS – A COMPARATIVE STUDY

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Abstract:

The Jerusalem artichoke (*Helianthus tuberosus* L.) known also as topinambour is plant with high importance for human and animal nutrition during the last decade. Its tubers were consumed fresh, stewed or they were added as flour in food products to improve their functional properties. In the current research a comparative study of bioactive substance and free radical scavenging activities of flour obtained from tubers of different varieties and wild populations of Jerusalem artichoke (*Helianthus tuberosus* L.) grown on territory of Bulgaria was done. The ultrasonic irradiation (42 kHz) was performed with 70 % ethanol and distilled water as solvents to accelerate extraction process. The total fructans, phenolic content and radical scavenging activities of the extracts were investigated. The 70 % ethanol extracts possessed the highest total phenolic content (6-17 mg GAE/g dry weight) and antioxidant activity defined by ABTS and CUPRAC methods. The water extracts characterized with higher fructan levels - 32 to 69 g/100 g dry weight. The flour obtained from tubers of Scorospelcu variety and wild population of *Helianthus tuberosus* L. were evaluated as a valuable source of total polyphenols and soluble dietary fibers, because of the rich fructan content. The results from our study also revealed the potential application of these flours as radical scavengers in human and animal nutrition for preparation of foods with improve health benefits.

Key words: *Helianthus tuberosus* L., Ultrasound-assited extraction, Total fructans, Antioxidant activity

A TEAR OF CHIOS: MASTIC

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Abstract:

Mastic is a resin obtained from Mastic tree (*Pistacia lentiscus*). It is called "Arabic gum" and "Yemen gum" in pharmacies. In Greece, it is known as the "tears of Chios" ,and in Turkey, it is referred to as "damla sakızı".Original a liquid, mastic is dried in the sun, and hard, brittle, translucent resin form of drops are transformed. When chewed, the resin softens and becomes a bright white and opaque gum. Mastic is soluble in ethanol, ether and, wherein, mastic acid, , bitter substances and essential oils. Mastic is thought have 3000 years of history. First mastic is used by the Greeks, then in the 16th century mastic has been learned by the Turks. Then the Turks have spread gum drops throughout east. Gum drops, which makes it unique, only in the southern region of the island of Chios in the Mediterranean grow. Mastic trees' sap derived from a natural source of nutrients. Mastic is used in pharmacy, confectionery industry, liquor industry, dentistry, perfumery, and cosmetic.

Key words: Mastic, Chios, Mastic tree

ASCORBIC ACID TREATMENTS FOR PREVENTING LIGNIFICATION ON READY-TO-USE CARROT

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Abstract:

Carrot was consumed by people due to benefits to human health. Carrots are best known for their rich supply of the antioxidant nutrient that was actually named for beta-carotene. However, these delicious root vegetables are the source not only of beta-carotene, but also of a wide variety of antioxidants and other health-supporting nutrients. Trends to use fresh-cut product increased nowadays, because humans want to consume fruit and vegetables freshly. In this research, the effect of different doses ascorbic acid treatments to carrots to prevent lignification was studied. For this aim, carrots were obtained from the Kocaeli Wholesale Distribution Center, and were screened for uniformity, such as being free from any mechanical damage and diseases and also same sized. After washing, carrots were shredded and treated with 1, 2 and 3% ascorbic acid to prevent lignification and to extend shelf life. Excessive ascorbic acid over carrot surface dried in a salad spinner for 60 second, and then carrots were packaged in a plastic box. Carrots were stored in a cold room at $4\pm 1^{\circ}\text{C}$ temperature and 85-90 RH during 14 days. Color values, visual quality scores of samples were determined at the beginning and 7 days intervals during storage. L values of samples treated with 3% ascorbic acid were higher than the other treatments, and followed by 2% and 1% ascorbic acid and control group. The same findings were obtained by a^* and b^* values of samples. Lignification of fresh-cut carrot occurs in the form of surface whitening. But in the present study, whitening which is signs of lignification did not seen on shredded carrot surface. So, it was found that ascorbic acid treatment to shredded carrots prevented to lignification. but firmness loss occurred ascorbic acid treated samples compared to control group. Therefore, it is suggested that ascorbic acid and firming agent must be used for shredded carrot to prevent both lignification and softening in the future work.

Key words: Carrot, shredded, lignification, colour, storage.

APPLICATION OF ULTRASONIC MEASUREMENTS TECHNIQUES IN FOOD INDUSTRY

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Abstract:

The food industry is currently focusing on using nondestructive, rapid, precise and online applicable inspection techniques for food quality and safety. Ultrasound can be utilized in industrial applications, such as monitoring the composition of meat, fish, poultry; on line control of dough fermentation, evaluating textural properties of cereal products, characterization of solid fat content in butter, in line control of cheese after curdling, determining physical and chemical properties of honey, control of carrageenan and its molecular properties in quality control. Ultrasonic measurements can be achieved according to the amount of ultrasonic energy reflected and transmitted to materials, the time of ultrasound wave flight and its velocity. Ultrasonic techniques that are used in food quality and safety applications can be classified in four main categories as pulse-echo, pitch and catch, continuous wave, process monitoring. In this study, ultrasonic measurements techniques and its applications in food industry is reviewed.

Key words: Ultrasonic measurement techniques, Food safety, Food quality

MICROBIOLOGICAL RISK ASSESSMENT OF RAW MILK CHEESES

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Cheese is an ancient food whose origins may predate recorded history. Probably first discovered in Central Asia or the Middle East, cheesemaking then spread to Europe. While cheese has been produced for centuries using raw milk, the introduction of pasteurisation in the 20th century has had an important role in enhancing the safety of many cheeses. Generally raw milk cheeses have a natural, highly variable microflora not found in pasteurised milk cheeses. Studies of various cheese types have indicated higher counts of Streptococci, Lactobacilli, Enterococci and Propionibacteria in raw milk cheese in Turkey. Artisan or artisanal cheese implies that a cheese is produced primarily by hand, in small batches, with particular attention paid to the tradition of the cheese maker's art, and thus using as little mechanisation as possible in the production of the cheese. Raw milk cheeses are more commonly produced by artisan cheese makers. Following milking and cooling of raw milk, several factors can act as hurdles during the cheesemaking process and these influence the growth, survival and/or inactivation of pathogens in cheese. Cross-contamination of raw milk cheeses with microbiological hazards can occur through inadequate food handling practices during retail sale, food service and in the home. Unpackaged cheeses in delicatessens are particularly vulnerable to cross contamination, especially with *L. monocytogenes* from other foods, food utensils, from display cabinet surfaces and condensation. Contamination of cheese post manufacture during retail, food service operations, or in the home can result from poor hygiene or infected food handlers. Pathogens and viruses can be transmitted to food via the faecal-oral route from hands soiled with faeces.

Key words: raw milk, raw milk cheeses, risk assessment, microbiological risk assessment

SİLİVRİ YOGHURT

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Abstract:

Silivri yoghurt is a kind of yoghurt which is made of ewe's milk and it is specific to in Turkey. The most important characteristics of this yoghurt is that there is a thick layer of cream on its surface. It was started to be produced commercially in 1870's. Production of real "Silivri yoghurt" totally stopped in 1980's since the amount of ewe's milk decreased and milk was processed into cheese. Yoghurt was made in earthenware in the first years and sold in Silivri. Then yoghurt which was made in Silivri was brought to İstanbul through seaways in earthenware. On the way to İstanbul, the structure and cream surface of yoghurt was destroyed. In order to remove this problem it was tried to make a very thick cream layer on the surface and production method of yoghurt was changed. In this way, yoghurt in more stiffness and thicker cream layer was produced. Since it was difficult to send yoghurt to İstanbul in earthenware and bring back the cases, after a while it was started to be made in tin cases (cauldron) and the yoghurt which was made in cauldron was called "Silivri yoghurt". This yoghurt is different from other kinds of yoghurt since the cases in which they are produced are low and have wide surface, and also this yoghurt has harder stiffness, its cream is thicker and rough due to its specific production technique. The main characteristics which distinguish Silivri yoghurt from classical yoghurt production is that heat-treated milk which was transferred in to cases in order to ferment are heated again and the speed of forming cream is increased. Heat-treated milk is transferred into metal cases at high temperature which would enable suds and then by giving heat beneath metal cases, the milk is heated for 40-60 min. in 70-90°C. This process is called "forming cream". It is also called "fire yoghurt" since both the milk in cauldron is boiled in wood fire, and due to process of "forming cream", which means reheating of milk cream provided to trays before fermentation. The process of forming cream lasts for 40-60 min. in 70-90°C. Then, milk which is cooled until degree of fermentation temperature are fermented in a way that its cream layer would not destroyed and it is left for fermentation for 3-4 hours in 40-45 C. It is left for cooling on its own until morning and the later day it is presented for sale. It was stated that the component of Silivri yoghurt was dry matter 13.78-19.50 % , fat 2.5-7.8% , acidity 45.5-122 °SH, nitrogenous substances 4.47-8.462% and ash 0.795-1.224%.

Key words: Yoghurt, Traditional yoghurt, Silivri yoghurt, properties

DAIRY SECTOR IN TURKEY

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Abstract:

In terms of production value, dairy industry composes 15 percent of the food sector in Turkey. Milk to be an essential nutrient that should be consumed, as well as its high contribution to the national income increases the importance of the dairy sector. Milk production plays an important role in Turkish agriculture. Turkey is among the largest global milk producers, but at the same time, has a very large informal sector for which little reliable information exists. In Turkey, 92% of the milk produced is cow milk, 6.1% sheep milk, 1.7% goat milk and 0.26% buffalo milk. "Turkey is in 15th place with 12.5 million tons of milk producing annually." "The major countries are Iraq, Azerbaijan, the United Arab Emirates and Kuwait for Turkey's dairy products export market." The street milk sellers buy their milk from family farms located in the neighbourhood of the cities. Consumers in small cities and rural areas purchase milk directly from the farms. In larger cities and urban areas consumers buy the milk directly from street sellers. Mandras are traditional processors that mainly manufacture White cheese, yoghurt, and ayran. Their manufacturing processes are heavily labour intensive. They are small labour-intensive milk processing units that employ as a rule less than ten persons. They process less than 10 tonnes of milk per day under very basic production conditions. The mandras are located in all parts of Turkey, in milk production zones and in remote areas. In Turkey, leading companies in dairy sector are mainly organized under two organization: SETBİR and ASÜD

Key Words: Milk, Milk production, Dairy sector, Turkey

MONITORING of AFLATOXINS in PEANUTS

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Abstract:

Peanuts (*Arachis hypogaea* L.) are one of the most important oilseed crops and snack foods in the world Agro-food trade market. The major producers/exporters of peanuts are the United States, China, Argentina, Sudan, Senegal, and Brazil. Peanuts are a perishable commodity, easily spoiled by fungi. Aflatoxins are a group of natural compounds mainly produced by *Aspergillus flavus* and *Aspergillus parasiticus*. They have been found to be carcinogenic, teratogenic, and mutagenic to humans and animals. Aflatoxin contamination of peanuts is one of the most important factors determining the quality of peanuts and has caused significant financial losses for producing and exporting countries. Therefore, monitoring of aflatoxins in peanuts and peanut-contained products is very important for protecting consumers. Various methods have been tried to decontaminate aflatoxin contaminated commodities (e.g. peanuts). These include physical methods (sorting, irradiation techniques, heating), chemical methods (acids, bases, oxidising agents), biological methods (microbiological), and solvent extraction. All EU member states have set tolerance limits for certain mycotoxin food combinations but at present no country has covered all important mycotoxins and all relevant commodities. The data varies greatly from country to country. The overall competent authority for carrying out a monitoring for aflatoxin levels in foodstuffs lies within the Ministry of Agriculture and Rural Affairs in order to estimate the actual dietary exposure of aflatoxin contaminants in the foodstuffs (eg. peanuts) concerned.

Key words: Peanut, Mycotoxin, Aflatoxin, Decontaminate

VITAMIN, AMINOACID AND MINERAL COMPOSITION OF GOAT MILKS' IN VARIOUS LACTATION PERIODS

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Abstract:

The purpose of this study was to determine the effects of breed and lactation on nutritional value of goat milk. Three different breeds (Turkish Saanen, Maltese and Hair goat) were provided from local producers at the beginning, mid and end of lactation period. Vitamin content was analyzed by using High performance Liquid Chromatography. Aminoacids were determined by gas chromatography with flame ionization detector. Inductively coupled plasma-atomic emission spectrometry was used for determination of mineral composition of milk samples. Vitamins A, B₂ and E, aminoacids and mineral contents of the milk samples (5 times each lactation period) were compared during lactation period. Vitamins A, B₂ and E contents of Maltese and Hair goat milks were higher than Turkish Saanen milk. Significant differences were also determined among the milk samples provided at different stages of lactation in terms of vitamin composition. Hair goat milk had the highest vitamin A content at mid lactation period. The highest Na content was determined in the milk of end-lactation period. Turkish Saanen breed had higher K content (1697.72 mg/L) in mid-lactation than other goat breeds and lactation periods. The amounts of Ca, Zn and Fe minerals were the highest at the beginning of lactation. Milks provided from Hair goat breeds had also the highest ALA, GLY, VAL, LEU, THR, PRO, MET, ASP+ASN aminoacids at the end of lactation period, but no significant effects of breeds and lactation period on the contents of LYS, HIS and TYR aminoacids were determined.

Key words: Goat, breed, lactation, mineral matter, vitamin, aminoacid.

INFLUENCE OF BREED, LACTATION NUMBER, AND PHYSIOLOGICAL STAGE OF LACTATION DAIRY COWS ON PHYSIOLOGICAL COMPOSITION OF MILK FOR CHEESE PRODUCTION

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Abstract:

Milk is the first food we eat from birth. It plays a vital role in our daily diet as it is consumed in large quantities in the form of milk, milk products of varied or as ingredients in various food preparations. In order to demonstrate the effect of these inputs further race, and the number of physiological lactation stage of lactation of the variation in milk composition and processability industrial, we undertook a study to examine the isolation of a sample of 12 dairy cows belonging to two different race: the Holstein and Montbeliard with two different lactation numbers: primiparous (first lactation) and multiparous (3rd lactation) at different stages of lactation (twenty days after calving), (two months after calving), (three months after calving). A study that required a trip to a farm in spreading the experimental criteria. Once the samples are collected they were transported to the laboratory where they have been a series of physico-chemical and microbiological analyzes (pH, acidity, density, total solids and grease, fat method of Gerber, GC fatty acid profile, and protein assay according to the Kjeldahl method). In fact, the results obtained from the various analyzes carried out show a change in the composition of milk according to its origin. The Montbeliarde breed produces more fat than the Prim-Holstein and richer in saturated fat milk. While the higher levels of unsaturated fatty acids are in favor of the Holstein breed. Unlike fat, it is the Prim-Holsteins that produce richer milk in crude protein, protein and casein. The study of the effect of lactation number on the chemical composition of milk showed variability the richness of the milk into useful materials. Primiparous milk was richer in fat and crude protein and its fractions compared to multiparous. Every time this study has allowed us to realize that the stage of lactation is also involved and has a significant influence on the physicochemical composition of milk between the three stages of lactation. The fat content and protein content varies inversely with the amount of milk produced and gradually diminish over the three stages studied. The study of the interaction between the various production parameters in place (race, lactation number, stage of lactation) is necessary for the improvement of milk quality technological tool.

Key words: milk, dairy cows, breed, lactation number, stage of lactation.

PHYSICOCHEMICAL CHARACTERISTICS OF SOME TABLE SWEET CHERRY VARIETIES

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Abstract:

SweetCherry varieties of 0900 Ziraat, Sweetheart and Regina from collections of 2008 and 2009 from Atatürk Central Horticultural Research Institute in Yalova-Turkey were selected as botanical materials in this study. The said materials were analysed in terms of their harvest quality (hardness of fruit flesh, resistance of breakage from stem, skin and stem colour, soluble solids, acidity that can be titrated, pH, ethylene production speed, respiration speed, total phenolic material amount, total antioxidant activity, total anthocyanine, sugar (fructose, glucose, sorbitol) and chlorophyll amounts in stems. It was observed that cherry stems had different pomological characteristics when their harvest quality was examined. It was seen that all varieties had similar fruit flesh hardness and resistance of breakage from stem. It was specified that while the sort (L) Sweetheart had a light colour shell, Regina and 0900 Ziraat varieties had shells darker in colour. 0900 Ziraat variety had a darker stem colour than the other two varieties. A comparison of respiration speeds of cherry varieties showed that the respiration speed of the Regina variety was lower than those of other two varieties. It was also observed that Regina variety had the highest phenolic substances (79,87mgGE/100 g); the other sorts had the following amount in terms of phenolic substances: 0900 Ziraat sort in 48.56mgGE/100g and Sweetheart sort in 37.37mgGE/100g. In parallel to these results, the highest antioxidant activity was observed at the variety of Regina with 520.46 µmol TE/100 g. While similar anthocyanine amount were calculated with 215.00 mgCyanidin-3-rutinosideED/100g and 211.3 respectively at the varieties 0900 Ziraat and Regina, the amount was lower at the Sweetheart variety with 197.67 mgCyanidin-3-rutinosideED/100g. The variety of Sweetheart had the highest fructose, glucose and sorbitol amounts, the varieties of Regina and 0900Ziraat had lower amounts in this sense.

Key words: SweetCherry (*Prunus avium* L.), antioxidant activity, anthocyanins, phenolic compounds, sugars.

ŞANLIURFA GROWN AYVALIK WAS OBTAINED FROM THE OLIVE OLIVE OIL NATURAL ANTIOXIDANT CAPACITY DETERMINATION

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ABSTRACT

Ayvalik olive varieties grown in Sanliurfa in this study derived from the antioxidant capacity of olive oil antioxidants were examined during aerobic respiration of cells against reactive oxygen species occurring in the body's defense system has important implications, dietary excess antioxidants uptake reactive oxygen species against may be sufficient so that living systems normal physiological functions can be fulfilled, but the production of an important potentially ayvalık varieties derived from oil antioxidant potential depicting a systematic research and antioxidant activity was to determine. Including DPPH and ABTS antioxidant capacity levels have been determined by two different methods. Research in the town of Sanliurfa is a specialized manufacturer of Hilver about 10 years old with olive varieties ayvalık installation was carried out in the garden. Olive samples, including meat and shell color index is determined by taking into account the maturity of classified examples, sigma plot 11.0 statistical analysis program was used.

STUDY OF SOME FACTORS INFLUENCING THE EVOLUTION OF LIPIDIC FRACTIONS, LIPOXYGENASIC ACTIVITY ON A PASTE OF BREAD WHEAT FLOUR DURING THE KNEADING

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Abstract

The aim of this work is to study the influence of the conditions of kneading of wheat's flour namely: speed, duration of kneading and addition of soya flour, on the evolution of some physicochemical and biochemical characteristics (lipidic fractions, the lipoxygenasic activity and on the destruction of the carotenoid pigments) as well as the relationships that may exists between these fractions and some technological characteristics. The technological analysis of wheat flour through alveograph Chopin has shown that the studied wheat is common breeding wheat; the mixograph test has also shown that the genotype AIN ABID presents short development time, average resistance to kneading and average backing strength. These technological characteristics are improved by adding soya flour. Initial speed of lipoxygenasic activity decrease during kneading, this decrease is faster when kneading speed is higher and also after adding soya flour. The total lipid content and fatty acids reduce as the kneading; this reduction is more pronounced after addition of soya flour. Increasing the ratio (polar lipid / neutral lipid) is explained by the formation of free lipid complex with the other constituents of the dough thus contributing to the formation of gluten network. This increase is more pronounced in the presence of soya flour. The increase of the destruction of carotenoid pigments as to the intensity and duration of kneading become more important and in the presence of soya flour.

Key words: bread wheat; soya flour; kneading; lipid contents and their fractions.

THE USAGE OF SUNFLOWER MEAL AS A PROTEIN SOURCE

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Sunflower is generally used in animal nutrition today. However, oilseed meals include materials as glycosides, which prevent to the absorption of the other nutrients. Thus it has limited usage in feeding for both poultry and ruminants. On the other hand, it is a product that should be evaluated in its entirety because it is an important waste of oil industry, rich protein resource and has high economic value. Besides, the meal does not contain toxic residues and its proteins have high nutritional value. Therefore it is an attractive source for protein supplement can be used for human nutrition. It is known that humans and children are faced with some diseases in undeveloped and underdeveloped regions in the world due to failure to obtain adequate protein. Taken directly protein from natural foods as well as the consumption of protein isolates obtained from various sources is becoming increasingly important in order to overcome the lack of protein and prevent these diseases. Although fish is one of the most widely used source of protein isolate, its fresh consumption is important and has high economic value. Therefore evaluation of alternative vegetable sources has essential importance. Sunflower proteins have balanced amino acid composition and many of them have low lysine content but they are rich in sulphur-containing amino acids of which plant protein sources are often poor. Also, sunflower meal has adequate amount essential amino acids. These properties add value to the protein obtained from sunflower. Another reason for usage of sunflower proteins as protein supplement for human nutrition is due to its digestible nature. The digestion properties of meal proteins positively affected from amino acid and phosphorus but fiber and carbohydrate content are adversely affected. For all these reasons, extraction conditions must be prepared under optimum conditions. In the literature, the main factors affecting these required criteria were defined as pH, concentration, temperature, treatment time and sodium chloride impact.

Key Words: Isolates, meal, protein, sunflower.

SENSORY EVALUATION, PHYSICOCHEMICAL PROPERTIES OF FERMENTED RED GRAPE BEVERAGES, “HARDALIYE”

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“Hardaliye” is a fermented beverage produced by red grapes and it is the most important traditional product in Thrace region. However, there are some questions about processing and quality characteristics of Hardaliye. The objective of this research was determination of some physicochemical properties and the sensory evaluation of “Hardaliye”. For this purpose, Hardaliye was produced by red grapes are called as “papazkarası” from Kırklareli region and it was stored in glass bottle for 2 months at +4 °C and 20 °C. Physicochemical properties (total monomeric anthocyanins, polymeric color content, total polyphenols, antioxidant activity, pH, total acidity, color properties) were determined for each 15 days during storage. Total phenolic content was analyzed by using the Folin-Ciocalteu method, and the amount of total monomeric anthocyanins was determined by using the pH-differential method. Antioxidant activity was analyzed by ABTS method and the results were expressed as “TEAC” (trolox equivalent antioxidant capacity). Color distribution properties were again determined by spectrophotometrically. Besides, sensory evaluation was performed for the first and the last months in storage. Sensory evaluation is a critical process for fermented product quality and consumer research. In Abstract, it was aimed with this project to be carried into the production of a beverage with industrial size and standard quality. Also, it can be served safely domestic and foreign markets are to be achieved.

Key words: Antioxidant, beverage, color, grape, hardaliye, sensory.

HORTICULTURAL SCIENCE

COMPARATIVE STUDY OF CHEMICAL COMPOSITION BETWEEN SEEDS OIL OF CACTUS (*OPUNTIA FICUS INDICA*) AND ARGAN OIL (*ARGANIA SPINOSA*) IN MOROCCO

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Abstract

Morocco is a leader in the production of edible cactus and argan oils. These oils are known by their pharmacological and nutritional benefits. It's considered as a very rich source of natural antioxidants. The aim of this study was to compare the total sterols, tocopherols and antioxidants contents in argan and cactus seeds oils, and to make qualitative measures namely acidity (% by weight, expressed as oleic acid) and peroxide value. The virgin argan oil used in this work was obtained from the Aklimarea of (Cooperation najahin province of Berkane) in the northeast of Morocco, while seeds cactus oil was provided by the national association for the development of cactus of Skhour Rhamna. Quality criteria were measured according to the method AOCS (American Oil Chemists Society) for acidity and ISO 3960 for the index of peroxide. Analysis of tocopherols and sterols were performed by phase liquid chromatography (HPLC), and gas chromatography (GC) respectively. The qualitative measurement has shown that argan oil's acidity (0.28%) is lower than that of seed cactus' oil (0.77%). However, the peroxide is almost the same in both oils with a 2.4-2.8 content (meq O₂ / kg) respectively. Our results showed that seed oil cactus contains 117.58 mg/100g of antioxidant tocopherols, including mainly α -tocopherol and γ -tocopherol at 36.89 and 58.06 mg/100 g respectively. However, Argan oil is richer in γ -tocopherol with 89.98 mg/100g. The sterol GPC analysis showed that the cactus seed oil is relatively richer in sitosterol than in sitostanol, 70.43 versus 64.97 mg/100g. This study showed that the argan oil is rich in vitamin E with a very high content of total tocopherols (752.21 mg/100 g) compared to cactus seeds oil, which is very rich in sterol with a very high content of total sterols (916.18 mg/100 g).

Key words: opuntia ficus indica, argan oil, tocopherols, sterols, acidity.

MORPHO-ANATOMICAL AND PHENOLOGICAL CHARACTERIZATION OF SPECIES OF OPUNTIA SPP PRICKLY PEAR PRESENT IN MOROCCO

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Abstract

The Opuntia cactus grows in arid and semiarid zones. Due to their remarkable genetic variability, Opuntia plants show a high ecological adaptivity. The prickly pear (Opuntiaspp) is currently attracting increasing interest by various actors in the socio-economic development of Morocco. As part of the plan "Marocvert" at 2020 horiziont, it is planned to plant 30,000 hectares of prickly pear in Rhamna situated at the north of Marrakech region. The objective of this study is to identify the species/ecotypes of the genus Opuntia would be best suited to the region. For this, the genetic variability of different species/ecotypes from different regions of Morocco was studied through criteria morpho-anatomical and phenological. Hundred twenty five ecotypes were collected and planted in the experimental station of INRA Settat Morocco (Station AinNzagh: latitude 33 ° 0 '3 N; longitude -7 ° 36' 59 W). The observations collected showed that the spacing between the areolas, snowshoes biometrics, phenology and fruiting level. We have identified seven species on the 125 ecotypes studied: *Opuntia ficus indica* (L) Mill, *O.megacantha SalmDyck*, *O.leucotricha*, *O.aequatorialis Britton & Rose*, *O.dillenii*, *O.robustaWendland HL* and *O.inermis*. In these species, the spacing between the areola varies between 2.3 and 4 cm, the number of young snowshoe increases in all species compared to the previous year, with the exception of *Opuntia robusta Wendland HL* . The total number of indeterminate buds is very important in all species in May with the exception of *Opuntia robusta Wendland HL*, and the rate of fruiting bodies is mixed. In conclusion, this study revealed the existence of seven species opuntia among the 125 ecotypes studied, including two species that had never been described before in Morocco: *O. ficus indica* (L) Mill and *O.megacanthaSalmDyck*. These species from different geographical origins from Morocco showed an important phenological difference in the size and shape of the cladode, the rate of fruiting and fruit color. The perspective of this work is to identify molecules with high therapeutic and anti oxidant effects potential in extracts from cladodes, fruit and flowers of prickly pear

Key words: Opuntia spp, systematic, ecotype, fruiting phenology.

EFFECT OF GROWTH HORMONES ON MICROPROPAGATION OF *OPUNTIA FICUS INDICA*

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Abstract:

In order to study the in vitro proliferation of shoots of two forms of *Opuntia* plant material from 15 years of age, a mineral solution of Murashige and Skoog, 1962 which macronutrients were halved (MS/2) and different balance of phytohormones were tested on the proliferation phase, multiplication and rooting: these three phases, the mineral solution MS/2 was selected for the two forms of *Opuntia*. Phytohormones combinations favorable to the proliferation and multiplication are BA [3mg L⁻¹] KIN [3mg L⁻¹] ANA [0.5mg L⁻¹] for the two forms of *Opuntia*. Hormonal balance AIA [0.5mg L⁻¹] with AIB [0.5mg L⁻¹] seems to be the best balance giving a number of (28 ±1.41) root growth in vitro by the *Opuntia ficus indica* Millf. *Inermis* followed by *Opuntia ficus indica* Milfl. *amycea* with (13±1.41) invitro-rooted shoots, root tips appear during the first few days, the roots obtained are fine, large, highly branched and grows in length with in the gélosé medium. Less shoots easily acclimated to a substrate based on peat. In the current study, the process of acclimatization has been applied successfully.

Key words: Micropropagation, culture medium, growth hormone, *Opuntia ficus indica*.

HYBRIDIZATION OF *OPUNTIA FICUS INDICA* BY *OPUNTIA ENGELMANII* VAR. *LANGUIFORMIS* AND PROSPECT OF IMPROVEMENT

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Abstract:

Opuntia is a very hardy species, It has in recent years a great importance in the fight against desertification, as it is an important for a source in arid and semi-arid areas. In order to improve the resistance to climatic hazards, we performed hybridization between two species of *Opuntia* are: the *Opuntia engelmannii* var. *languiformis*, this species has characteristics of disease resistance, it is located at the perimeter of Mesrane, Djelfa region, serte that the pollinator species. For the pollinating species, we chose the *Opuntia ficus indica* Mill. F. *Inermis* located at the perimeter of Belaiba, M'sila region, sensitive to climatic hazards. Our job is considered the viability of the pollen grains, the rate of fruit set, fruit ripening period and the qualitative and quantitative characteristics of fruits from hybridization. Indeed, the in vitro viability of the pollen grains, has proved satisfactory, it reached a rate of more than 75%. The success rate of hybridization is satisfactory. Manual hybridization favored fruit set, where the rate of the latter reaches 72.5%. Fruit resulting from cross pollination are a burden greater than those obtained by natural pollination.

Key words: Hybridization, *Opuntia engelmannii*, *Opuntia ficus indica*, Pollenviability.

THE SELECTION OF PRICKLY PEAR (*Opuntia ficus-indica* L.) IN EASTERN MEDITERRANEAN REGION OF TURKEY

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Prickly pear (*Opuntia ficus-indica* L.) belongs to *Opuntia* genus of Cactaceae family. Prickly pear (*Opuntia ficus-indica* L.) is naturally grown in Mediterranean region of Turkey particularly in Adana, Mersin, Osmaniye, Hatay, Antalya and southern Aegean. It is sold and consumed in summer time at local markets. There is no statistical data of production and consumption amounts of prickly pear in Turkey. The aim of this study was the selection, conservation and evaluation of prickly pear (*Opuntia ficus-indica* L.) genetic resources in eastern Mediterranean Region and determination of types for cultivation. In this project, 106 prickly pear genotypes were selected in eastern Mediterranean Region and these genotypes have been examining for morphological, pomological and chemical properties.

Key words: Prickly pear, *Opuntia ficus-indica* L., Genetic Resources, Selection, Biodiversity

This project was funded as TOVAG 111O135 by TUBITAK.

MOLECULAR CHARACTERIZATION OF 187 POMEGRANATE GENOTYPES BY SRAP

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There are different types and forms of pomegranates in Turkey because it is located in its native spreading areas. As the result of several selection programs many promising genotypes have been chosen. The selections have been examined in Aegean and Mediterranean ecological conditions where they originated. Alata Horticultural Research Station has one of largest pomegranate genetic resources in Turkey. This collection contains 270 pomegranate genotypes. The collection consists of Mediterranean, Aegean, South Eastern, and Bitlis region genotypes, and one USA, one Turkmenistan and two Spanish cultivars. The aim of this study was to characterize 187 pomegranate genotypes by SRAP markers. SRAP molecular analysis with 15 primers generated a total of 80 reproducible bands; 20% of which were polymorphic. The results indicate a low level of genetic diversity present amongst the pomegranate genotypes.

Key words: Pomegranate, genetic resources, molecular, SRAP

This project was funded as TOVAG 107O045 by TUBITAK.

THE STUDY ON FROST TOLERANCE OF 12 TURKISH POMEGRANATE (*Punica granatum* L.) CULTIVARS

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The aim of this study was to determine frost tolerance of 12 Turkish pomegranate cultivars during 2 years. The study was carried out using 12 pomegranate cultivars at the Horticultural Department of Agricultural Faculty of Çukurova University (Adana) and Alata Horticultural Research Station (Mersin) between 2007 and 2008 years. In the study, the annual cuttings taken from 12 pomegranate cultivars were treated by different temperature (-4, -8, -12, -16, -20 °C) in two different duration (4-8 hours). In results, there was no important difference of frost tolerances of the cultivars between years. Although there is no damage at -4 °C, the level of damage increased between 31-46 % at -8 °C. Increasing frost degrees decreased liveliness of cuttings. There was %4 liveliness of only İzmir 26 cultivar at -20 °C however all other cultivars were damaged fully at -20 °C. It was found that the treatment of "8 hours" was more lethal than those of the treatment "4 hours" on the cuttings of 12 pomegranate cultivars.

Key words: Pomegranate, Frost tolerance, cultivars,

FRUIT OF LIFE: JUJUBE (*ZIZIPHUS JUJUBE*)

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The jujube (*Ziziphus jujube*) fruit is recognized as the most important *Zizyphus* species and belongs to the Rhamnaceae family. Jujube plant grows commonly in Europe, southern and eastern Asia, and Australia, northern China. The ripe fruit is wrinkled and range from red to purplish-black. Jujube is a tasty and highly nutritious fruit. Jujube fruits are rich in various nutrients with carbohydrates, fiber, protein, fat, and several other vitamins and minerals. The main biologically active components are vitamin C, phenolics, flavonoids, triterpenic acids, and polysaccharides. Jujube has numerous pharmacological effects. Fruits, peels and seeds of jujube have been commonly used as a drug in traditional medicine and has also been commonly used as food, food additive and flavoring. Edible and different parts of Jujube possess multiple medicinal properties. The jujube fruit has been described as the “fruit of life”. Bioactive compounds have important roles in the prevention of chronic diseases. Jujube fruits are a significant source of phenolic compounds. Phenolic acids have been found to have strong antioxidants against free radicals. Therefore, jujube can be considered as a good source of natural antioxidants. Jujube fruit is recommended for the treatment of some chronic human diseases such as cancer and cardiovascular disease. In the paper is described simply health effect of *Ziziphus Jujube*.

Key Words: Jujube, fruit, *Ziziphus jujube*

EVALUATION OF THE IMPACT OF PHYTOSANITARY TREATMENTS ON BIODIVERSITY OF ENTOMOFAUNA OF A VINEYARD IN TADMAIT (GDE KABYLIE)

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Abstract

The use of pesticides in agriculture and the deterioration of natural habitats of fauna are the main causes of biodiversity decline. Especially insects, whether beneficial or harmful, play a predominant role in our agricultural environments as decomposers of organic matter, pollinator, pest or biological control agent. To estimate the impact of phytosanitary treatments made during the agricultural year in a vineyard where Fungicide treatments against downy mildew and powdery mildew are routinely performed, we sampled the entomofauna of the leaves of vines from a vineyard near Tizi-Ouzou. We estimated according to each cardinal direction richness (S), the diversity (H') and equitability (E). With the Japanese umbrella we captured 351 individuals, they belong to 5 classes, 15 orders, 38 families and 79 species. The highest richness is registered to the east with 38 species [$H' = 4.6$ bits; $E = 0.9$] and lowest in the south with 30 species [$H' = 4.1$ bits; $E = 0.8$]. In the leaves of the vine, *Plagiolepis schmitzi* is the most common in the north with (R.A.% = 15.1%) and to the east with (R.A.% = 15%), in the south it is Entomobryidae sp. 1 (R.A. % = 16.9%) and Aranea sp. 27 is the most abundant in the west (R.A. % = 15.8%).

Key-words: Biodiversity, vineyard, phytosanitary treatments, Japanese umbrella, Gde Kabylie (Algeria).

PHENOLIC COMPOUNDS AND UTILIZATION IN FRUIT GROWING

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Phenolic compounds are a class of chemical compounds in organic chemistry which consist of a hydroxyl group (-OH) directly bonded to an aromatic hydrocarbon group. Many phenolic compounds occur in nature and used in manufacturing of perfumes and flavors. Generally phenolic compounds have strong antiseptic and antibacterial properties and act as nerve stimulants. The main phenolic compounds which presented in plants are benzoic acid, cinnamic acid and flavonoids. Phenolic compounds have a potential use against oxidative damages diseases; therefore play a protective role through ingestion of fruits and vegetables. These compounds are very much essential for the growth of plant and involve in reproduction process of plants. Phenolic compounds distributed in almost all plants and they are subject of a great number of chemical, biological, agricultural, and medical studies. They have too many roles in fruit growing like as: gives colors of fruits, roles in the taxonomic studies, helps to determine of graft compatibility in early stage, their effects on plant growing, relation with dormancy requirements, breeding of pest and disease tolerant plants and uses in plant protection area. In these review the characteristics and uses of phenolic compounds was reported.

Key words: Phenolic compounds, fruit growing, fruit quality, breeding, cultural treatments, plant protection

EFFECT OF UREA, H₃BO₄ AND CaCl₂ ON FIELD CHARACTERISTICS OF APPLE FRUITS CV. GOLDEN DELICIOUS

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The study was conducted on apple trees orchard cv. Golden Delicious in Enishki, Duhok governorate, Iraq to investigate the effect of pre-harvest spray with calcium, boron and nitrogen on fruit characteristics and mineral contents. Trees were sprayed to run off with four weekly sprays of 0, 0.5 and 1% CaCl₂ started 53 days after full bloom, three weekly sprays of 0, 0.1 and 0.2% boric acid started 8 days after full bloom and four weekly sprays of 0, 0.5 and 1% urea started 28 days after full bloom. The results indicated that spray with 2 or 4% CaCl₂ reduced fruit drop and increased fruit firmness and fruit Ca content, CaCl₂ spray had no effect on bitter pit like incidence. Boric acid spray with 0.3 or 0.6% reduced fruit drop significantly and resulted in reduction of bitter pit like incidence. Urea spray with 2 or 4% urea decreased fruit drop, 2% urea spray increased fruit firmness and had no effect on fruit bitter pit incidence.

Key words: CaCl₂, Boric acid, Urea, apple, Golden Delicious, bitter pit

**STUDY OF THE POPULATION OF NEMATODES ASSOCIATED TO THE OLIVE TREE *OLEA EUROPAEA* L.
IN SOME REGIONS OF ALGERIA**

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Abstract

The Prospections conducted in both orchards and nurseries in some oil-producing regions (Blida, Boumerdes, Mascara, Biskra, El-Oued and Laghouat) have revealed the presence of 10 genera of nematodes which four are considered fearsome for olive trees. Then *Pratylenchus* detected in the majority of the sampled areas showed a frequency ranging from 12.5% to 71.42%. *Meloidogyne* only existing in the "Mascara" region showed a frequency of 14.28%, despite this low density are also considered as dangerous. The *Helicotylenchus* presented in turn a frequency from 6.25% to 50%, in the majority of the prospected sites. This one is considered as dangerous as their two previous counterparts. Among ectoparasites, only *Xiphinema* are expected to be the most fearsome, while other genera like: *Paratylenchus*, *Gracilacus*, *Telotylenchus*, *Aphelenchoides*, *Hemicriconemoides* and *Tylenchorynchus* are present in low densities and their harmfulness has not been demonstrated.

Key words: Olive, Nematode, Nursery, Orchard.

EFFECTS ON PLANT MORPHOLOGY OF DROUGHT IN OLIVE

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ABSTRACT

In recent years - with the increasing effect of global warming - the impact of drought on plants has also been increasing. The effects of drought vary according to species and varieties of plants. The olive tree is one of the least sensitive plant to drought. While all other plants are faced with heavy damage by drought within a short period, olive tree can protect itself against drought stress by activating internal defense mechanisms. Although olive trees are partly drought-resistant, when it can't find the necessary water during long drought periods, physiological and morphological effects are unavoidable. As a result, the development of the olive trees and the product quality is affected negatively. In this study, the morphological responses of olive under drought conditions were examined.

AN OVERVIEW OF OLIVE PRODUCTION AT SOUTHEAST ANATOLIAN REGION IN TURKEY

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The olive was spread from its place of origin on what is today Turkey and Syria to other parts of the Mediterranean basin in a very early period. The olive found conditions for its greatest cultivation in Spain, Italy and Turkey. It was the Spanish who spread the olive to America. Catholic missionaries spread the olive to Mexico and later to California, as well as to South America. This crop is including our main fruit trees. The olive is drought tolerant, but grows best when it has sufficient water. Overwatering should be avoided. Olives like a sunny, well-drained site with a fertile soil to plant the olive. Southeast Anatolian part of Turkey is suitable to grow olive especially for oil olive cultivars. According to TUIK data, there are 155 427 000 olive trees in 2011 in Turkey. The fruit bearing trees are 75 %, unfruitful or young olive tree are 25%. Most of the olive trees are available in Aegean region 75 percent, second region is Marmara with 9.3 %, Mediterranean region is 14 percent and Southeast Anatolian part of Turkey has 1.8 %. The yield is low in this region because of lack of water. Olive trees are surviving very dry and low humidity conditions at Southeast Anatolia. Last decades government of Turkey supported to establish the olive orchards. Olive has economic importance for the farmer who live at Southeast Anatolia. But there are some problems have to be solved. Present situation and the problems will be presented in this paper

Key words: Olive, Southeast Anatolia, Problems

THE EFFECT OF FERTILIZATION TREATMENTS ON PRODUCTIVITY, MATURATION, CAROTENOID CONTENT AND NUTRITIONAL STATUS OF THE TABLE OLIVE CULTIVAR 'KONSERVOLIA ARTAS'

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Abstract

A study on the productivity, fruit weight, maturation, carotenoid content and nutritional status of the table olive cv. Konservolia Artas was conducted. The fertilizer treatments that were applied were as follows: a) Control (no fertilizers added), b) Nitrogen as $(\text{NH}_4)_2\text{SO}_4$ (1.3 kg per tree) applied to soil in two equal dosages, early February and 30 days before the beginning of the flowering period (N), c) Nitrogen plus Acadian (0.5% v/v), a commercial product derived from the seaweed *Ascophyllum nodosum* (N+SWE1), d) Nitrogen plus boron (B) applied as borax (150 g per tree), 20 days before the beginning of the flowering period, plus Millerplex (0.5% v/v), another commercial product also derived from the seaweed *A. nodosum* (N+B+SWE2). Both seaweed extracts were applied foliarly 10 days after the termination of the flowering period. The application of N+B+SWE2 caused the highest fruit growth and productivity and advanced olive fruit maturity, whereas the treatment N+SWE1 led to delayed maturity. The treatments containing seaweed extracts increased impressively the concentration of fruit skin carotenoids. Moreover, the treatment N+B+SWE2 increased significantly P, K, Fe, and B concentrations in leaves, while the treatment N+SWE1 increased significantly N, Ca and Mn concentrations. The trees that were fertilized only with N presented significantly higher leaf Mg and Zn concentrations. Foliar spray with N+B+SWE2 caused a significant increment of all studied nutrients in mature fruits, except Ca. Potassium, Fe, Mn, B and Na concentrations were found to be higher in mature fruits, whereas Ca, Mg and Zn were higher in immature fruits.

Key words: *Ascophyllum nodosum*, boron, carotenoids, foliar, maturation, nutrients, olive

MORPHOLOGY, POMOLOGY AND FATTY ACID COMPOSITION WITH SSR BASED MOLECULAR ANALYSIS OF OLIVE GENOTYPES IN MERSİN

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In this study was aimed to select superior genotypes within olive populations of Mersin provinces in eastern Mediterranean Region. Leading fruit and tree characteristics were determined in shoot, leaf and fruit samples collected from 22 genotypes. These genotypes were investigated for fruit weight, number of fruits per 100 g, flesh/seed ratio, oil ratio, fatty acid composition, habitus, lenticel size, length of internode etc. Twenty two promising genotypes as cultivar candidate were selected and genetic characterization of 22 selected olive (*Olea europaea* L.) genotypes together with 6 local and 4 foreign reference cultivars obtained from Alata Horticultural Institute was performed using 10 microsatellite markers (UDO4,UDO9, UDO12, UDO24, UDO26, DCA9, DCA11 ,DCA13 ,DCA15, UDO 11) and genetical identification were carried out at the genetic level with allele profiles by using 10 microstellite markers in SSR analysis and also intergenetic similarities were determined. Allele sizes were determined by utilizing Beckman CEQ 8800 automatic fragment analyzer at the each locus at the same time allele quantity, expected and observed heterozygotisy and specification probability were evaluated. Obtained results were assessed at the dendogram level.

Key words: *Olea europaea* L., selection, Mersin, morphology, microsatellite, SSR

WALNUT TOP-WORKING AND ITS IMPORTANCE FOR TURKEY

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Abstract

Top-working may be one of successful methods used for changing one variety to another when walnut trees don't produce sufficient yield. Top-working application that enables to replace unproductive or poor quality walnut varieties with better quality ones is a simple, easy and reliable operation for growers. Therefore, it can make more efficient the walnut orchards in Turkey. Seedling walnut trees that don't yield in the walnut orchards can be also brought into production. Top-working can therefore contribute to walnut cultivation in Turkey. Grafting methods such as 'bark graft' and 'modified bark graft' can be operated on the main branches with 25-30 cm trunk diameter of 10-15 year old walnut trees or seedling trees. In these methods, the trunk or main branches can be grafted with cross-cut above 2-3 m from the level for walnut seedling trees. After the trunk of tree is cut for xylem exudation two weeks before grafting in early spring, the grafting application is done in late March when air temperature reaches to 20-25 °C. The suitable temperatures for walnut top-working coincide with in early April in Turkey. The shoots should be taken in January, February and March, and stored at 4 °C in the refrigerator until grafting season. A graft master can averagely make 15 pcs of top-working in a day depending on the age and location of tree. The graft take is usually resulted in high success rates. The grafted trees begin to yield a few years later, and tree yields are closer to their peers within 5-7 years.

Key words: Walnut, Top-Working, Grafting, Turkey

FOOD AND THERAPEUTIC INTEREST OF THE STRAWBERRY TREE: *Arbutus unedo* L. IN THE REGION of the NORTH EST ALGERIAN

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Abstract

The Strawberry tree, *Arbutus unedo* L of the family of Ericaceae is a rustic, essentially wild, typical shrub of Mediterranean basin. We purpose to value this medicinal plant which remains underestimated by the population of the northeast of Algeria, in spite of its important therapeutic potential. We want by this work to value the strawberry tree, which contains mainly often present phenolic compounds in important quantities and responsible for its major pharmacological properties: the arbutin of the leaves confer a diuretic and antiseptic properties. Also the tannin confer to the leaves the astringent and antidiarrheic properties. Furthermore, recent works were able to demonstrate that the roots have a hypotensive activity. So beside its therapeutic virtues, the Strawberry tree is very appreciated for its fruits, the arbutus berry which makes good jams. Finally our work is to make sensitive the population of the benefactions of the strawberry which tends to disappear in our country.

Key words: *Arbutus unedo* L - leaves - phenolic compounds – Ethnobotany – Fruits –therapeutic activity

**RESEARCH TOWARDS CONSERVATION FOR THE VULNERABLE AND RARE WILD APPLE TREE
*ERIOLOPUS TRILOBATUS***

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Abstract

The wild apple tree *Eriolobus trilobatus* (Rosaceae) is one of the rarest trees occurring in the Balkans. Its only natural population in Europe exists in the Evros district in Thrace and counts less than 150 scattered individuals. It is threatened by forestry operations, agriculture, road construction and wildfires. Since 2004, the Forest Genetics Laboratory, Orestiada, Greece, has coordinated a number of research activities towards the conservation of this tree. A detailed map of the expansion of the species has been produced, where all known trees were marked. Genetic studies using random and SSR markers revealed that the diversity is patchy and that the population is fragmented, facing reproduction problems and extinction. Sexual and asexual propagation has been tested for this species. Germination tests have shown that the most suited technique is cold stratification for 90 days. Seedlings can be successfully produced under shade and protection. High diversity among different half-sib families in germinability and early growth have been observed. Vegetative propagation via late autumn hardwood cuttings has failed to produce roots and the callus formation depended largely on the genotype of the tree and the auxin treatment applied. Propagation efforts will carry on in order to increase the population number and to create *ex situ* clone banks and seed orchards.

Key words: *Eriolobus trilobatus*, rare plants, restoration, biodiversity, conservation

BACTERIAL ACTIVITY OF *CITRUS LIMONUM* ESSENTIAL OIL

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Abstract

Lemon tree, *Citrus limonum* RUTACEAE is a small tree which has adapted in the Mediterranean basin. The essence is extracted from the tree bark. The aim of this study was to characterize and evaluate the bactericidal activity of this essence. The qualitative characterization consists in a botanical analysis of the drug and thin-layer chromatography of the extract, which revealed the presence of limonene and citral. The quantitative test was performed by gas chromatography. The essence comprised 72% of limonene, 9% of terpinene, 11% of β pinene, 9% of linalool, 0.9% of geranial and 0.7% of neral. The bactericidal activity of the lemon essential oil against microorganisms responsible for nosocomial disease was demonstrated by the aromatochromatogram. Its good air diffusion leads to prospects for its formulation and its use for cleaning up the air in hospitals.

Key words: essential oil, lemon, thin-layer chromatography, gas chromatography, aromatochromatogram, nosocomial disease.

DETERMINATION OF GRAFT SUCCESS BETWEEN CHIP-BUDDING AND OMEGA BENCH GRAFTING TECHNIQUES

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This study was conducted in order to determine the success rate of chip-budding and omega bench grafting techniques. Research was conducted in the nursery of Manisa Viticulture Research Station and Sultan 7 was used as a plant material, grafted onto 2 different rootstocks (5BB and 41B).

Grafting was made up by chip budding and omega bench grafting techniques. There were 4 replications per each grafting technique and 40 grafted cuttings were planted per each replication. After grafting, paraffined grafted cuttings were stratified (3 weeks) with pine sawdust + woodchip in plastic cases, humidified with fungicide. They were placed in the callusing room under controlled conditions (25°C and %80-85 relative humidity) for 3 weeks. At the end of this period the grafting techniques had different effects in terms of callusing ratio (%), rooting and sprouting ratios (%), callusing level on the grafting union and callusing level at the bottom part (0-4), the ratio of grafted cuttings having planting quality (%) and productivity of grafted vine (%). As a result, all parameters are considered together for both grafting techniques in callusing room. Thereby chip-budding was found to be optimal grafting technique.

Key Words: Chip budding, Omega grafting, Sultan 7, 41B, 5BB.

**EFFECTS OF DIFFERENT PLANTING FREQUENCY TO SOME AGRICULTURAL TRAITS OF BITTER MELON
(*MOMORDICA CHARANTIA* L.) GROWN IN RIZE ECOLOGICAL CONDITIONS**

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Abstract

This trial was established in research and practice garden in Faculty of Agriculture and Natural Sciences according to randomized complete block design with three replications in 2013. Bitter melon (*Momordica charantia* L.) seedlings grown in viols in the greenhouse were planted to land at different frequencies (70x50 cm, 70x100 cm, 70x150 cm) on May 20. The harvest started on August 12 and ended on September 18. Measurements for in each fruit harvested were made. In the study, from fruit characteristics, fruit ratio without seed and seed coat, seed weight and seed coat ratio in fruit and, from seed characteristics, seed length, width seeds, seed depth and 1000 seed weight; from yield components, the fruit yield, fruit yield per plant, single fruit weight per plant, number of fruits per plant and fruit length were determined. According to the results obtained from the research, the highest fruit yield per unit area was obtained from 70x50 cm of planting distance. In addition, the values obtained from the same planting distance in terms of fruit weight, fruit weight and fruit ratio without seed and seed coat, seed length, seed width and seed depth were higher than the one's which obtained from other planting distances

Key words: Bitter melon, agricultural traits, yield, seed

SOME POMOLOGICAL PROPERTIES OF PROMISING PERSIMMON GENOTYPES FROM ARDEŞEN AND PAZAR PROVINCE (RIZE), TURKEY

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Abstract

Turkey has a great potential with regard to fruit species and varieties. Eastern Black Sea Region is located within natural growing sites of such a rich diversity. The present research was conducted to determine pomological properties of some persimmon genotypes selected from Eastern Black Sea Region (Ardeşen and Pazar Provinces) with a rich local persimmon population. Fruit weight, fruit size (length, width and thickness), fruit shape index, flesh and skin color, astringency, fibrousness, soluble solids content, titratable acidity and pH values were investigated as the pomological properties. Fruit weights of selected genotypes varied between 165.5 – 303.3 g in 2007 and between 254.9 – 308.2 g in 2008. Fruit shape of almost all of the selected genotypes was round but fruit flesh was not astringent. Skin color was generally orange. SSC values of the genotypes varied between 14.90 – 21.40% in 2007 and between 15.80 – 24.10% in 2008.

Key words: Color, Fibrousness, Fruit Weight, Soluble Solids Content, Shape Index.

A STUDY ON THE SELECTION OF WALNUT (*JUGLANS REGIA L.*) IN TRABZON

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The present analysis is intended to shed light on the species with the supreme characteristics from walnut population grown from the seed in Trabzon between years of 2008 and 2009. According to the selection criteria, over 500 trees have been scrutinized, and seventy three of the sea reworth having fruit samples. As a result of the research, 10 walnut genotypes have been selected. The fruit weights of the chosen genotypes are 10.2-12.4 grams, and interior weights are 5.2-6.7 grams. The inside proportions are by % 44.5-63.0. The Shell ticknesses are 1.3-2.1 mm. Ash by %1.5-2.1, protein by %13.3-17.2, lipid by %52.2-68, palmitic acid by % 4.9-6.4, stearic acid by %1.4-2.3, oleic acid by % 18.5-27.0, linoleic acid by %51.7-63.0, linolenic acid by % 10.8-16.1 have varied between these values. The eight of the chosen genotypes have protandrous flowering, one of them has protogenous flowering and one of them has homogamous flowering type.

Key words: Walnut, selection, pomology,

DETERMINATION OF SO₂ IN SULPHURISED FRUITS AND VEGETABLES BY STEAM DISTILLATION UNIT AND COLLECTING KITS

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Sulfurdioxide has been used in foods as preservation agents for centuries. Especially in dried fruit and vegetables. Alongside its preservative effect in foods, excessive use of it also can cause some health problem on those who consumed these food. Thus, many countries have regulation restricting the sulfurdioxide level in foods. Information of sulfur-sulfurdioxide level must be officially shown on the label of foods according to Turkish Food Codex Regulation. Nowadays, the analysis of sulfurdioxide in dried vegetables and fruits (especially apricots) in public and private laboratories in Turkey has been carried out in approximately 150 minutes. For this reason, there is need application of a quick, reliable, economic and easy method for the determination of sulfurdioxide in dried vegetables and fruits (especially apricots). In this study, a method which gives reliable results for dried and sulfurized apricots is presented and it needs low energy and a few time-saving as little as 4-5 minutes for application. Another purpose of this project is to provide spread using of a reliable and economic method by dried fruits sector. This steam distillation unit and collecting kits for sulfur dioxide determination method is suggested as an alternative method. This method will rapidly provide the determination of sulfurdioxide in dried vegetables and fruits without wasting time. The sulfurdioxide level in foods absolute value must be <10 ppm based on legal regulations in Turkey. In this method, SO₂ determination in dried fruits is done by steam distillation, followed by redox titration. Therefore, the distilled SO₂ is collected in an iodine solution and the remaining iodine is titrated back with a standardized sodium thiosulfate solution. The described method shows comparable result with the Monier-Williams method. This method is suitable for detection of low levels and it is achieved with a good recovery rate close to 100% sensitivity for samples containing > 2mg sulfur, its standard deviation was obtained RSD <1.

Key words: Apricot, SO₂, Fruit, Vegetables, Sulphurdioxide, Steam Distillation

THE ROOTSTOCK INFLUENCES GROWTH AND DEVELOPMENT OF 'DEVECİ' PEAR

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Abstract

The vegetative and reproductive performance of 'Deveci' pear (*Pyrus communis* L.) grown on three rootstocks [Quince BA 29 and EMC (*Cydonia oblonga*) and seedling of *P. communis*] were compared during 2012-2013 years. Vegetative growth characteristics such as rootstock and stem diameter, leaf width, leaf length, leaf area, leaf petiole length and thickness, plant height, trunk sectional area and crown volume, and phenological characteristics such as first flowering, full flowering, days from full flowering to maturity, harvest date, and fruit weight and yield were examined. In terms of phenological characteristics, MC had earlier rootstock than BA29 and seedling. The most vigorous trees were on the BA29 and followed by the EMC and Seedling. The highest leaf width, length, area and leaf petiole length were obtained from trees on the BA29 rootstock followed by the MC and seedling. MC had lower leaf petiole thickness than the others. The trees on the BA29 rootstock had higher rootstock diameter, stem diameter, plant height, plant width and crown volume than the others. The highest fruit weight and yield per tree were obtained from the trees on the BA29 (405.7 g and 8.33 kg, respectively) and the EMC (157.6 g and 2.37 kg, respectively) followed by the seedling (62.6 g and 0.69 kg, respectively). As a result of this growing period, we suggested that the 'Deveci' pear should be grown on BA29 quince rootstock, because of the more vigorous growth and the higher yield were obtained from on BA29.

Key words: Pear, 'Deveci', growth, rootstock, yield, fruit weight

DETERMINATION OF EFFECTS OF DIFFERENT SOIL TILLAGE AND SHOOT LENGTH APPLICATION ON VEGETATIVE GROWTH, WATER STRESS AND YIELD OF CABERNET SAUVIGNON GRAPE VARIETY

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Abstract

The study was conducted between 2010 and 2012 years in Tekirdağ Viticulture Research Station on Cabernet Sauvignon grape variety grafted on Kober 5BB rootstock. In the region conditions winter and spring months have been pluvial and rain in this period has caused to fast vegetative growth between bud burst and bloom of grape varieties. The aim of the study was to determine suitable soil tillage method, effects of different soil tillage and shoot length on vegetative growth and water stress level of Cabernet Sauvignon grape variety while suppressing vegetative growth. For suppressing vegetative growth 3 different soil tillage method (conservation tillage, minimum tillage and conventional tillage) were applied. According to results of different soil tillage methods, the lowest pruning weight (1,58 kg/vine), leaf area (142,38 cm²) and yield (3,2 kg/vine) were found in conservation tillage application. As to results of different shoot length, the lowest pruning weight (1,69 kg/vine) was obtained in 1m shoot length application. Predawn leaf water potential (Ψ_{PD}) and midday leaf water potential (Ψ_{MD}) measurements were done spanning growing season three years in a row and there were found difference among years. As a result, conservation tillage was offered for Cabernet Sauvignon grape variety in Tekirdağ conditions. But tilling soil after 5 or 6 years from starting conservation tillage would be useful for sustainable viticulture.

Key words: Cabernet Sauvignon, water stress, yield, conservation tillage

COMPARISON of QUALITY CHARACTERISTICS of DIFFERENT REIGONS RAISINS

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Abstract

Turkish raisin is well known as named Sultana all over the World. Raisins are important ingredients for food industry especially for confectionery part. Turkey is the one the biggest producer and the biggest trader of raisin in the World. Turkey has a intercontinental opponent like USA and also have local opponents such as Iran and developing Syria. Also Afghanistan has developing trend in raisin producing. In this study comparasion of quality charactersitics of Sultana and Afghanian raisins is aimed. For this purpose some quality parameters, such as moisture, size, colour, rehydration ratio, total phenolic compounds, total flavonids and mineral compounds of raisins are investigated. Raisin materials were obtained, Sultana, from viticulture research station, Manisa, and, two different Afghanian raisins, from Afghanistan. Sultana and two different Afghanian reigon raisins were marked as S, Afg 1 and Afg 2. All raisin samples were produced in 2013 production year. As a result, by the comparasion of Sultana and Afghanian raisins, the main difference between these raisins will be presented obviously. The results showed that there is big difference between Sultana and Afghanian raisins for total phenolic compounds. On the other hand moisture content of raisins determined closer to eachother. As overall results, it will be shown the powerful and weak sides of Sultana against to Afghanian raisins due to quality characteristics.

Key words: Sultana, Afghanian region raisin, grape drying

TOTAL PHENOLIC AND FLAVONOID CONTENTS, PHENOLIC COMPOSITIONS AND COLOR PROPERTIES OF FRESH GRAPE LEAVES

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Abstract

Grape leaves have been consumed as fresh and canned for years. Stuffed grape leaves (dolma) is a traditional delicacy for Turkish, Balkan and Middle East nations. In this study; grape leaves from Sultani Çekirdeksiz(SÇ), Sultan1(S1), Sultan7(S7), Saruhanbey(SB) and Narince(N) grape cultivars were assayed for their total phenolics, total flavonoids, some phenolic compounds and color properties. Total phenolic and total flavonoid contents of the samples were determined by Folin Ciocalteu and colorimetric aluminum chloride methods respectively. Results were expressed as (+)-catechin equivalent mg l^{-1} . The phenolic compositions of the samples were separated by HPLC. L^* , a^* , b^* values of the samples were measured by Minolta Colorimeter and a/b values were calculated. Total phenolic contents varied from 9.72 to 14.22 mg g^{-1} fresh leaves and total flavonoid contents from 5.08 to 7.22 mg g^{-1} fresh leaves. L^* values of samples were measured between 37.9–45.0 and a^* values -8.3– -3.9 and b^* values 8.6 – 15.0. a/b values were calculated between -0.57– -0.45. (+)-Catechin, (-) epicatechin, gallic acid, caffeic acid and vanillic acid were detected in all grape leaf samples.

Key words : Grape leaves, Phenolics, Flavanoids , Color properties

DETERMINATION OF THE YIELD AND DEVELOPMENT OF OPEN-ROOTED GRAFTED GRAPEVINE SAPLINGS

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Abstract

This study has been carried out aimed to determine the yield and vegetative growth of open-rooted grafted saplings for the period of 2 years under the climatic conditions of Canakkale province. Grafted cuttings have been planted in nursery plots between the dates of 27–30 April of each of two years, and standard maintenance procedures were applied. Significant differences were determined on the basis of different variety/rootstock combinations as a result after the examination of open-rooted grafted saplings. According to the mean results, the highest nursery yield (73.8%) was obtained from Cardinal/41B combination followed by the second group of combination that is, 41B/Alphonse Lavallée (62.8%) and 41B/Cabernet Sauvignon (58.5%) while the lowest yields were taken from Yuvarlak Cekirdeksiz/41B and Sultani Cekirdeksiz/41B combinations in percentage of 33.3% and 37.0%, respectively. However, the highest first category of grafted grapevine sapling yields were obtained from Yuvarlak Cekirdeksiz/41B and Sultani Cekirdeksiz/41B combinations in percentage of 73.2% and 72.0%, respectively.

Key words: Open-rooted Grafted Saplings, Nursery Yield, First Category Grafted Grapevine Sapling Yield, Canakkale.

THE STUDY OF ADAPTATION OF THE NEW PEACH CULTIVARS IN THE AGRICULTURAL REGION OF VLORA

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Abstract

Drupaceous fruits hold an important place in the species structure of our horticultural farms. To anticipate problems of the development of arboriculture and qualitative production for local markets, scientific institutions have become part of the positive solutions for this sector of primary importance. This is the reason why through a long term collaboration, CTT Vlore & IAM Bari was made possible the bringing from Italy of 96 cultivars of peaches, plums, cherries, apricots, nectarines, almonds that dominate the production markets of the Mediterranean countries. In the new structure are included 21 peach cultivars and rootstocks while the planting material is of basic category, clear of viruses, viroids, and other similar pathogens. As the main rootstocks were selected GF 677 and MRS 2/5. To study the behavior, adaptability and productivity of the peach cultivars, in the conditions of warm coastal areas, specialists from the Agriculture University of Tirana and Center for Technology Transfer in Vlore through a methodical study carried out a number of tests and evaluations during a three year period. At the end of the study it resulted that the cultivars with a very early maturation better adapted in the coastal areas are: Kardinal, May Crest, and Spring Crest. The cultivars with ½ early maturation and a consolidated productivity are: Bolero, Dixired, Early Crest, Iris Rosso. Cultivars with an average maturation are: Redhaven, Redhaven Bianca, Red Top, Regina Bianca. Suitable cultivars with a delayed maturation are considered: Big Moon, Domiziana, Halle, Laure, and Maria Delizia.

Key Words: cultivar, structure, arboriculture, agro-technology, vegetative rootstock.

THE DETERMINATION OF NITROGEN DEMAND OF PHYSALIS (*PHYSALIS PERUVIANA L.*) IN
YALOVA/TURKEY

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Abstract:

Fruits of physalis are rich in vitamin A, B, C, iron, phosphorus and zinc. In recent years, growing *Physalis peruviana L.* is a new tendency in Turkey. However, there isn't any trial for nutritional demand of physalis in Turkey also. The main purpose of this trial is determining nitrogen demand of physalis. Furthermore determine to effect of nitrogen fertilization on some fruit quality. For this purpose six different nitrogen levels were used, 0 kg da⁻¹, 4 kg da⁻¹, 8 kg da⁻¹, 12 kg da⁻¹, 16 kg da⁻¹ and 20 kg da⁻¹. Optimum nitrogen level for maximum yield which 468 kg per da was 11,3 kg da⁻¹. In addition, yield, fruit diameter and plant high were affected from different nitrogen levels significantly also. The trial was carried out between 2012-2013 in Yalova.

CHARACTERIZATION FOR FRUIT QUALITY OF SOME LEMON SELECTIONS AND CULTIVARS UNDER ADANA ECOLOGICAL CONDITIONS

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Abstract

Lemon production in Turkey has a great deal of importance in terms of its great amount of export. Because of the suitable ecological conditions of the Mediterranean coast of Turkey, lemon has been successfully cultivated for a long time. Therefore spontaneous bud mutations and hybridizations result in variations for agronomical traits among cultivated lemons in time. The objective of this study was to determine fruit quality characteristics of promising lemon genotypes derived from a selection program and compare them with common cultivars. Fruit weight (g), height (mm), diameter (mm), index, juice content (%), rind thickness (mm), total soluble solids (TSS, %), acidity (A, %), TSS/A ratio, and seed number per fruit were investigated in order to see the differences of 13 selected lemon types and cultivars. Significant differences between selected types and cultivars were obtained in terms of all investigated fruit quality parameters. According to results, the highest fruit weight was obtained from 78A Interdonato lemon, followed by 32M and 30M, respectively whereas Antalya yerli yuvarlak lemon type had the lowest fruit weight. Correspondingly to fruit weight, 78A, 30M and 32M selections of Interdonato lemon had the highest fruit diameter whereas Antalya yerli yuvarlak lemon type had the lowest. The lowest seed number per fruit was determined in 30M selected type with an average of 1.10 seeds per fruit. Citric acid contents of Tuzcu 09N Aklimon and Feminello Santa Teresa were higher in comparison to other types and cultivars. Besides Improved Meyer yielded the highest juice content whereas Carruboro and Tuzcu Yediveren Kütdiken yielded the lowest.

Key words: Lemon, selection, adaptation, fruit quality

CHEMICAL COMPOSITION AND SENSORY EVALUATION OF PLUM FRUITS

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Abstract

Plum fruits have been known as food for people since antiquity. They are consumed fresh, dried or processed. The increasing consumers' demand for quality of fruit, is a relevant reason to present information about the differences in the chemical composition and the sensory characteristics widely spread and newly studied plum cultivars. The study of 12 plum cultivars was carried out in the period 2010 - 2012 at the Fruit-Growing Institute – Plovdiv, Bulgaria. The results showed that the fruits of 'Jojo', 'Topking', 'Topfive' and 'Mirabelle de Nancy' have a total soluble solid above 20 °Brix. The highest content of sugars was established in the fruits of 'Jojo', which was statistically proven. Fruits of 'Pacific' have the highest acid content – 1.28%, which was statistically significant compared to the other studied cultivars. The highest content of vitamin C was established in the fruits of 'Stanley' cultivar – 11.92 mg/100 g. According the sensory data, most delicious proved to be the fruits of the cultivars 'Bellamira', 'President' and 'Tuleu Timpuriu' and those results determine them as suitable for fresh consumption. The general sensory evaluation showed that the fruits of 'Bellamira', 'Haganta', 'President' and 'Tuleu Timpuriu' are excellent in quality and they could be recommended to consumers and traders. Looking at the values of the chemical and sensory analysis, it could be concluded that there is not a correlation between them. Some authors found similar results for different fruit species. Obviously consumer's perceptions have their own specificity which lead to this differences.

Key words: *Prunus domestica* L., fruit evaluation, fruit quality

BIOCHEMICAL AND POMOLOGICAL VARIABILITY AMONG 14 MOROCCAN AND FOREIGN CULTIVARS (PRUNUS DULCUS)

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Abstract

Biochemical and pomological variability among 14 cultivars (*Prunus Dulcus*) planted in a germoplasm collection site in Morocco were evaluated. Almond samples from six local and eight foreign cultivars (France, Italy, Spain, and USA) were characterized. Biochemical and pomological data revealed significant genetic variability among the 14 cultivars; local cultivars exhibited higher total polyphenol content. Oil content ranged from 35 to 57% among cultivars; both Texas and Toundout genotypes recorded the highest oil content. Total protein concentration from select cultivars ranged from 50 mg/g in Ferraduel to 105 mg/g in Rizlane1 cultivars. Antioxidant activity of almond samples was examined by a DPPH radical-scavenging assay; the antioxidant activity varied significantly within the cultivars, with IC50 values ranging from 2.25 to 20 mg/ml. Autochthonous cultivars originated from the Oujda region exhibited higher tegument total polyphenol and amino acid content compared to others. The genotype Rizlane2 recorded the highest flavonoid content. Pomological traits revealed a large variability within the almond germplasms. The hierarchical clustering analysis of all the data regarding pomological traits distinguished two groups with some particular genotypes as distinct cultivars, and groups of cultivars as polyclone varieties. These results strongly exhibit a potential use of Moroccan-originated almonds as potential clones for future selection due to their nutritional values and pomological traits compared to well-established cultivars.

Key words: *Prunus Dulcus*, Antioxidant activity, almonds

EFFECT OF NITROGEN FORM ON TRIFOLIATE ORANGE (*Poncirus trifoliata*) AND SOUR ORANGE (*Citrus aurantium*) PLANTS GROWN UNDER SALINE CONDITIONS

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Abstract

The effect of the form of nitrogen on the vegetative growth and the chemical composition of trifoliolate orange plants (*Poncirus trifoliata*) and sour orange plants (*Citrus aurantium*) irrigated with Hoagland 50% nutrient solution with or without NaCl combined with three forms of nitrogen (nitrate, ammonium and their combination) was studied. At the end of the experiment, it was found that the trifoliolate orange plants were more sensitive to salinity, since the weight of the fresh matter and the concentration of chlorophyll in the leaves were negatively affected. The highest values in the weight of the leaves and roots of the trifoliolate orange plants were observed in the treatments with ammonium N, while the highest concentration of chlorophyll was observed in the treatments with a combination of nitrate and ammonium N under normal conditions. Furthermore, the highest values in the weight of the fresh matter of the roots and shoots as well as in the chlorophyll units in the basal and top leaves were found in the sour orange plants which received a combination of nitrate and ammonium N under salinity conditions. Generally, nitrogen forms had different effects on the two rootstocks in many cases. Finally, the addition of NaCl to the nutrient solution increased Na concentration in the leaves, the shoots and the roots of the two rootstocks, whereas K concentration was reduced.

Key words: nitrogen forms, salinity, sour orange, trifoliolate orange, citrus fruits

POSSIBILITIES OF EMBRYOGENIC CALLUS INDUCTION FROM EPICOTYL EXPLANT OF SOME CITRUS ROOTSTOCKS

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Abstract

Somatic embryogenesis is being viewed as one of the important techniques of plant tissue culture for mass propagation and synthetic seed production. Besides embryogenic cell cultures constitute an important material for protoplast isolation and genetic transformation using biolistic methods in terms of variety improvement programs. Embryogenic callus lines in citrus can be obtained using different culture conditions and explants such as; undeveloped ovule, ovule, nucellus, style, stigma, anther, leaf, epicotyl, cotyledon and root segments. Besides responses to different culture media are often genotype-specific. In this study, the possibilities of embryogenic callus induction from epicotyl explant of five citrus rootstocks were investigated. Epicotyls obtained from *in vitro* germinated seedlings of *Citrus macrophylla*, *Poncirus trifoliata*, Cleopatra, Sunki and Tardivo mandarins were cultured in three different media. Callogenesis, direct and indirect organogenesis and embryogenic callus induction were obtained. Also color and structure of induced callus lines were recorded. First callus formation was recorded after four weeks of culture in Tardivo mandarin cultured in media including 2,4-D (1 mg l^{-1}) + BAP (0.5 mg l^{-1}). In the same culture medium, a hundred percentage of callus induction was determined from the epicotyl explants of *C. macrophylla*, *Poncirus trifoliata*, Sunki and Tardivo mandarin. Also 93% and 68% percentage of indirect shoot organogenesis was recorded in *C. macrophylla* and Cleopatra mandarin cultured in media including 2,4-D (1 mg l^{-1}) + BAP (0.5 mg l^{-1}), respectively. Direct organogenesis was only obtained in culture media including Kinetin (1 mg l^{-1}) from all rootstocks except Sunki mandarin.

Key words: Citrus, rootstock, organogenesis, embryogenic callus, *in vitro*

A RESEARCH ONGRAFTED VINE RATIO AND VEGETATIVE GROWTH OF 'ORA', 'PRIMA' AND 'EARLY SWEET' GRAPE CULTIVARS GRAFTED ON CERTAIN ROOTSTOCKS

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ABSTRACT

This research was conducted in 2014 at the Department of Horticulture of Mustafa Kemal University. 'Ora', 'Prima', 'Early Sweet' grape cultivars were grafted on '41B', 'SO4' and '1103 P' American rootstocks using omega (Ω) grafting method. Ambient temperature and humidity values were recorded during the term of the trial. Sprouting ratio (%), callus formation grade (1-4), callus degree (1-4), summer shoot length (cm) and summer shoot diameter (mm), total leaf surface area (cm²), rooting degree (1-4), rooting ratio (%), total green and dry weight (g), leaf photosynthesis rate, chlorophyll content and nutrient element (N, K, Mg, Ca, Fe, Mn) content were analyzed throughout the research. Differences were observed between rootstocks and cultivars on the basis of analyzed characteristics. 1103 P rootstock yielded higher values than 41B and SO4 rootstocks in terms of sprouting ratio, callus formation grade, callus degree, shoot length, shoot thickness, total leaf area, rooting rate, total (leaf, shoot, root) green weight (g) and total dry weight (g). 1103 P (88,89%) was found to be significantly higher in terms of grafted vine ratio than 41 B (61,11%) and SO4 (51,11%) rootstocks. While the influence of rootstocks were not found to be significant in terms of Mg, Na, Ca in nutrient element content of cultivars; statistical differences were observed in terms of N, K, Mn contents.

Key Words: Grafted vine ratio, graft success, growth, chlorophyll, mineral content

EFFECT OF INTERSTOCKS IN PHOTOSYNTHESIS AND GROWTH RATES FOR 'NAVELINA' ORANGE AND 'KÜTDIKEN' LEMON

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Abstract

We studied the effects of interstocks in dwarfing properties and photosynthesis ratio during the growth period. Combinations were set up by grafting 'Navelina' orange (N) and 'Kütdiken' lemon (K) cultivars grafted on sour orange; and, Flying Dragon trifoliolate (FD), Citrumelo 1452 (C), Star Ruby grapefruit (SR), Rubidoux trifoliolate (R) were used as interstock. Experimental plants were grown in controlled greenhouses. Rootstock, interstock and scion stem diameters and sprout growth were measured following grafting on a monthly bases. Aboveground parts of plants, leaf and root dry weight, number of leaves, leaf area, photosynthesis rate and transpiration ratio were determined on plants at four periods (July 06, October 06, January 07 and April 07). The greatest dwarfness effect determined at final measurement of various grafting combinations was at FD interstock for 'Naveline' orange and at R interstock for 'Kütdiken' lemon. The highest dry weight of aboveground parts of plants for both cultivars was determined at C interstock combinations and control, whereas lowest values were determined at SR interstock combinations. The photosynthesis rate was highest in summer period. The photosynthesis rate was highest at 'Navelina' cultivar having dwarfing effect at N/FD/SO and N/SR/SO combinations while the highest photosynthesis rate for 'Kütdiken' was achieved at K/C/SO combinations, which has no dwarfing effect.

INFLUENCES OF ROOTSTOCKS ON FRUIT QUALITY OF 'HENDERSON' GRAPEFRUIT

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Abstract

In this study, the effects of some important citrus rootstocks such as local sour orange (*Citrus aurantium* L. var. "Yerli"), Carrizo and Troyer citranges (*Citrus sinensis* Osb. x *Poncirus trifoliata* Raf. var. "Troyer" and "Carrizo"), Swingle citrumelo (*Citrus paradisi* Macf. x *Poncirus trifoliata* Raf.), Volkameriana (*Citrus volkameriana* Tan. and Pasq.) on fruit quality of Henderson grapefruit were investigated. The experiment was conducted in 2013 at the Department of Horticulture, Faculty of Agriculture, University of Cukurova on the trees planted as 8 x 8 m in 1997. Fruit weight, height, diameter, index, rind thickness, juice content, total soluble solids, titratable citric acid, and TSS/TA ratio were determined in order to see the effects of various rootstocks. The smallest fruit size was obtained from the scion on Troyer citrange whereas fruit size of scion on the other rootstocks were in the same subset. Rootstock significantly affected total acid content and the highest total acid content of fruits was found with Troyer citrange and *Swingle citrumelo*. Also, there was a significant rootstock effect on total soluble solids, highest for fruits from the trees on Troyer citrange.

Key words: Citrus, rootstocks, Henderson, grapefruit, fruit quality.

DIFFERENT INTERSTOCK LENGTHS EFFECTS ON 'STAR RUBY' GRAPEFRUIT AND 'KÜTDIKEN' LEMON FOR SOME PLANT NUTRIENT ELEMENTS

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Abstract

This study was conducted to determine the effects of different varieties and the lengths of interstock on leaf nutrient concentrations of Kütdiken lemon (KL) and Star Ruby grapefruit (SR). SR with different lengths (5, 10, 20 and 40 cm) was used as interstock for KL and Minneola tangelo (MT) with same lengths was used as interstock for SR. Sour orange (SO) was used as rootstock for both species. KL and SR scions grafted on SO were used as control treatments. Leaf nutrient element concentrations [nitrogen (N,) phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), manganese (Mn), iron (Fe), zinc (Zn), copper (Cu)] were determined in season 2010. The results indicated that the different lengths of interstock had no obvious effects on the contents of microelement but had noted significant effects in the contents of Mn in KL leaves. (Mn) was the highest on KL/SR-20 cm/SO and KL/SR-10 cm/SO. Differences among interstock length were important for P and Ca content of Star Ruby and the highest P content was found SR/SO (control), SR/MT-10 cm/SO and SR/MT-40 cm/SO trees. The content of Ca was determined as the highest in the leaves of SR/SO (control), SR/MT-20 cm/SO, SR/MT-40 cm/SO and SR/MT-5 cm/SO. The KL/SO (control) trees have given the highest K content followed by KL/SR-10 cm/SO, whereas the lowest K content was obtained in the leaves of KL/SR-5 cm/SO.

EVALUATION OF SOME CAROB (*CERATONIA SILIQUA* L.) GENOTYPES IN TURKEY BY CLUSTER ANALYSIS

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This study was carried out to determine the evaluation of some carob (*Ceratonia siliqua* L.) genotypes by cluster analysis. In this study, the fruits harvested from 17 wild carob genotypes in 2011 and 2012 years in Silifke (Mersin, Turkey) province. In these genotypes, pod weight, pod length, pod width, pod thickness, fruit stalk length, fruit stalk thickness, seed number, seed weight, pulp ratio, seed width, seed length, seed thickness, leaf width, leaf length, leaf petiole length, leaf petiole thickness, total soluble solids, pH and titratable acidity were determined. In the results, relationship among these characters was analyzed by hierarchical cluster analysis (HCA) resulting in the separation of these genotypes classed in three groups and in three ungrouped genotypes. According to HCA, 17 carob genotypes were similar in rates ranging from 46 to 87%. While the highest similarity was found between 1 and 16 genotypes, the most distant genotype was 8. Cluster I consisted of 1, 3, 4, 9, 11, 13, 14, 15 and 16 genotypes. 5, 7 and 17 were placed in cluster II; 2 and 6 were placed in cluster III. Genotypes 8, 10 and 12 can be considered as rather singular.

Key words: Carob, *Ceratonia siliqua*, Cluster analysis, Genotype

CLASSIFICATION OF WILD APRICOT GENOTYPES (*PRUNUS ARMENIACAL.*) USING PRINCIPLE COMPONENT ANALYSIS AND CLUSTER ANALYSIS

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In this study, the relationships among fruit characters on 37 genotypes, previously selected from the population wild apricot of Gümüşhane (Turkey) have been researched. In order to find the main variation trends between fruit and seed characters in the zerdali forms and to evaluate their correlation, data were processed according to the principal component analysis (PCA) using SPSS for Windows (Version 15.0, SPSS Inc., 2006). As a result of correlation analysis, it is seen that some important relationships are found among the fruit, the seed and the fruit juice characteristics of wild apricot. The relations among fruit weight and other characteristics, except the total dry matter, have been found positive and significant. The highest relations regarding fruit weight have been observed between fruit size and flesh/seed ratio. Four groups are created according to the classification of multivariate cluster analysis; the group components consist of the following characteristics; the first component (PCA1); fruit thickness, fruit width, fruit weight, flesh/seed ratio and fruit length; the second component (PCA2); seed weight, kernel weight, seed width, seed thickness; the third component (PCA3); seed length, titratable acidity and pH; the fourth component (PCA4); soluble solids content and total dry matter. Consequently, with this study, it can be said that the knowledge that fruit weight and fruit size, seed weight and seed size, fruit acidity and pH, soluble solids content and total dry matter values can create a group, can be used; and therefore it will decrease workload and waste of time in selective breeding studies to be done on wild apricot.

Key words: Wild apricot, *Prunus armeniaca*, classification, principal component analysis, fruit traits

BREEDING BY SELECTION OF 'YOMRA' AND 'DEMIR' APPLE GENOTYPES (*MALUS COMMUNIS* L.) GROWN IN ARSIN AND YOMRA PROVINCES (TRABZON, TURKEY)

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Abstract

This study was carried out to breeding by selection of local 'Yomra' and 'Demir' apple genotypes (*Maluscommunis* L.) grown in Arsin and Yomra provinces in Trabzon (Turkey). In this study, pomological characteristics for local apple genotypes were investigated in 2007-2008 years. "Weight-Ranked Method" was used in evaluating obtained data to select the promising apple local genotypes. In the method, fruit weight, fruit diameter, total soluble solids, titratable acidity and firmness traits based to selection the promising genotypes. In 5 'Yomra' genotypes (61YO41, 61YO42 and 61YO01 as partial alternate bearing; 61YO05 and 61YO06 as alternate bearing, respectively)selected by "Weight-Ranked Method", fruit weight, fruit diameter, firmness, total soluble solids and titratable acidity varied from 100,21 g to 107,68 g; from 64,20 mm to 68,66 mm; from 6,60 lb 8,40 to lb; from 12,00% to 15,00%, and from 3,50% to 7,10%, respectively. In 5 'Demir' genotypes (61DE36, 61DE20 and 61DE13 as partial alternate bearing; 61DE01 and 61DE12 as alternate bearing, respectively) selected by "Weight-Ranked Method", average values for fruit weight, fruit diameter, firmness, total soluble solids and titratable acidity varied from 100,16 g to 121,54 g; from 66,29 mm to 68,64 mm; from 6,80 lb to 8,75 lb; from 13,85% to 15,75%, and from 7,05% to 13,35%, respectively. As a result, it can be said that the 10 selected genotypes in 'Yomra' and 'Demir' apples are promising genotypes. These genotypes can be recommended for future breeding studies as table cultivars.

Key words: Apple, *Maluscommunis*L., breeding, selection, genotype

CLONAL SELECTION OF SARI ULAK OLIVE

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Abstract

This research was carried out selecting the highest character clons of Sarı Ulak olive cultivars grown in province of Adana and Mersin in 2006 – 2010 years. This research 70 type was selected inside of 39 type. The finding obtained from experiement was evaluated by changed weight ranked method. End of the work were selected 14, 7, 2, 15, 11 ve 35 clon numbers as hoprfully.

Key words: Olive, Selection, Sarı Ulak

A REVIEW ON GRAPE GROWING IN TROPICAL REGIONS

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Abstract

Although grapevine is adapted to a wide range of climates, the best growing of grapevine are performed in regions which meet certain specific climatic requirements. Grape growing is also extensively carried out in the latitudes between the Tropics of Cancer and Capricorn called as tropical regions. Recent times, viticulture activities has increased significantly in the tropical regions and well quality table grapes, wine, grape juice and raisin are obtained from countries such as Brazil, Venezuela, India and Thailand located in both tropical and subtropical regions. The production technics used for grape growing in tropical regions is different than used for traditional temperate regions. Most of grapes grown in these regions carry table, raisin and wine grape characteristic. Grape varieties grown in tropical regions should have early ripening periods, short growing cycle and high resistance to fungal diseases.

Key words: *V. vinifera* L., hot climate, tropical regions, viticulture zones, grape growing.

THE EFFECTS OF DIFFERENT TREATMENTS ON CAROB (*CERATONIA SILIQUA* L.) SEED GERMINATION

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This study was carried out to determine the effects of different treatments on seed germination on a wild carob genotype grown in Silifke province (Mersin, Turkey). In this study, the fruits were harvested in 2012 and their seeds were stratificated. After the stratification, sulfuric acid and gibberellic acid were applied to the seeds. Experimental design were planned with three replicates, and 30 seeds per each replicate were used. Carob seeds were treated with different diluted sulfuric acid concentrations (Control, 80, 85, 90 and 95%) for 30 minutes in petri dishes, and then were soaked in water for two days. In gibberellic acid treatments, seeds were treated with 500 ppm, 1000 ppm and 1500 ppm concentrations for 24 hours. All treated seeds were sowed to perlite. The results showed that the seeds didn't germinate in control group, the highest germination rate for sulfuric acid treatments was observed in 95 % sulfuric acid as 89 % rate, and the highest germination rate for gibberellic acid treatments was observed in 1000 ppm dose as 29 % rate.

Key words: Carob, *Ceratonia siliqua*, seed, treatments, germination

THE FACTORS AFFECTING THE ADOPTION OF INNOVATIONS IN TURKEY PLUM GROWING

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Abstract

This study was made in Mersin, Bursa and Afyon provinces at the plum enterprises examined the present situation and concerned innovations, adopted how and through which channels the researches, assessed impact of the research findings which were continued and transmitted to the practice, and investigated relationship the research institute with the agricultural extension service. The data was obtained by survey from 195 plum enterprises. Logit analyses was used to determine the effects of the factors as education, experience, age, family population, plum production area, gross profit per hectare, the frequency of contact with extension agent to adoption. It weren't found differences in respect of gross margin among innovative levels. In Mersin has been found the highest gross production value and gross margin.

Keyword: Plum, Growing, Innovation, Adoption

THE RESPONSE OF MONOTERPENE COMPOUNDS OF CV. GEWÜRZTRAMINER GRAPE (*VITIS VINIFERA* L.) TO VARIOUS DOSES OF PROHEXADIONE-CALCIUM APPLIED AT DIFFERENT PERIODS

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Abstract

Wine grape quality is affected by different factors. One of these factors mentioned is also excessive vegetative growth, leading to excessive canopy shade in grapevine. This unfavorable situation can decrease wine grapes and wines qualities due to reductions in some of light dependent quality constituents of grape. Plant growth retardants have been practically used for fruit and grape production, leading to better vegetative growth and balanced cropping level in plant. For this aim, it can be utilized from various gibberellin inhibitors for their ability to restrict vegetative growth of plant. This research was carried out in Tekirdağ, Turkey, vegetation period of 2010, using cv. Gewürztraminer wine grape. In the study, prohexadione-calcium (pro-Ca), which is one of the gibberellin biosynthesis inhibitors used to suppress the vegetative growth, was used at concentrations of 0, 100, 200 and 300 ppm in two different spraying times, including two pre-bloom applications plus one post-bloom and one pre-bloom application and two post-bloom applications. As a result, it was seen that various doses of pro-Ca treatments at different spraying times had varying effects on quality characteristics of cv. Gewürztraminer.

Key words: *Vitis vinifera* L., aromatic grape varieties, monoterpenes, plant growth retardants, pro-Ca.

EFFECT OF CALCIUM AND BORON ON THE CHEMICAL STATUS, GAS EXCHANGE PARAMETERS AND GROWTH PERFORMANCE OF POMEGRANATE PLANTS GROWN UNDER NaCl STRESS

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Abstract

A greenhouse experiment was conducted to study the effects of sodium chloride (NaCl) on growth, nutrient status, carbohydrate and proline content and gas exchange parameters of pomegranate plants (*Punica granatum* L. cv. Wonderful). One-year-old, own-rooted pomegranate plants were grown for 58 days in a sand–perlite medium. They were irrigated with nutrient solutions containing two concentrations of B (25 or 117.5 μ M) in combination with 0, 40 or 80 mM NaCl and 1.0 or 10 mM CaCl_2 , respectively. At the end of the experiment, the greatest height was observed in plants treated with 1.0 or 10 mM CaCl_2 or 117.5 μ M B, whereas it was significantly reduced by the inclusion of NaCl into the nutrient solution. Similarly, a decline of fresh and dry matter weight was recorded in the treatment with 80 mM NaCl. The concentration of chlorophyll and carbohydrates in leaves was unaffected by the inclusion of NaCl into the nutrient solution, whereas in roots, the respective concentrations were reduced by 50% compared to control. Moreover, as a result of salinity (mainly 80 mM NaCl), a decrease of photosynthetic parameters (transpiration rate, internal concentration of CO_2 and stomatal conductance) was recorded, although most of these effects were not statistically significant. Finally, NaCl treatments increased the concentrations of Na and Cl but reduced the concentration of the rest studied macro and micronutrients in leaves and roots.

**TECHNOLOGICAL INVESTIGATIONS FOR IMPROVEMENT OF GRAPEVINE PROPAGATION MATERIAL
PRODUCTION IN BULGARIA**

**PART I: RESULTS OF AFFINITY STUDY AND COMPARATIVE TESTING OF PARAFFINS FOR THE
PRODUCTION OF GRAFTED ROOTED**

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Abstract

The investigations were carried out at the Institute of Viticulture and Enology – Pleven, Bulgaria, in the period 2011-2013. To study the biological affinity of the newly-selected red wine variety Storgozia at IVE-Pleven cuttings from that variety were grafted to rootstocks widely used in viticultural practice - Berlandieri x Rupestris 110 Rihter (110R); Riparia x Rupestris Kordifolia 44-53 Malague (44-53M), Berlandieri x Riparia SO4 - control. The best callus formation at the site of grafting during stratification was found in the case of grafting of Storgozia variety to rootstock 44-53 M - 85.8%. The strongest growth was also induced by the rootstock 44-53 M. The yield of first-class vines with 44-53 M (50.4%) was almost identical to that obtained with SO4 - 50.9%. Comparative study of paraffins Aktigref, Rebvaks VG and Proaktigref for applying after cuttings transplantation was carried out for determining the stimulation of callus induction at the site of grafting and prevention of tissue dehydration. The best results (percentage of first-class vines) were obtained using Rebvaks VG - 44.4%.

Key words: vine propagation material, technology, nursery, affinity, paraffins

**TECHNOLOGICAL INVESTIGATIONS FOR IMPROVEMENT OF GRAPEVINE PROPAGATION MATERIAL
PRODUCTION IN BULGARIA**

PART II. TESTING OF AGRITECHNICAL PRACTICES IN VINE NURSERY

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Abstract

The study was carried out at the Institute of Viticulture and Enology, Pleven for improvement the technology for the production of grafted rooted vines. The subject of the study included the agritechnical practices: irrigation and irrigation regime in vine nursery, application of herbicides for weed control and fertilizing with organic fertilizers was the subject of the study. In the comparative tested irrigation practices and irrigation regime in the nursery the results were in favour of the drip irrigation. The action of the herbicides Lumax 538 SC (375g/l *s-metolachlor* + 125 g/l *terbuthylazine* + 337.5 g / l *mesotrione*), Stomp 33 EC (330 g/l *pendimethalin*), Goal 2E (240 g / l *oxyfluorfen*) and Dual Gold 960 EC (960 g/l *s-metolachlor*) was studied. The organic fertilizers Humustim, Aagrohumustim, and Biohumus were tested for fertilization optimization. Fertilization with organic fertilizers had a positive effect on the growth processes in terms of the elements of growth and yield of grafted rooted vines.

Key words: vine propagation material, nursery, irrigation regime, herbicides, fertilizing, organic fertilizers

INFLUENCE OF ROOTSTOCKS (Gisela 5, Gisela 6, MaxMa, SL 64) ON PERFORMANCE OF 0900 ZIRAAT SWEET CHERRY

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Abstract:

This study was carried out in order to determine the effect of rootstocks (Gisela 5, Gisela 6, MaxMa 14 and SL 64) on performance of sweet cherry cultivar '0 900 Ziraat' during 2010-2013 years. The trial in randomized block design was established as to factorial design. Each graft combination included 20 trees. The trees was trained as Spanish Bush training system. At the end of study, effect of rootstocks on vegetative growth was found significant. It has been determined that the trees grafted on SL 64 and MaxMa 14 rootstocks were more vigorous than the those grafted on Gisela 5 and Gisela 6. The rootstocks formed significant differences at the precocity. While the first blooming on the trees on Gisela 5 and Gisela 6 rootstocks occurred at second year after planting, the first blooming on the trees on MaxMa 14 and SL 64 rootstocks occurred at fourth year after planting. It has been determined that occur significant differences on yield per tree and yield efficiency among rootstocks. In terms of yield per tree and yield efficiency, While the lowest value was in SL 64 rootstock, the highest value was recorded in Gisela 5, and it has been determined that the differences between three rootstocks (Gisela 5, Gisela 6 ve MaxMa 14) were not significant. While fruit weight varied according to the rootstock used in study, the trees grafted on Gisela 5 had the smallest fruit. Accompanied with differences between MaxMa 14 and SL 64 rootstocks were not significant, the biggest fruit were produced on trees grafted on SL 64 rootstock. As a result of the statistical analysis, it has determined that the rootstocks that used in trial did not create significant differences on soluble solids content (SSC) value. One of the most significant diagnosis was 6 % mortality rate that occurred on trees grafted Gisela 5 and Gisela 6 rootstocks.

A STUDY ON PROPAGATION OF MULBERRY (*MORUS SPP*) BY WOOD CUTTINGS

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ABSTRACT

The effect of IBA on rooting of wood cutting of black mulberry and red mulberry was investigated. Cuttings taken in December were treated with several doses (0, 2000, 4000, 6000 and 8000 ppm). Under mist and temperature controled greenhouse conditions the cuttings planted in perlite were left to rooting for 90 days. At the end of 90 days, rooting period, root quality parameters determining the rooting such as percentage of rooting, the degree of rooting, the number of roots, the branch of number roots and the length of root. While the best percentage of rooting in black mulberry obtain from 6000 ppm IBA treatment, in red mulberry the best percentage of rooting was obtained from 4000 ppm IBA treatment.

Key Words: Mulberry, cutting, IBA, rooting

EFFECTS OF BA+GA₄₊₇ TREATMENTS ON FRUIT QUALITY IN FUJI APPLE VARIETY

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Abstract:

This study was carried out in order to determine the effects of BA+GA₄₊₇ treatments on fruit quality in Fuji apple variety grafted on M9 rootstock in Isparta ecological conditions. In this context, 100 and 150 ppm BA + GA₄₊₇ doses were applied twice to the trees. BA + GA₄₊₇ treatments were most effective on fruit quality. They were increased higher fruit weight, fruit diameter and fruit length than the control.

Key words: *Malus x domestica*, growth regulators, fruit size

MINERAL COMPOSITION OF LEAVES AND FRUITS IN SOME MYRTLE (*Myrtuscommunis* L.) GENOTYPES

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Abstract:

In this study, mineral composition of leaves and fruits of two genotypes having purple-black and yellowish-white fruits grown in Çandır (Isparta) and a genotype having yellowish-white fruits grown in Serik (Antalya) were determined. The results showed that both leaves and fruits of myrtle are rich based on contents of K, Ca, Mg and P. Significant correlation was not obtained between fruit colours and mineral contents of genotypes. Highest total minerals were obtained from genotype 11 (with purple-black fruit) for the leaf samples and from genotype 17 (with yellowish-white fruit) for fruit samples.

Key words: *Myrtuscommunis*, fruit, leaf, minerals

HYDROGEN PEROXIDE INDUCED ANTIOXIDANT ACTIVITIES IN CALLUS CULTURES OF *BELLIS PERENNIS* L.

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Abstract:

Many plants with biological potential can be highlighted among the various plant families, such as the family Asteraceae, which has approximately 1,620 genera and 23,600 species, including the genus *Bellis* and the species *Bellis perennis*, known as common daisy or English daisy. In the present study we describe the effect of H₂O₂ pretreatment on in vitro enzymatic and non enzymatic antioxidant activity of *Bellis perennis* callus cultures. The effect of hydrogen peroxide (H₂O₂) on callus cultures of *B. perennis* L. increased catalase (CAT), superoxide dismutase (SOD), total phenolic and proline activity. Callus derived from pedicel explants was cultured on Murashige and Skoog medium supplemented with 0.5 mg L⁻¹ indole-3-acetic acid (IAA) and 0.5 mg L⁻¹ thidiazuron (TDZ). After a month of culture, callus was transferred to MS medium containing 10 mM H₂O₂ and then incubated for 6 hours. It was clear that H₂O₂ pre-treatment resulted in an increase in enzymatic and nonenzymatic antioxidants. The present data suggest that H₂O₂, a stress signal, could trigger the activation of antioxidants in callus cells.

Key words: *Bellis perennis* L., antioxidants, SOD, CAT, total phenolic, proline

TRAINING AND PRUNING OF APPLE AND MODERN TRENDS OF DEVELOPMENT

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Abstract:

Since Second stage of intensification of apple industry in Europe started during early of 70s of the last century with Dutch "Slender spindle" training system for high density plantations new systems such as "Central leader", "Axe central", V and Y shaped system, "Solen", "Solax", "Cone" etc. were developed in different countries of the world. Planting systems were classified at five group as low to ultra high density, that is since less 1000 to more than 8000 trees per hectare. According to studies in France during the last 40 years apple tree cultivars have been classified in four group depend of their fruiting type- I type Starkrimson, II- Reine des Reinettes, III-Golden Delicious and IV-Granny Smith. This classification give us the answer why we have biennial bearing for the apple cultivars in type I and regular bearing for type IV, and why is very important to maintain good balance between vegetative growth and reproductive shoots as a part of apple canopy architecture. In this overview the main problems of apple training and pruning systems in modern apple plantations will be discussed.

Key words: *Malus domestica* (Borkh), training and pruning systems, fruiting type and habit

STUDY ON THE INFLUENCE OF DIFFERENT DRYING REGIMES ON THE CHEMICAL COMPOSITION OF ORGANIC FRUITS FROM SOME PLUM CULTIVARS

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Abstract:

Fruit drying is the oldest method for food preservation because of its easy application and economic efficiency. The quality of dried fruits is determined by the quality of raw material and the optimal drying conditions. The change in some biochemical indicators was followed in different drying regimes for fruits of some plum cultivars. In the first variant in the drying process was used an alternative energy source - solar, and in the second one - heat pump. The plum cultivars - Gabrovska, Mirabelle De Nancy and Stanley – are included as an object of this study, which are distinguished by very good technological qualities. It was found from the conducted experiment that the lowest content of dry matter substance in fresh fruits is distinguished in Mirabelle De Nancy - 25.50 %. In the alternative source for drying of fruits, the highest content of biological active substances are from cultivar Gabrovska (ascorbic acid - 8.80 mg/%) and Stanley (anthocyanins – 40.81 mg/%). In the heat drying of fruits the highest content of both components have the fruits of Stanley. Significant decrease of some chemical indicators was recorded, which were pre-calculated toward absolutely dry units for both regimes of drying. The aim of the present study is to follow and compare the change of some chemical indicators for both drying regimes of organic fruits in the different plum cultivars.

Key words: plum, dried fruits, chemical composition, solar dryer, heat pump

EFFECT OF DIFFERENT PRUNING SEVERITY ON VEGETATIVE GROWTH IN PEACH (*Prunus persica* Stokes (Sieb.)(Batsch))

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Abstract:

Pruning of bearing trees is applied in peach trees harder than other fruit trees. Locations where glazed frost, frost, or drought danger are observed, pruning should be applied more slightly in bearing trees. Besides this, cultivar characteristics should be taken to account during pruning. In this study, The effect of vegetative growth of branches was investigated by using six different pruning severity on eight-year-old 'Redhaven' and 'Dixired' peach trees was investigated. The pruning severity applied on the branches were as follows: 1) Non pruning (control), 2) Tipping (1-2cm), 3) Pruning of 1/3 of the branch, 4) Pruning of 1/2 of the branch, 5) Pruning of 2/3 of the branch, 6) Pruning above 3-6cm of the branch. Pruning of branches was performed between end of January and beginning of February during three years. After one year form each pruning, the length, diameter and bud amount of 2-year-old branches, and the length, diameter and bud amount of 1-year-old shoots grown from 2-year-old branches were determined and analysed.

Key words: Peach, Pruning Severity, Vegetative Growth

GENETIC DIVERSITY OF MOROCCAN *ATRIPLEX HALIMUS* POPULATIONS USING RAPD MARKERS

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Abstract:

Atriplex halimus L. (Chenopodiaceae) is a monoecious C4 perennial shrub native to the mediterranean basin, used as fodder shrub for livestock and useful for rehabilitation of degraded rangelands. The Local genetic resources of this species have been currently damaged by severe genetic erosion due irregular rainfall and reduction of range land. Thus, the identification and the conservation of *A. halimus* populations has become a necessity for improvement and management of these resources. In this study, our interest has focused on the use of the RAPD markers to explore the molecular polymorphism and characterize 11 Moroccan spontaneous populations and one populations originating from USA. A number of 157 reproducible amplified bands were obtained with 17 primers. Out of 157 amplified bands, 146 (93%) were polymorphic. Global AMOVA analysis showed that the most genetic variation was within populations (66.57%), with the reminder occurring between populations (33.43%). Hierarchical AMOVA analysis revealed that variation among regions (Morocco versus USA) accounted only for 5.87% of the total genetic variation, suggesting that there is not a significant genetic differentiation of populations located at the opposite sides of the Atlantic Ocean. The actual genetic structure could have arisen by a combination of genetic drift effect and limited level of gene flow (0.50). A neighbour- joining dendrogram based on Dice's coefficient resolved five major groups of populations correlated in part with bioclimatic type. Nevertheless, geographic distance did not explain the genetic differentiation among populations ($r = 0.103$, $P = 0.646$). In resume, our data indicated the presence of a high genetic variability among and within the *A. halimus* populations. This result should have important implications for the conservation and management strategies of genetic variation of *A. halimus* in Morocco.

Key words: *Atriplex halimus*, Natural populations, RAPD, Genetic structure, Morocco.

TOTAL PHENOL AND ANTIOXIDANT CAPACITY IN MOROCCAN POMEGRANATE VARIETIES

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Abstract:

Pomegranate (*Punica granatum* L.) is an important fruit tree of tropical and subtropical world regions, where it is highly appreciated for its delicious edible fruit. In Morocco, the successful adaptation of pomegranate trees to the climate of many of its regions is reflected in their wide distribution over the country. The cultivation of this species has known in recent years a great extension and the total pomegranate production is about of 70 000 tons. Our study has focused on characterizing the 10 major Moroccan cultivars to acknowledge the quality and bioactive compounds of the fruits. The following determinations were assessed: pomegranate fruit maturity index, which truly defines juice taste, as well as organic acids and sugar contents, total phenols, and antioxidant activity of pomegranate juice. The cultivar behaved as the most influencing factor conditioning pomegranate sugar and organic acids profiles, antioxidant activity, and total phenolics. The assessment of pomegranate chemical compositions implies the great potential of Moroccan cultivars for both fresh market and fruit processing. In fact, the "Hamde" sour cv. seems particularly suitable for juice production because of its high phenolics content. Given the divergence observed on bioactive compounds concentrations and antioxidant activity among evaluated cultivars, the genotype factor should be considered as the most influencing factor in future breeding programs to enhance the synthesis of beneficial bioactive compounds. Additionally, the presence of bioactive compounds in pomegranate juices may encourage their consumption for potential health benefits.

Key words: pomegranate, fruit, total phenol, antioxidant capacity.

BREEDING PROGRAM FOR FRESH APRICOT CULTIVAR DEVELOPMENT IN TURKEY

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Abstract

An apricot breeding research was conducted to develop new varieties at Alata Horticulture Research Station for Alata Yıldızı, Çağrıbey, Çağataybey and Sakıt-6 local varieties and Priana, Feriana and Precoce de Colomer international varieties during the year 2003. Hybrid plants were planted to field in 2005 and 54 genotypes yielded in 2014. Pomological analyses (fruit weight, height, width, water soluble solids, acidity and flesh firmness) were performed over harvested fruits. Results were compared with the values of Ninfa and Precoce de Tyrinthe, and Mogador the common varieties of Mediterranean. Mogador was harvested May 1, Ninfa was May 5, and Precoce de Tyrinthe was May 10. Hybrids were harvested between May 12 and June 9. Some genotypes had larger fruits with higher water soluble solids than Ninfa and Precoce de Tyrinthe. Fruit weight of hybrids changed between 70.43 -15.56 g. Fruit weight of Mogador, Ninfa and Mogador were 38.66 g, 35,36 and 59,23 g, respectively. SSC of hybrids changed between 19.23-7.23%. Otherwise, SSC of Mogador, Ninfa and Precoce de Tyrinthe were 12.26, 11.67 and 11.40, respectively. Results showed that although hybrids had earlier harvesting time than common cultivars, hybrids had high SSC and fruit weight.

Key words: Apricot, hybridization, breeding, new variety

ECONOMIC CHARACTERISTICS OF SOME NEWLY-SELECTED WINE VARIETIES AND VINE CLONES IN BULGARIA

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Abstract

During the period 1994-2008, in the Institute of Viticulture and Enology - Pleven, a comparative study of the economic characteristics of newly-selected in Bulgaria wine varieties and vine clones was carried out. It was found that according to the mechanical analysis of the grapes of the studied interspecific varieties, they were typically wine with specific characteristics of the clusters and berries suitable for the production of quality red and white wines. These varieties had high fertility rate and productivity, increased resistance to biotic and abiotic stress and were suitable to be grown on different training systems in all viticultural regions of Bulgaria. The analyzed data of many years from the grapes physico-chemical analysis of the studied clones of wine varieties showed that they were superior compared to the population of the respective variety mainly in the cluster size and mass and not so much in the berry size. The clones had a more intense rate of sugars accumulation in the grapes, while maintaining a good level of titratable acidity. The wine quality produced from the clones was better in comparison to wine from the population of the respective varieties.

Key words: vine, wine variety, clone, economic characteristics.

DETERMINATION OF SOME POMOLOGICAL CHARACTERISTICS OF LOCAL APPLE (*MALUS COMMUNIS* L.) VARIETIES GROWN IN KAYSERİ

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Abstract:

This study was conducted on 23 local apples cultivars in Kayseri and its surroundings. Fruit samples harvested in 2011 and were investigated as pomological characteristics. Fruit weights of apple cultivars were between 36.38 g and 128.21 g. While the varieties were between 21.22 mm and 62.74 mm in point of fruit length, they were between 28.22 mm and 67.51 mm in point of fruit diameter. While minimum soluble solids content was 6.90 %, maximum soluble solids content was 15.4 %. While the varieties were between 4.1 kg/cm² and 8.0 kg/cm² in point of fruit firmness, they were between 3.28 and 4.76 in point of pH.

Key Words: Local Apple, Pomological Characteristics, Kayseri,

THE YIELD AND QUALITY CHARACTERISTICS OF WIDELY GROWN GRAPE VARIETIES AT MERSIN LOWLANDS AND HIGHLANDS

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This study was carried out in Mersin in 2012-2013. Mersin, a city of Mediterranean Region, has very high potential for viticulture, While the early varieties, with high table quality, are cultivated in the lowlands, table and dryable grape cultivation is done widely at highland regions at the end of season. In this study, it was understood that Yalova İncisi, Tarsus Beyazı, Ergin Çekirdeksizi, Trakya İlkeren and Victoria grape varieties were cultivated at the lowland (≤ 500 m) and Kışniş, Göğüzüm, Takkara, Dilmit and Tilkikuyruğu grape varieties were cultivated at the highland of the Mersin. The aim of this study was to examine the yield (kg / vine) and some quality characteristics [(cluster weight (g), berry weight (g), total soluble solid content (%), pH, acidity (%), berry color (L, a *, b *), berry removal force (g), maturity period] of grape varieties at Mersin lowlands and highlands. Grape growing maturity period in Mersin begins with in the second half of June at lowland (Trakya İlkeren) and ends with at the end of November (Tilkikuyruğu) at highland. The highest yield of grapes per vinestock was determined at Ergin Çekirdeksizi (10.42 kg) at lowland. On the other hand, that was Tilkikuyruğu (16.93 kg) at highland. Varieties' bunch of grapes weights was determined between 318.09 g (Trakya İlkeren) and 410.48 g (Ergin Çekirdeksizi) and a hundred berry weight was found out between 285.0 g (Ergin Çekirdeksizi) and 759.4 g (Victoria) at lowland. However, bunch of grapes weights showed a change between 192.00 (Kışniş) and 446.61g (Tilkikuyruğu) and a hundred berry weight was from 93.6 g (Kışniş) to 651.8 g (Tilkikuyruğu) at highland. Lowest and highest values of berry removal force were, respectively, Tarsus Beyazı (240 g) and Victoria (536 g) at the lowland, while that was Kışniş (121 g) and Tilkikuyruğu (418 g) at the highland varieties. Total soluble solids contents of varieties differed from 14,8% to 13.1% (except Tarsus Beyazı) at lowland. On the other hand, that showed an alteration between 15.6% and 19.2% at high land.

Key words: Mersin, lowland, highland, viticulture, yield, quality

PRUNING AND TRAINING METHODS IN VITICULTURE

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Abstract:

Viticulture is one of our country's most important agricultural deal. Although the establishment of such a state bond, taming, pruning, care and evaluation of grapes due to lack of technical knowledge on topics such as the amount of product obtained perunitarea is very low. An appropriate form of training young vines in the creation of the circuit; products in the circuit if the productivity, quality and development by balancing the highest possible performance in order to reach an older branches and formed on the summer shoots cut or plucked removal, shortening, bunches and leaves diluting and similar trans actions pruning is called. In viticulture pruning and training concept sare often confused with each other. Finishing; plant made successively in the young period, with winter and summer pruning is the way to express. In modern viticulture; finishing system, it is meant that the shape forming feature switch given to plant bodies is placed on the a but ment (support) system are evaluated together. In contrast, pruning; plant in young circuit training method after the creation of the product development, yield and for the regulation of premeditation on the branches and shoot abbreviations, include so penetrations such as extraction and dilution. Also formed with the process of the training method is intended to protect.

DETERMINATION OF CRACKING RESISTANCE AND FRUIT QUALITY PARAMETERS OF BIG LORY AND PRIME GIANT CHERRY CULTIVARS UNDER THE ECOLOGICAL CONDITIONS OF EĞİRDİR (ISPARTA)

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Turkey is one of the largest cherry producer and exporter countries of the world. The fact that 0900 Ziraat is the main variety used in cultivation limits both export period and export quantity. It is required to use new early and late varieties that allow cultivation in different periods. The rain that falls during maturity period causes cracking in cherry fruits and impairs the quality of the leads. This study was conducted on the cherry varieties of Big Lory and Prime Giant in Fruit Growing Research Station. The harvested fruit samples were tested in terms of fruit weight, fruit width, fruit length, fruit hardness, total soluble solids, titratable acidity, TSS / acid ratio, fruit skin color, and artificial cracking. As a result, both of the cherry cultivars were found to be suitable to the needs of the market in terms of some fruit quality parameters. The results suggested that they had pretty good values of especially fruit weight (13.38 gr for Big Lory; 14.32 gr for Prime Giant) and fruit width (31,15 mm for Big Lory; 31,84 mm for Prime Giant). The cracking index was determined to be 53.73 in Big Lory and 38.30 in Prime Giant.

Key Wordds : *Prunus avium* L., fruit quality, cracking index

POMOLOGICAL CHARACTERISTICS OF PERSIMMON (*DIOSPYROS KAKI*) GROWN IN ULUBEY PROVINCE (ORDU/TURKEY)

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Abstract:

This study was conducted on 50 persimmon cultivars in Ulubey and its surroundings. Pomological characteristics (fruit weight, fruit size, total soluble solid, pH, titratable acidity, etc.) were determined on 54 types. The local persimmon cultivars were examined in terms of fruit weight, titratable acidity, soluble solids content and pH values and these properties were determined between 323.25-73.24 g, 0.31-0.05 %, 20.00-10.0 % and 6.64-5.61 respectively.

Key words: Persimmon, *Diospyros kaki* L., Pomological, Ordu

EFFECTS OF AGAR TYPES ON ROOTING PERFORMANCE IN TISSUE CULTURE: SAMPLE OF QUINCE A ROOTSTOCKS CULTURES

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Abstracts

Selection and use of true type gelling agent is very important for the success of tissue cultures and also for the affective costs. In this study, the effects of three different concentrations (5, 7 and 10 g/l) of the four types of commercial agar (Merck, Difco-Bacto, Oxoid and Gelrite) were investigated on *in vitro* rooting of Quince A which is one of the popular pear rootstocks. 30 g/l sucrose and 0.5 g/l IBA or NAA was added to the each media. Rooting rate (%), root length (cm), callus formation (%), callus size (cm), fresh and dry root weight (g) was determined. Study was organized completely randomized plot design with three replicates and 20 micro plants were taken in each replicate. There were different rooting rates according to used agar and auxin types. Although gelrite is one of the expensive gelling agents, effects on rooting of Quince A were negative. These results will help in reducing costs in tissue culture studies.

Key words: Cost, Agar, gelrite, NAA, IBA, quince A

HIGH DENSITY PLANTING TRIAL OF STANLEY PLUM VARIETY ON PIXY

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This project carried out at Fruit Research Station in 1999-2008. In this study, it was examined performance of Stanley plum variety on Pixy at different planting distances. Stanley on plum seedlings was used as traditional plum growing at 4 x 4 m. Stanley on pixy rootstocks planted at 4 m between rows and 1, 2, 3 m in row as three replicated and 4 plants per replication by randomized block design. Phenologic observations, pomologic analyses and morphologic measurements were done for performance of trees. Differences among phenological dates of distances were not important statistically. Fruit weight (g), yield (kg/da) and cumulative yield per trunk sectional area (kg/cm²) were the highest values in 1 m plantings. Yield (kg/tree) was the highest at 3 m plantings. As a consequence, high density growing of Stanley plum variety is possible with 4x1 m planting distance with Pixy rootstock.

Key words: Plum, Stanley, Pixy, High Density

SOME OF GRAPE (*V.vinifera L.*) CULTIVARS, ROOTSTOCKS AND CLONES PURIFICATION FROM VIRUSES WITH THERMOTHERAPY + MERISTEM CULTURE

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Turkey with regard to the total area of vineyards and grape production is among the few countries in the world, but grape amount obtained per unit area in Turkey is not available considering the desired level. One of the most important reasons for this, seedlings produced in our country usually not certain quality characteristics, pest and disease conditions. Especially materials contaminated with viruses is the absence of any chemical struggles. Purification process of these materials is possible only with thermotherapy and meristem culture. In this scope "**Purification of our country Some Important Grape Varieties, Rootstocks and Clones Respect to for Viruses and Agrobacterium Vitis**" project in Tekirdağ Viticulture Research Station was prosecuted with the support Public Institutions Research Funding Program (1007) of The Scientific and Technological Research Council of Turkey (TÜBİTAK). The evaluation viruses in the project are *Arabis mosaic nepovirus*, *Grapevine fanleaf nepovirus*, *Grapevine fleck virus*, *Grapevine leafroll closterovirus -1,-2,-3,-6,-7*, *Grapevine virus A*, *Raspberry ringspot nepovirus*, *Strawbeery latent ringspot nepovirus*, *Tomato black ring nepovirus*. Project materials were primarily tested for virus, clean materials was directly transferred to the screen house (28 clones), contaminated materials were provided to transfer to the screen house after applying them thermotherapy and meristem culture. At the end of the project, total of 93 clean material was obtained from contaminated materials.

Key words: Meristem Culture, Thermotherapy, Virus, Grapevine, Purification, TÜBİTAK, Screen House.

EXAMINATION OF SOME PHYSICAL PROPERTIES OF AEGEAN REGION VINEYARD SOILS

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The present study was conducted in order to determine some physical properties of the soils in the Aegean Region where grape cultivation is carried out intensely. With this survey study conducted between the years of 2010 and 2013, physical analyses were carried out on soil samples collected from 17 different species from the cities of Manisa, Denizli, Izmir, Usak and Aydin. Soil samples were taken from two different depths as (0-30) cm and (30-60) cm, and Texture (Bouyoucos 1955), Total Lime % (Caglar, 1958), Total Soluble Salt % (Soil Survey Staff, 1951), Organic Substance % (Walkey and Black, 1947) and pH (Jackson, 1967) (Kacar, 1995) analyses were performed.

A general evaluation of the soil samples showed that in terms of total soluble salt % the samples were non-saline, in terms of organic substance % the samples contained very low, low and medium level of organic substances, in terms of total lime % the samples varied from low to extremely limey, and in terms of pH values the samples were slightly alkaline, alkaline and strongly alkaline. With the examination of the texture groups of the samples on the other hand, varying soil texture groups from sandy to clayey were found.

Key words: Aegean Region, Vineyard, Soil

DETERMINATION OF OPTIMUM HARVEST DATE OF SWEET CHERRY CV. LAPINS GROWN IN ISPARTA

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Abstract

In terms of agricultural exports, cherry is an important product for Turkey. Export is possible with the high quality production, harvest at the right time and properly storing. Quality cherries to market is one of the most important step that determination of the optimal harvest date and harvesting on these dates. Fruits are encountered with the loss of quality and products if they are not harvested an exact date. This study was conducted to evaluate physical measurements of fruit quality as a maturity index for estimating optimum harvest date (OHD) of 'Lapins' cherries. For this purpose, the days after full blossom (DAFB) was determined as 19.04.2012. Cherry fruits, began after 22 DAFB, were harvested at certain periods. Fruit samples were picked from 22 to 85 DAFB. Skin color, fruit width and length, fruit weight, fruit firmness, soluble solids (SSC), titratable acidity (TA), respiration rate, maturity index (SSC/TA ratio) were analyzed in picked fruits. As a result of the analysis, as DAFB was increased, fruit weight, fruit width and length were increased. Fruit growth was slowed down in the days after OHD. With the start of the changes in fruit color L*, b* and h° color value were rapidly decreased, while a* value was increased. This color changes was slowed down in the days after OHD. Respiration rate in small fruit stage was very high, while respiration rate was slow gradually during growth. OHD of Lapins cherry variety was determined as 64 DAFB.

Key words: Sweet cherry, Lapins, Optimum harvest date, fruit maturity.

CULTIVABLE PLANT GROWTH PROMOTING RHIZOBACTERIAL DIVERSITY IN THE ACIDIC TEA RHIZOSPHERE SOILS IN THE EASTERN BLACK SEA REGION AND THEIR USING IN TEA PRODUCTION

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ABSTRACT:

Microorganisms are important in agriculture in order to promote the circulation of plant nutrients and reduce the need for chemical fertilizers as much as possible. These kind of beneficial microorganisms are freely living and mostly known as a biological control or biofertilizer agents in agriculture throughout the world. Therefore, the objective of this study is to isolate and identify plant PGPR from the rhizosphere of tea, and characterize them for N₂-fixation, P-solubilization, ACC deaminase activity, high carbon sources utilization and plant growth promotion. We conducted a survey of PGPR naturally colonizing a mild climate with high precipitation and acidic soil in tea growing region. A nitrogen-free solid malate-sucrose medium was used to isolate N₂-fixing bacteria. The isolates were identified based on whole-cell fatty acid methyl ester (FAMES) analysis using the MIDI system and BIOLOG assays. Among the selected 786 bacterial strains, 424 strains exhibited N₂-fixing activity and 335 were efficient in phosphate solubilization; 98 strains have ACCD activity; 285 strains were efficient in N₂-fixation and P-solubilization. Acid tolerant strains stimulated overall plant growth, including shoot development and leaf yield, improving macro- and micro-nutrient uptake, and activities of enzymes of Turkish registered tea clones. In these studies indicate that a higher yield potential can be expected from acidic soils with PGPR inoculation. The studies showed that the effects of PGPR are more visible in early development stage of tea plants. It is particularly interesting that shoot growth and leaf yield of tea grown in acidic soils was significantly enhanced by some PGPR than mineral fertilizers. PGPR strains tested have great potential for the sustainable and environmentally friendly organic tea production.

Key words: *Camellia sinensis*, Plant growth promoting rhizobacteria, 1-aminocyclopropane-1-carboxylate deaminase activity, Leaf yield, Macro and micro element content, Acid tolerant strains

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**GROWTH MANIFESTATIONS AND MORPHOLOGICAL CHARACTERISTICS OF OFFSPRING
OF HYBRIDIZATION OF BLACKTHORN /PRUNUS SPINOSA/ WITH REPRESENTATIVES
OF PRUNUS DOMESTICA**

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Abstract

The researches were conducted with *Čačanska leptica* cultivar. It is grown in Troyan region where it shows very good development and fruit bearing. The cultivar has a short juvenile period, as it forms blossoms in the second year since planting. The flowering is medium early and it passes 3-4 days before this of Stanley. The fruits, in most cases under conditions of Troyan, start ripening at the end of the first ten-days of August. In favourable climate conditions, it forms large fruits with a weight of 37.5 g and an attractive appearance. In years of extreme droughts, at the time of fruit growing bigger and ripening, they remain small with poor appearance. The purpose of the present study is to determine the influence, of pre-planting preparation for the creation of plum plantation, on the damage force from the lack of moisture on fruit quality. The researches were conducted in two plantations established on different technologies. In the first plantation, the trees are planted in soil pits, and in the second one according to the trench method of Prof. Dinkova. Because of prolonged drought in 2012, 90% of fruits from the first plantation had a weight of 15.2-23.5 g (35% with a weight of 15.2 g), and in the second plantation established according to the trench method 80% of fruits had a weight of 37.9 g.

SOME MECHANICAL AND PHYSICAL PROPERTIES OF PLUM FRUIT

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Abstract

Exploration in the determination of physical and mechanical properties of plum fruit; a total of 18 Da, built in an area and plum of fruit in (*Prunus cerasifera* Ehrh.) situated manufacturer in the garden in the town of Aydın in Umurlu three different harvest period (April 15 May 15 to May -1) was carried out. This study aimed to determining the physical and mechanical properties of plums, during different harvest period moisture content, fruit length, width, thickness, geometric mean values of diameter, sphericity, shape index, bulk density, true density, mass, porosity, projection area, and some physical features detachment force compression behavior under load and damage in different situations, such as falls from heights on different surfaces were some of the mechanical properties. The first harvest from the last harvest until the fruit weight and size were generally tends to increase. Plum of fruit mass of 5.491 g with 20.028 g for (throughout) the harvest period, fruit length of 22.92 - 30.01 mm, fruit width 20.84 - 28.88 mm, thickness 20.28 - 27.54 mm, shape index were found between 1.11 - 1.09. Moisture range is 15.22% with 20.86% of the range, bulk density during the harvest period 359.30 mm³ with 278.88 mm³ decreases from and true density increased during the harvest period. Plum of fruit in different harvest periods 0.5 m -1.5 m - 2.5 m in height when he was thrown from injury volume was measured respectively, 0186 mm³, 0.452 mm³, 0.836 mm³. With the increasing height of fall generally have increased sensitivity to shock damage. According to this study the deformation of the second harvest period (1 May); the other two harvest period (April 15-May 15) was determined to be less than.

Key words: Plum, Harvest Period, Physical Properties, Mechanical Properties

THE COMPARISON OF ELEMENTAL COMPOSITION OF DEVECİ AND SANTA MARIA PEAR VARIETIES

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Abstract

This study was implemented to compare the nutrient elements contents of two different pear cultivars in order to determine the sufficiency ranges might be used for different cultivars. For this purpose, concentrations of N, P, K, Ca, Mg, B, Fe, Zn, Cu, Mn, Cr, Ni, Cd, Pb and Co elements were determined in the leaf and fruit parts of pear cultivars, Deveci and Santa Maria. The mean values of N, Ca, Mg, B, Mn and Cd concentrations were found to be statistically different in the leaf samples. Concentrations of the elements in the fruit flesh were different at N, P, K, Ca, Mg, B, Fe, Zn and Cu. Concentrations of the elements in fruit peel were similar in both two cultivars, except N and B. Despite the differences found among the same elements, in the leaves of two different cultivars, the concentration of these elements were near to each other. So that, it could ve suggested that interpretation of the leaf and fruit analysis results from the different pear cultivars can be made by comparing to a single set of critical values or sufficiency ranges.

Key words: Pear, Nutrients, Sufficiency range

MOLECULAR MARKERS BASED DETERMINATION OF S ALLELS OF SOME TURKISH AND FOREIGN ALMOND CULTIVARS AND GENOTYPES

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Abstract

Gametophytic self-incompatibility (GSI) is a widespread mechanism in flowering plants that prevents self-fertilization and promotes outcrossing such as almond. Almond cultivars are largely self-incompatible, although self-compatible cultivars exist. Self-incompatibility is gametophytic and controlled by a single *S* gene with multiple codominant alleles. The *S* locus shows a high diversity in almond and until now more than 37 alleles have been identified. Determination of *S* alleles in almond is very important for breeding and planting new orchards. In this study 80 almond cultivar and genotypes screened via *S* allele specific molecular markers. As obtained results, high level of variation were determined among almond genotypes with regard to *S* alleles. Results also showed that almond genotypes have great potential for almond breeding and new orchard planting.

Key words: Almond, self-incompatible, molecular markers

STUDY ON FRUIT STAINING OF CITRUS IN THE EASTERN MEDITERRANEAN REGION

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Abstract

The study was carried out to determine there as on fruit staining of citrus in the Eastern Mediterranean Region in 2004 and 2005. For this purpose, citrus farming which is important in Adana, Mersin and Hatay provinces in the 15 packinghouses, stained amount of fruits and staining status on products are exported to different countries were determined. From fruits coming to packing and discarded from fruits after application of standard packing house, 250 of fruits based on 0-4 scale were examined. Although agent which cause to staining of the fruits coming to packing houses was encountered in the most varieties of oranges, a maximum was determined in grape fruit in the fruits were discarded. From orange varieties, Washington Navel was found to be more sensitive to staining agents than Valencia. In addition, the staining observed in orange fruits, eight different thrips species *Pezothrips kellyanus* (Bagnall), *Frankliniella occidentalis* (Pergande), *Thrips meridionalis* (Priesner), *Thripstabaci* (Lindeman), *Thripsmajor* (Uzel), *Haplothrips reuteri* (Hinds), *Haplothrips distinguendus* (Uzel) and *Melonathrips* sp., (Thysanoptera: Thripidae) were determined. *P. kellyanus* is a new record from these species of trips for Eastern Mediterranean Region. Fruits of staining are thought to be caused by trips species. Staining agent was found significantly in lemon fruits coming to packing houses and discarded from fruits.

Key words: Citrus, fruit staining, packing house, thrips, *Pezothripskellyanus*

EFFECTS OF ROOTSTOCKS ON DIFFERENT PHYSIOLOGICAL PARAMETERS IN SOME GRAPE CULTIVARS

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Abstract

Rootstocks affect the vigor, yield and fruit quality besides the physiology and alter the resistance of the scion to abiotic and biotic stress factors. In viticulture, different rootstocks affect the same scion also in different ways. This study was conducted in five years old vineyard in Manisa conditions. Leaf samples of Cabernet Sauvignon, Merlot and Syrah cultivars grafted on 110 R (*Vitisberlandierix Vitisrupestris*) and 1103 P (*Vitisberlandieri x Vitisrupestris*) were taken during veraison. Proline, carbon hydrate, color (CIE L^* , a^* , b^*) and chlorophyll (SPAD) contents of the samples were analyzed. The effects of the rootstocks on scion were compared and tried to make a correlation between them in respect to stress conditions. The obtained data were interpreted according to statistical analysis and Duncan multiple comparison test was used to state the differences. Statistical differences in all parameters were noted when all rootstocks and scion combinations evaluated together. When rootstocks effects on scion analyzed, 1103 P were found statistically significant in all parameters except carbon hydrate values where 110 R were found insignificant in proline, a^* and L^* values. As a result rootstocks were found effective on evaluated physiological and stress parameters and scions have different response on the same rootstock.

Key words: Vine, rootstock, proline, carbon hydrate, SPAD, color.

VALUABLE LOCAL APPLE CULTIVARS AND FORMS OF GENUS MALUS IN THE REGION OF APRILTSI

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Abstract

The local plant resources of *Malus* genus were studied in the region of Apriltsi. Great variety was found and valuable apple cultivars and forms were selected. The growth vigour of trees was defined. Biometric measurements of fruits were made. Due to growing of fruits on a seedling root-stock, they had great growth vigour and they reached significant sizes. Weight of fruits varied from 39 to 190 g. Sadovska Perusha had the largest fruits - 190 g, Baba Katarina - 175 g, MA 6 - 165 g. The susceptibility to fungal diseases - apple scab (*Venturia inaequalis*) and powdery mildew (*Podosphaera leocotricha*) was accounted. Most of the studied forms, such as Stefanka, Baba Katarina, Sadovska Perusha, Bozhechka, Form MA 6, are slightly susceptible to studied diseases, which determined them as appropriate for biological fruit production. From the conducted study on the basis of obtained results, as the most perspective were selected the local cultivars Sadovska Perusha, Baba Katarina, Bozhechka, Stefanka and forms MA 6, TSM and MT.

Key words: plant genetic resources, apples, cultivars, diseases.

AMPELOGRAPHICAL CHARACTERISTICS OF SOME LOCAL GRAPE CULTIVARS IN ARTVIN PROVINCE

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Abstract

Turkey, where has been one of homelands of vine, has a very old and long tradition for vine growing due to being between the centers of grapevine genes. The great diversity of different vine forms in Anatolia indicates that, viticulture and winemaking was first started and spread from this region. To record this diversity, "Determination, Identification and Preservation of Grapevine Genetic Resources of Turkey (National Vineyard Collection)" project was launched in 1960s' and 1437 species/types were transferred to collection vineyard up to now. In this study, 7 genotypes were chosen, which transferred from the National Vineyard Collection in recent years. These genotypes were collected from Artvin province. Ampelographic characteristics of this genotypes described according to OIV method.

Key Words: *Vitis vinifera* L., Ampelography

SOME POMOLOGICAL PROPERTIES OF PROMISING PERSIMMON GENOTYPES FROM ARDEŞEN AND PAZAR PROVINCE (RIZE), TURKEY

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Abstract

Turkey has a great potential with regard to fruit species and varieties. Eastern Black Sea Region is located within natural growing sites of such a rich diversity. The present research was conducted to determine pomological properties of some persimmon genotypes selected from Eastern Black Sea Region (Ardeşen and Pazar Provinces) with a rich local persimmon population. Fruit weight, fruit size (length, width and thickness), fruit shape index, flesh and skin color, astringency, fibrousness, soluble solids content, titratable acidity and pH values were investigated as the pomological properties. Fruit weights of selected genotypes varied between 165.5 – 303.3 g in 2007 and between 254.9 – 308.2 g in 2008. Fruit shape of almost all of the selected genotypes was round but fruit flesh was not astringent. Skin color was generally orange. SSC values of the genotypes varied between 14.90 – 21.40% in 2007 and between 15.80 – 24.10% in 2008.

Key words: Color, fibrousness, fruit weight, shape index, soluble solids content

EFFECTS OF DIFFERENT DEFICIT IRRIGATION STRATEGIES ON PHENOLIC COMPOUNDS OF BRAEBURN APPLES AT HARVEST AND DURING POSTHARVEST STORAGE

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Abstract

This study involves six different irrigation treatments for Braeburn apple cultivar grafted on M9 rootstock. These treatments are: none deficit irrigation, T1; continuous deficit irrigation, T2; deficit irrigation between the 40th and 70th days after full bloom, DAFB, T3; deficit irrigation between the 70th and 100th DAFB, T4; deficit irrigation between the 100th and 130th DAFB, T5; deficit irrigation between the 130th and 160th DAFB, T6. Fruits were harvested on optimum harvest time and stored at 0°C temperature and 90±5 % relative humidity for 7 months. The phenolic compounds of apples harvested in 2011 and 2012 were quantified by HPLC-DAD. Phenolics were analyzed at harvest and 3., 5.and7.months of coldstorage.The main phenolic compound in all treatments was found to be epicatechin. Resultsshowedthat different deficit irrigation treatments and storage time significantly affected phenolic composition of Braeburnapples.

Key words: apple, phenolic compounds, postharvest, HPLC

FORMATION OF ÇOTANAK GROUPS ACCORDING TO DIRECTION OF BRANCHES IN THE OCAKS TOMBUL AND PALAZ IN HAZELNUT VARIETIES

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Abstract

This study was conducted with Tombul and Palaz hazelnut varieties as three recurrences in 2010. Çotanak groups and çotanak lengths was determined according to direction of branches which in the Ocaks (a Turkish name of the training or growing system used for hazelnuts). In this study, while there was maximum 7 çotanaks on the branches of palaz hazelnut variety, on the tombul hazelnut it was determined as 11. At the Palaz variety, it was determined that there was 54.66, 54.99, 68.33, 81.33 çotanak groups respectively in the east, west, north, South directions, likewise at the Tombul variety there was 106.33, 83.33, 96.34, 115.00 çotanak groups. It was determined that for Palaz variety, the highest çotanak length was 49.96 mm in the east, the lowest çotanak length was 47.48 mm in the South and as for Tombul variety the highest çotanak length was 49.63 mm in the north, the lowest çotanak length was 46.60 mm in the west. Both in the two hazelnut varieties it was determined that South facing branches had the most fruits and according to average of four directions; at the palaz hazelnut variety double and triple çotanaks occurred, at the tombul hazelnut variety triple and quartet çotanaks occurred.

Key words: hazelnut, tombul, palaz, direction, çotanak group

DETERMINATION OF GRAFT SUCCESS FOR SOME WINE GRAPES GRAFTED ONTO 1103 P

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Abstract

This study was conducted to determinate graft success for some wine grape varieties grafted onto 1103 Paulsen (*VitisberlandierixVitisrupestris*) rootstock by omega grafting machine. Research was conducted in the Manisa Viticulture Research Station nursery. 'BornovaMisketi', 'Merlot' and 'Narince' wine grape varieties were used as plant materials. There were three replications per each varieties in this experiment also twenty grafted cuttings were produced per each replication. After grafting they were kept for 3 weeks in callusing room and they were planted in black polyethylene bags for rooting. The effects of different scion/rootstock combinations on callusing level (0-4), sprouting rate (%), the shoot development level (0-4), main shoot length (cm), second-third internode diameter (mm), fresh weight of shoot and foliage (g), dry weight of shoot and foliage (g), productivity of grafted vine (%) were examined. According to the results, only sprouting rate was statistically found significant and the best sprouting rate was obtained from the combinations of BornovaMisketi (%72,50) and the lowest value was obtained from Narince (%32,50).

Key words: Grafted vine, wine varieties, 1103 P.

EFFECTS OF GRAPE-ROOTSTOCK COMBINATIONS ON RATIO AND QUALITY OF THE POTTED VINE GRAFTS

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Abstract

There are many factors affecting the production of grafts in viticulture like genetic and environmental factors. Different rootstock and scion combinations have different effects on all agronomical and physiological parameters. It is also important to make a successful graft union by determining good affinity and optimizing environmental factors to obtain high graft ratio and healthy vine. This study was conducted at Manisa Viticultural Research Station in 2014. As plant material, Crimson Seedless, Cardinal and Michele Palieri grape varieties and 1103 Paulsen (*Vitisberlandierix Vitisrupestris*) and Kober 5 BB (*Vitisberlandierix Vitisriparia*) rootstocks were used in study. Grafts were made by using omega graft machine. Data of this study were analyzed into two stages; the end of graft union phase and sapling production phase. Grafts were placed into callusing room (26 °C and %90-95 relative humidity) for 24 days and callusing levels (0-4), sprouting and rooting ratios (%) were determined at the end of this period. All potted grafts were rooted under controlled conditions (26±2 °C ve %70-75 relative humidity) for 6 weeks then were transferred under net for adaptation. Shoot development (0-4), main shoot length and diameters, number of nodes on main shoot, root development (0-4), average root number and length, chlorophyll content and ratio of grafts were recorded after two weeks in shading. All parameters were found statistically significant. The best result was obtained from the combinations of 'Cardinal/5 BB (%80.00)' and 'Michele Palieri/1103 P (%78.33)' in respect to graft ratio. The lowest graft ratio was 'Crimson Seedless/1103P (%46.66)' combination.

Key words: Vine, graft, graft ratio, combination.

DETERMINATION OF POLLEN NUMBER AND QUALITY EFFECTIVENESS OF DIFFERENT POLLINATORS ON FRUIT SET FOR SOME CLEMENTINE MANDARIN TYPES

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Abstract

It is very important to use the appropriate pollinator for self-incompatible plants to achieve regular yield. The Clementine mandarin being very popular in citrus family is both monoembryonic and self-incompatible. Clementine has many clones and each clone has different pollinators. This study was carried out to find appropriate pollinator for 4 Clementine types (A67, A82, A90 and D22) which were obtained by selection in our country. For each Clementine type (A67, A82, A90 and D22) self pollination, cross pollination studies carried out. Also different pollinators (Kütdiken lemon, Clementine Nour and Valencia orange) were used. The number of pollens, pollen viability and pollen germination rate were main criteria checked for the appropriate pollinator. Also fruit set was analysed to determine the pollinator effectiveness. For pollen viability; triphenyl tetrazolium chloride (TTC), for pollen germination; agar in petri and for pollen count; Hemacytometric lam methods were used. As a result Kütdiken lemon and Valencia orange pollen numbers were obtained as the highest but the viability and germination rates of pollens were low. Kütdiken lemon and Clementine Nour varieties was detected as the appropriate pollinator for the fruit set.

Key Words: Citrus, Clementine, Appropriate Pollinizer, Fruit Set

COMPARISON OF THE FATTY ACID COMPOSITION OF THE DIFFERENT ORGANS OF *PISTACIA LENTISCUS* L. REGENERANTS PRODUCED IN VITRO

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Abstract

Fatty acids have many important biochemical functions such as energetic, metabolic and structural activities. Lentisk, *Pistacia lentiscus* L., is an evergreen and dioecious shrub of the Anacardiaceae family consisting of nine species. Despite its limited distribution in the world, this plant is now being used internationally for several therapeutic properties such as its antifungal, antibacterial, antimicrobial, antioxidant, anti-ulcer agent and is limited to treating stomach aches, heartburn, jaundice and respiratory problems. The fatty acid composition of leaf and stem samples of in vitro of *Pistacialentiscus*L. were determined by gas chromatography. Fatty acid methylesters (FAMES) were analyzed by capillary gas chromatography using a Shimadzu GC-2010 Plus equipped with a flame ionization detector (FID) and a fused silica capillary column (DB-23) (Bonded 50 percent cyanopropil, 30mx0.25mmx0.25mm film thickness, J&W Scientific, Folsom, CA, USA).The main fatty acids were determined as linoleic, palmitic, oleic and linolenic acids. Palmitic, oleic, linoleic and linolenic acid, which are the major fatty acid of the stem parts, was found to be as 23.10, 8.58, 31.17 and 32.06% in leaf, while 31.94, 12.38, 32.55 and 15.95 % in stem, respectively. Other fatty acids such as myristic, pentadecanoic, palmitoleic and stearic acid were present only in trace proportions. This research is a part of our investigations on exploiting fatty acids and bioactive natural products with prospects for using them in industrial applications.

Key words: Lentisk, fatty acids, *Pistacialentiscus* L., in vitro.

DIKEGULAC-SODIUM EFFECT ON MICROPROPAGATION AND BIOCHEMICAL PARAMETERS IN THE CHERRY ROOTSTOCKS CAB-6P AND GISELA 6

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Abstract

The effects of dikegulac-sodium (DS) alone and in combination with benzyladenine (BA) on the morphogenetic and biochemical responses in the cherry rootstocks CAB-6P (*Prunus cerasus* L.) and Gisela 6 (*Prunus cerasus* x *Prunus canescens*) were investigated. In the CAB-6P rootstock, DS did not promote shoot proliferation whereas its application at 40, 120 and 150 μM suppressed shoot length. In the Gisela 6 rootstock, the number of shoots per explant and shoot proliferation rate were greater with 80 μM DS. Furthermore, DS significantly stimulated rhizogenesis in both rootstocks. Leaf chlorophyll concentration of CAB-6P microshoots was maximum in the control treatment, whereas in the Gisela 6 rootstock, 40 μM DS had a positive effect on it. In the CAB-6P explants, DS decreased leaf (20-150 μM) and root (80-150 μM) carbohydrate concentration as well as proline concentration in roots (40-150 μM). All DS concentrations, especially 80 μM increased leaf carbohydrate concentration of Gisela 6 explants. Carbohydrate and proline concentration in roots was 2.5 times greater with 80 μM DS, compared to the control. In the CAB-6P rootstock, a synergistic effect was found between BA and 250 μM DS regarding shoot fresh weight (FW). Best rooting results in terms of root number per rooted explant and rooting percentage were obtained with 500 μM DS. In the Gisela 6 rootstock, 250 μM DS promoted the positive effect of 4.4 μM BA concerning shoot number per explant. DS seems to be a promising growth regulator in micropropagation of the cherry rootstocks CAB-6P and Gisela 6.

Key words: Carbohydrates, Cherry Rootstocks, Chlorophyll Content, Dikegulac-Sodium, Micropropagation, Proline,

PLANT REGENERATION FROM ROOT EXPLANTS IN CARRIZO CITRANGE

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Abstract

Citrus fruits rank the first in the world with respect to production among fruits. Carrizo citrange is hybrids of Washington navel orange and *Poncirus trifoliata*. Carrizo citrange has many advantages as a rootstock. In the present study we optimized plant regeneration from root explants. Seeds of Carrizo Citrange were germinated in *in vitro* conditions. Roots coming from germinated seeds were used as explant resouces. Roots explants were cultured in MS media (Murashige and Skoog, 1962) supplemented with 21 different concentration and combination of BA (6-Benzyl Adenine) and NAA (1-Naphthaleneacetic acid). The experimental design was a completed randomized plot with four replicates. Means were separated by analysis of variance and the LSD test was performed to examine significant differences in callus and shoot formation. From the results of the study callus and shoots formations rates were calculated for each combination and discussed. Callus formation rate was obtained as 88.09% and shoot formation rate %60.95. Callus and shoot formation rates were determined relatively higher in 21 different concentration and combination of BA and NAA comparing with control.

Key Words: *In vitro*, citrus, BA, NAA

DETERMINATION AND COMPARASION OF LIGNIN CONTENT IN SOFT-HARD SEEDED POMEGRANATES

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Abstract

Pomegranate (*Punica granatum* L.) is one of the oldest known edible fruit tree species, originating in Central Asia, but with a wide geographical global distribution. Besides using pomegranate as raw fruit, it has been used as herbal remedy. In consumption of pomegranate soft-hard seededness is very important. Soft seededness arises in a reduction of lignin. Lignin topo chemistry has ultra-structural aspects and lignification results from the enzyme mediated polymerization. Also lignin has three different monomers (coniferyl alcohol, sinapyl alcohol, p-coumaryl alcohol) are synthesized in the cytoplasm. Aim of the present study is to determine initiation time of lignification after pollination and amount of lignin accumulation in soft and hard seeded pomegranates. Known as a hard-seeded Hicaznar and soft-seeded 33N26 varieties were used as plant materials. Fruits from the two defined varieties were taken at intervals after pollination and fertilization at different sizes. UV absorption method was used as a biochemical method to determine initiation time of lignification after pollination and amount of lignin accumulation. Determination of the total lignin content was performed via the acetyl bromide method (Liyama and Wallis, 1990). The lignin content was analyzed with UV at 280 nm. Coniferyl alcohol was used to prepare a calibration curve, and the results were presented as equivalents of coniferyl alcohol. It was observed that lignin content was increased in fruits collected at different sizes. Lignin content of Hicaznar known as hard-seeded was determined higher than soft-seeded 33N26.

Key words: UV absorption, lignin, pomegranate

ANTIMICROBIAL EFFECTS OF THE ESSENTIAL OILS FROM SOME CITRUS VARIETIES

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Abstract

Citrus oils are mixtures of volatile components as terpenes, oxygenated compounds and terpenoids. These active components have got many features such as antifungal, antiviral, antioxidant, anti-allergic, antibacterial. Thus citrus essential oils are used in cosmetics, food, drug and chemistry industries. In the present study different fruits of citrus varieties were collected from the local market. The essential oils of peels were extracted with steam distillation extraction method. Percentages of oil yield among citrus varieties were determined in Satsuma mandarin (*Citrus unshiu* Marc.) as 1,6 %, Clementine mandarin (*C. reticulata* Blanco) 1,4 %, Meyer lemon (*C. meyeri*) 2 %, Interdonata lemon L. [*C. lemon* (L.) Burm.f.] 1,1 %, Washington navel orange [*C. sinensis* (L.) Osbeck] 4 %, Star Ruby grapefruit [*C. paradisi* (Macf.)] 1,8 %, Sour orange (*C. aurantium*) 2,14 %, Blood orange [*C. sinensis* (L.) Osbeck] 4,6 %. The antimicrobial activities of the essential oils in the citrus varieties were tested by disc-diffusion method. *E. coli* (ATCC 25922), *B. cereus*, *S. aureus* (ATCC 25923), *S. typhimurium* (ATCC 14028), *L. monocytogenes* (ATCC 7644), *E. faecalis* (ATCC 29212) were used as testing organisms. The antimicrobial activities were compared with standard Tetracycline and Cefazolin antibiotic discs. The essential oils shown different antimicrobial activity. The essential oil from Blood orange [*C. sinensis* (L.) Osbeck] showed highest antimicrobial activity on all of these bacteria. The essential oil of Clementine mandarin and Sour orange showed no activity on *E. coli* and *S. typhimurium*, on the other hand were showed 50 % activity compared to standard antibiotics on *S. aureus* and *B. cereus*.

Key Words: Citrus Oils, Citrus Peel, Essential Oil, Antibacterial Activity,

TRANSFORMATION OF ROLABCD GENES IN SOME CITRUS ROOTSTOCK THROUGH *Agrobacterium rhizogenes*

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Citrus is one of the most important fruit crops globally due to its highly economical and nutritional value. Therefore the cultivation of citrus dwarf rootstocks are very important, which to produce a higher yield per unit area and to facilitate cultural operations. *Agrobacterium rhizogenes* is a gram negative soil bacterium that produces hairy root disease in dicotyledonous plants. *A. rhizogenes* induces the formation of proliferative multi-branched adventitious roots at the site of infection. Rol genes located in plasmid of *A. rhizogenes* play a role in inducing hairy root disease. The aim of the present study is obtaining dwarf citrus rootstock by using *A. rhizogenes* in *in vitro* conditions. In this study Sour Orange (*Citrus aurantium* L.), Gou Tou Sour Orange (*Citrus aurantium* L.), Carrizo citrange (*Poncirus trifoliata* Raf. X *Citrus sinensis* Osb. Var "Carrizo") and Tuzcu Cleopatra mandarin (*Citrus reshni* Hort. Ex. Tan.) have been used as plant materials. In transformation assay leaves and stems have been used as explant sources. According to the results direct shoot proliferation was observed from the stem explants. Some of the shoots obtained from stem explants were identified by molecular methods that these shoots had contained Rol genes. Hairy roots were observed from the inoculated leaf explants of Carrizo Citrange and Gou Tou Sour Orange.

Key Words: Citrus, gene transformation, *in vitro*, hairy root, dwarfing rootstock

PRELIMINARY RESULTS OF DETERMINING NUCELLAR EMBRYO INITIAL CELLS BY HISTOLOGICAL ANALYSIS IN ORLANDO TANGELO

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Nucellar embryony is a form of seed reproduction that occurs in certain plant species, including many citrus varieties. Nucellar embryos develop from the maternal nucellar tissue of the ovule surrounding the sexual embryo sac and have the same genetic constitution as the female plant. The aim of the study is to determine the period which the nucellar embryo initial cells began to develop by histological analysis. 'Orlando Tangelo' produces almost 100% polyembryonic seeds for that reason, Flowers of 'Orlando Tangelo' before and after anthesis were collected. In hybridization studies "Orlando Tangelo" was used as mother plants and Fremont Mandarin as pollenizer. First of all, three different size of flower buds were collected before anthesis in order to examine the nucellar embryo initial cell formation at pre-anthesis period. Then, after hybridization, daily pistil samples have been collected during 15 days for examining post-anthesis nucellar embryo initiation. The samples were immediately fixed into FPA-70 solution. Histological analyses were carried out with paraffin-embedding method and sections were stained by using the hematoxylin. All sections were observed under fluorescent and light microscopes and the nucellar embryo initial cells were first observed in third day after anthesis.

Key Words: Polyembryony, paraffin, microscope, nucellar

TECHNOLOGICAL CHARACTERISTICS COMPARATIVE STUDY OF PAMID VARIETY CLONES

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Abstract

Comparative study of the technological characteristics of the newly-selected clone 5/76 of Pamid variety and clone Pamid Ruse 1, grown in the soil and climatic conditions of Pleven (Central Northern Bulgaria) was carried out. The study included three consecutive vintages (2006 - 2008). It was found that Pamid clone 5/76 greatly surpassed the productivity and grapes quality of the control - Pamid Ruse 1. The mechanical analysis did not reveal any significant differences in the cluster and berry structure and composition of the investigated clones, as well as in their theoretical yield. Pamid clone 5/76 showed better sugar accumulation capacity. There were no significant differences in the acidity content of the grapes of the two clones. The wines produced from the newly-selected clone Pamid 5/76 had higher alcohol, sugar-free extract, total phenolic compounds and anthocyanins content compared to the control samples from Pamid Ruse 1. In the organoleptic analysis the samples from Pamid 5/76 were assessed the highest. These variants had more intense, vivid color, the soft, elegant tannins dominated in their taste.

Key words: Pamid, clone, grapes, wine, mechanical analysis, chemical composition, organoleptic profile.

COMPARATIVE ANALYSIS OF OPTIONS FOR INVESTING IN THE PRODUCTION OF TABLE GRAPES FROM SEED AND SEEDLESS VARIETIES

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Abstract

The issue set by the World Health Organization concerning the healthy diet of the population highlights the need of increasing fresh fruit consumption, including table grapes. Achieving this goal is a challenge in Bulgaria, with a view of the constantly decreasing production and increasing market prices of the produce. Meeting the domestic market demands with table grapes of quality and price satisfying to the maximum level the tastes and preferences of consumers requires encouraging of investment activity in the sector. The specifics of the investment process in viticulture, resulting from the long period for the establishment of the vine plantation, the long operation life of the asset, the high need of capital and the considerable production and market risk, determine the complexity of investment choices. The evaluation of several possible investment decisions facilitates the choice of the production strategy. In this connection the object of the study is the effectiveness of investments in the production of table grapes from the seed varieties Bolgar, Alfons Lavale, Parvenets and Misket Hamburgski and the seedless Kishmish Moldovski, Byalo Edro Bez Seme, Kondarev 10, Kondarev 6 and Rusalka 1. The comparative economic analysis is based on the developed theoretical models of farms by net present value, profitability index and payback period. Comprehensive assessment of the economic viability of investment marks the highest values for the seedless variety Kondarev 6 and the seed variety Parvenets.

Key words: table grapes, investments, payback period, profitability index

**SELECTION OF RESISTANCE TO PHYLLOXERA (*Daktulosphaira vitifoliae* Fitch)
OF VINES IN BULGARIA**

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The results from studies of Bulgarian scientists for obtaining wine and table grapes varieties resistant to low winter temperatures, fungal diseases and pests by the method of interspecies sexual hybridization, including studies in laboratory and field conditions concerning the response of varieties of *Vitis vinifera* L. and the newly selected interspecies varieties and hybrids to root and leaf form of vine phylloxera (*Daktulosphaira vitifoliae* Fitch) are presented.

Key words: Vine, Interspecies hybridization, Resistant varieties, Phylloxera.

POLYPLOIDY STUDIES IN VITICULTURE

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Abstract

Seedless table grapes are more preferred by consumers. Stenospermocarpy and parthenocarpy are natural causes of seedlessness. The fruits of the seedless grape varieties are usually small. Polyploidy is an alternative way to obtain seedless and large sized new table grape cultivars. There are large sized tetraploid grape varieties like Kyoho, Pione, Olimpia, Heukgoosul. Triploid grape cvs. Honey Seedless, King Dela and Mirai were released from hybridization studies of these tetraploid cvs. between diploid genotypes. Infertile pollens at triploid plants stimulate fruit developing without fertilization. Another advantage is the increase of size of organs like fruit and leaves. That's why, polyploidy should be used at seedless table grape breeding programs.

THE EFFICACY OF AMINOETHOXYVINYLGLYCINE (ReTain) FOR IMPROVING FRUIT SET IN '0900 ZIRAAT' SWEET CHERRY

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Abstract

This study was carried out to determine the effect on fruit set and fruit quality of different dose spray application [control (0 mg L⁻¹), 250, 500 and 750 mg L⁻¹] of AVG applied to '0900 Ziraat' sweet cherry variety grafted on MaxMa 14 rootstock. Compared to control treatment, it was determined that fruit set on the trees applied AVG increased from 97.5% to 130.2%. At commercial harvest date, while the soluble solids content was significantly decreased, significant differences in fruit quality (fruit weight, fruit sizes, geometric mean diameter, flesh firmness, titratable acidity, ripening index and color characteristics) were not observed between control and AVG treatments. There was significant difference between AVG doses with regard to soluble solids content. The lower SSC value was obtained from 500 mg L⁻¹ AVG treatment.

Key words: Fruit set, '0900 Ziraat', Color, Firmness, Fruit Weight, *Prunusavium*, Soluble Solids Content, Ripening Index.

BIOLOGICAL CONTROL OF FRUIT ROTS ON STRAWBERRY AND GRAPE BY BOTRY-ZEN

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Abstract

Fruit rots are of the most important disease of grape and strawberry. With recent public concerns regarding pesticide residues on fruit, there is a need for alternative disease management practices that will reduce risk to consumers. The main aim of this study was to investigate the effectiveness of the commercial product BOTRY-Zen (active ingredient: *Ulocladium oudemansii* (U3 strain)) to control the strawberry and grape fruit rots. It was found that this product at rate of 6g BOTRY-Zen / l reduced significantly the symptoms of the disease in comparison to control. However, its effectiveness was significant less than the fungicide Switch 25/37.5 WG (fludioxonil:cyprodinil) at a rate of 1 g / l (recommended by producer). There was no significant difference between the BOTRY-Zen at rate of 4g / l and control plants. The results of this study showed that the commercial product BOTRY-Zen could be a useful tool to control fruit rots of strawberry and grape in biological fruit production system.

Key words: *Botrytis cinerea*; fungal pathogens; *Ulocladium oudemansii*

(This work was funded by O.P. Competitiveness and Entrepreneurship (EPAN II), ROP Macedonia - Thrace, ROP Crete and Aegean Islands, ROP Thessaly - Mainland Greece - Epirus, ROP Attica)

PATHOGENICITY AND CHARACTERIZATION OF *PILIDIELLA GRANATI* CAUSING POMEGRANATE DISEASES IN GREECE

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Abstract

This is the first report of the occurrence of shoot blight and canker disease of pomegranates in Greece caused by the fungus *Pilidiella granati* Saccardo. The pathogen caused cankers on shoots, fruit rot and crown rot of pomegranate trees. Preliminary studies showed that pycnidia developed on mummified fruits, blighted shoots and crown could be overwintering forms of the fungus *Pilidiella granati*. Optimum temperature for mycelial growth and conidia germination of *P. granati in vitro* was between 25 - 30°C and was totally inhibited at 2-4°C and at 35°C. Pathogenicity tests showed that the pomegranate cv. Wonderful and 9 genotypes grown in Imathia Prefecture, Greece, were equally susceptible to *P. granati*. In general, the disease caused by *P. granati* could be a threat to pomegranate cultivation in Greece and its epidemiology and management should be investigated in the field.

Key words: cultivars, *Punica granatum*, sensitivity, susceptibility, temperatures

(This work was funded by O.P. Competitiveness and Entrepreneurship (EPAN II), ROP Macedonia - Thrace, ROP Crete and Aegean Islands, ROP Thessaly - Mainland Greece - Epirus, ROP Attica)

MULTI-CRITERIA EVALUATION FOR SUSTAINABLE HORTICULTURE

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Abstract

Multicriteria evaluation is a transparent way of systematically collecting, processing and analyzing objective information. This method integrates multiple criteria in order to combine all the relevant concerns in the decision problem as a gauge for comparison. Agricultural crop suitability is one of the interdisciplinary approaches that involve integration of criteria from different branches of science. Assessment for vegetable development in Plovdiv, Bulgaria is influenced by many parameters namely, soil and land parameters, climatic attributes, terrain and physiographic, social characteristics, cultural aspects, cultivation customs, infrastructure and human development, services available, market situations, live-hood of population, standard of living, ecology and many more. All of them can logically be classified into following categories: physical characteristics, environmental parameters and socio-economic condition. Matching all these conditions and different requirements to assess the suitability of horticulture is carried out by Analytical Hierarchy Process (AHP), developed by Saaty (1977). By calculating important indicators for sustainable vegetable cultivation, using GIS applications and digital information in the form of assessment map are the core of process.

Key words: multi-criteria evaluation, sustainable horticulture, Analytical Hierarchy Process (AHP), GIS

DATE PALM (*PHOENIX DACTYLIFERA* L.) GENETIC RESOURCES IN ALGERIA

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Abstract

In Algeria, there are about 550 oases dispersed all over the Sahara, on 2 million km². Here, the agriculture mainstay is date palm trees (*Phoenix dactylifera* L.) and their number is near 17 million with 8 million quintals date production for the year 2013. Date palm genetic resources evaluation based on several criteria (dates and seeds morphology, dates quality, mode of consumption, harvest period, resistance to the diseases) allowed to list near one thousand of cultivars and the main ones, showed a strong east-west repartition, moreover, majority of these cultivars remains endemic to their regions. This number is very important in traditional oases where farmers grow the plant from seeds. However, phoenicicole diversity decreases in modern date palm groves where only few of cultivars are represented. Mono varietal modern plantation development dictated by market forces intensified the decline in genetic resources. In Algerian south-east date palm groves; there are essentially Deglet Nour, Ghars, Degla Beida and Mech Degla. Deglet Nour cultivar dates essentially destined to exportation to north countries, represent more than 50% of date palms population. Nowadays, oasis agrodiversity is threatened by this biodiversity regression in some date palm groves, this regressive and irreversible evolution is accentuated by this cultivation abandonment, diseases, urbanism expansion to the detriment of palm plantation, and knowledge and local know-how loss.

Key words Date palm, genetic resources, oasis agrodiversity, biodiversity regression.

BARRIERS TO NATURAL REGENERATION OF CORK OAK IN EASTERN ALGERIA

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Abstract

The impact of human activity on the natural environment in the Mediterranean region was significant for 7 000-8 000 years. Anthropogenic factors include plowing and cultivation involving the destruction of ecotones; thoughtless reforestation with exogenous species whose impact on native vegetation has not been studied previously; repeated fires and ranching. The purpose of this study is to evaluate the natural regeneration of cork oak in the three modes of reproduction: seedling regeneration, regeneration by stem rejection and finally regeneration by suckering, this in 165 stations characterized by various mesological factors. We found that the natural regeneration of cork oak, still possible despite all the constraints both biotic and abiotic. But this regeneration cannot succeed without the required human intervention, without which the renewal of the cork oak is compromised with all the disastrous consequences thereof on biodiversity.

Key words: *Quercus suber* L - Sowing - Rejection of strain - suckering - Eastern Algeria.

COLCHICINE INDUCED CHROMOSOME DOUBLING IN *CERATONIA SILIQUA* L. AND IT IS EFFECT ON SOME PLANT GROWTH CHARACTERISTIC

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Abstract

This study was conducted in the nursery and siliviculture laboratory in the Forestry Department/College of Agriculture and Forestry/Mosul University/Iraq , during a period from February until the end of October month 2007 to get on chromosomal polyploidy of carob by immersion seeds in aqueous solution of colchicine (zero, 500, 1000, 2000 mg/L) and for a period immersion (6, 12, 18, 24 hours) and then shed light on the effect of chromosomal polyploidy on some plant growth characteristic . The results obtain chromosomal tetraploidy when immersion seeds in the 2000 mg/l colchicine for a period 6 ,12 , 18 , 24 hours and the percentage of tetraploid seedlings reached 33.33% , 46.42% , 51.72% , 48.38% respectively and when immersion seeds in the 1000 mg/l colchicines for a period 12 , 18 , 24 hours and the percentage of tetraploid seedlings reached 17.31% , 25.00% ,38.46% respectively . while we couldn't see any tetraploid in other treatments , which was diploid . but for the recipes studied , the 2000 mg/l colchicines for a period 24 hours immersion caused significant increase in the largest leaf area and chlorophyll content , from the other hand this colchicine concentration causes significant decrease of the leaf shape factor and the stomata density .

Key words : colchicine , carob , chromosome , diploid , tetraploid

INVESTIGATION OF THE POSSIBILITY OF USING THE NATURAL BIODIVERSITY AS ORNAMENTAL PLANTS IN EAST MEDITERRANEAN REGION

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Abstract

Because of its natural and cultural characteristics, Alata Horticultural Research Institute is taken under protection as a first grade natural site area and is being under dense pressure of surrounding inhabiting housing. Sand dunes have rich genetic resources. In this study, the natural biological diversity of the dunes use of as the ornamental plants possibilities were investigated. Natural plants which can be use as ornamental plants were selected with selection and taken culture. Suitable species as *Inula crithmoides*, *Otanthus maritimus*, *Plantago maritima*, *Medicago marina* are selected. The whole species showed the best development similar to the their natural environment type of sand media. These plants, which are successfully taken culture, can be used for landscape of coastal areas.

**SUPPLY OF RAW MATERIALS FOR COSMETIC INDUSTRY WITH IN VITRO MICROPROPAGATION IN
LILIUM CANDIDUM L.**

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Abstract

Bulbous plants (geophytes) are an important part of genetic biodiversity of Turkey and have a great potential in perfume pharmaceuticals industry since they contain metabolites and ornamental flower industry because of beautiful flowers. *Lilium candidum* (white lily) is one of the biologic diversity in Turkey which is a bulbous plant of the family Liliaceae. Distribution areas in Turkey are Southwest Anatolian Region, Aydın, Muğla, Antalya and general distribution areas are determined as Balkans, Lebanon and Palestine. Extracts of this plants contains various biologic active compounds which having antimutagenic and antioxidant effects (organic acids, flavonoids, glycosides, nitrogen-containing compounds, saponins and steroid compounds) and white lily bulbs are used in modern medical treatments nowadays. Under normal condition white lily bulbs have produced 1 times over 1/ 1.5 years; but in this study it can be taken three times of the year with in vitro micropropagation technique. As a result of these experiments, twin scales of *L. candidum* were used as explants and the best bulblet was obtained on MS medium containing 0.6 mg l⁻¹ TDZ 0.2 mg l⁻¹ NAA and 0.3 g l⁻¹ activated charcoal in vitro micropropagation applications. The methods determined from *in vitro* micropropagation on *L. candidum*, can also be applied for the micropropagation of other economically important ornamental and medicinal geophytes. Supply of raw materials for cosmetics industry in Turkey and many companies in this industry producing cosmetic products are expected to be provided in this way.

Key words: Geofit, *Lilium*, *Lilium candidum*, Twin scales, Bulblets, Micropropagation

PRELIMINARY STUDIES FOR OBTAINING VARIATION ON *VACCARIA HISPANICA* AND ENDEMIC *RICOTIA CARNOSULA*

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Abstract

Mutation and polyploidy techniques are commonly used in ornamental plant breeding studies to get diverse variations. The aim of this research was to obtain variation in *Vaccaria hispanica* (Mill.) Rauschert (Caryophyllaceae) and endemic *Ricotia carnosula* Boiss. & Heldr. (Brassicaceae). It was carried out in Batı Akdeniz Agricultural Research Institute in Antalya, Turkey, during 2008-2009. The seeds of both species were treated with 7 doses of gamma radiations to induce mutation while 2 concentrations of 3 chromosome doubling chemicals were applied to the seeds of only *R. carnosula* to increase the ploidy level. For the gamma radiations, 100 seeds were irradiated in each dose (control, 10, 20, 50, 100, 200 and 300 Gy) at a Cobalt-60 source in Turkish Atomic Energy Authority (TAEK) in Ankara, Turkey. Two concentrations of colchicine (0.05 and 0.1%), oryzalin (0.005 and 0.01%) and trifluralin (0.005 and 0.01%) as well as control treatment were applied to 100 seeds for each treatment for 4 hours at room temperature in dark for the chromosome doubling. Prior to the applications, the seeds were kept in a desiccator at 65 °C for 24 hours for seed moisture equilibration. Seeds were sown as dry in both trials. Treated a total of 2.100 seeds were sown individually to the viols containing peat and perlite in a glasshouse for the germination, then the survival seedlings were planted to the soil in outside. The effect of gamma irradiation and chromosome doubling chemicals on seed germination, plant survival and induction of the variations were evaluated. Seed germination ranged from 41% (20 Gy) to 68% (10 Gy) in *R. carnosula* and from 28% (20 Gy) to 68% (200 and 300 Gy) in *V. hispanica* in the gamma radiations. As to the chromosome doubling treatments, the highest germination percentage (82%) was obtained by the concentration of 0.01% trifluralin whilst the lowest one (28%) was found in 0.1% colchicine. On the other hand, different desired variations were induced by different gamma doses in both species. The preliminary results of this study seem to be used for the mutation and ploidy breeding studies for *R. carnosula* and *V. hispanica* henceforth.

Key words: Ornamental plant, variation, mutation, polyploidization, gamma radiation, colchicine

ADVANCES OF GREEN ROOFS FOR ENVIRONMENT IN URBAN AREAS

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Abstract

In 21th century, the unplanned urbanization, global warming, lack of green space, and the human effects on the ecological balance in the nature influence the human life particularly in our cities. Additionally, the mentioned changes cause to decrease on other open-green spaces as well as the reduction of the natural places in the cities. That's the reason for ecological anxiety as well as the demand for recreational and roof areas in urban places. Establishing of the plant material on rooftops provides numerous ecological and economic benefits which might be summarized as following: improving of the microclimate and air quality, offering to a natural habitat, providing for additional space, increasing of water retention and noise protection, storm-water management, energy conservation, mitigation of the urban heat island effect, and increased longevity of roofing membranes, as well as providing a more aesthetically pleasing environment for life. This paper is a review of current knowledge regarding to the benefits of green roofs in urban areas that are so far from the nature and lack of green space.

Key words: Urban Areas, Green-roof, Benefits of Green-roofs

ORNAMENTAL PLANTS PRODUCTION IN TURKEY

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Abstract

The plants that concern man can be divided into three general categories: agricultural plants that are grown for food or fiber; weedy plants that grow where they are not wanted; ornamental (amenity) plants. Ornamental plants are plants that are grown for decorative purposes in gardens and landscape design projects. In terms of biological properties and agrotechnical requirements, ornamental plants are divided into several groups, such as trees and shrubs, perennials, biennials, annuals, grasses, and bulbs. Ornamental plants are grown numerous groups of cultivated and wild plants, including representatives of various plant families. Ornamental plants are used to provide greenery in cities and other inhabited areas, in gardens and parks, and outside of public buildings and residences. Most commonly ornamental garden plants are grown for the display of aesthetic features including: flowers, leaves, scent, overall foliage texture, fruit, stem and bark, and aesthetic form. Ornamental plant production is divided into different types with different characters and different markets: cut flowers and ornamental foliage, potted plants for interiors, balcony plants, outdoor plants, bulbs production and nursery stock. The economic importance of ornamental plants extends past production industries. In recent years there has been an increase on investments both on areas and values in the floriculture sector in Turkey. Turkey is a country that is optimally situated for ornamental plant production. It has many advantages for a prospering horticultural sector, like having a favorable climate for production of cut flowers, geographical proximity to the main markets, production in modern greenhouses and cheap and skilled labor. In this study, the current position of the ornamental plants production has viewed and the opportunities in developing the ornamental plants production has emphasized in Turkey.

Key words: Ornamental Plants, Ornamental Plants Production,

CRYOPRESERVATION OF SOME ENDEMIC CYCLAMEN SPECIES OF TURKEY BY VITRIFICATION OF EMBRYOGENIC CALLUS CULTURES

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Abstract

Cyclamens are under extinction due to destruction of natural habitats, unconscious usage of agricultural areas and taking out the tubers continuously from nature for export. For this reason, conservation studies and biotechnological researches on cyclamen which is an important genetic resource are quite significant. *In vitro* preservation possibilities of *Cyclamen* (*C. cilicium*, *C. mirabile*, *C. Parviflorum* and *C. pseudibericum*) which is an important genetic resource in our country were investigated. In this study, *in vitro* conservation and cryopreservation-vitrification techniques were used for four endemic *Cyclamen* species to preserve plant genetic resources. In *in vitro* preservation period, different osmotic reagents (mannitol, sorbitolandsucrose) and different temperatures were treated with PVS2 and genetic stability of obtained plantlets was tested using RAPD primers.

Key words: Cyclamen, ultra lowtemperature, PVS2, germplasmconservation

EFFECTS OF IRRIGATION FREQUENCY ON GRASS DEVELOPMENT AND QUALITY

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Abstract

In this study; the effects of different irrigation regime for the development and quality of grass plant were studied. Construction cost of grass lawn was calculated also. Four different irrigation regimes were applied and following those applications, it was determined that irrigation frequency decrease resulted root length increase. However, irrigation frequency decrease resulted lower tillering ratio as well. Additionally, as long as irrigation frequency decreased, the grass density also decreased. Also, color of grass turned to light green when the irrigation frequency was decreased. As another result; while the germination was quite successful in the areas where the irrigation was sufficient, the germination ratio decreased in water-shorter areas. At the end of the relevant study, the unit cost required for the grass lawn construction was found as 8,98 ₺/m². Finally, the best results in this study was obtained from the irrigation regime made according to the moisture needs of the soil. This research was supported by Trakya University Academic Research Projects Unit (Project number: TÜBAP 2012-23).

Key words: Grass Lawn, Irrigation, Germination, Grass Quality, Unit Cost

EFFECTS OF EPİBRASSİNOLİDE APPLİCATION ON COOL-SEASON TURFGRASS GROWTH AND QUALİTY UNDER SALT STRESS

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Abstract

Brassinosteroids are steroidal phytohormones with a significant role in the amelioration of various biotic and abiotic stresses. Perennial ryegrass (*Lolium perenne* L.) and tall fescue (*Festuca arundinaceae* Schreb.) are both cool-season turfgrass species and used extensively on home lawns, parks, sport fields and general landscaping areas. The objective of this study was to determine the effect of 24-epibrassinolide (24-EBL) application on growth and quality of perennial ryegrass and tall fescue grown under salt stress. The study was conducted in pot experiments under greenhouse conditions. Turfgrass species were grown under non saline (0.54 dSm⁻¹) or saline conditions (5dSm⁻¹) and were sprayed with 0.00 and 0.15 mg l⁻¹ EBL. Results showed that salt stress negatively affected the shoot growth and turfgrass quality and increased leaf firing. However, foliar application of 24-EBL significantly improved the shoot growth and quality of both species. The positive effects of (24-EBL) was more pronounced in perennial ryegrass. Results indicated the stress-ameliorative properties of 24-epibrassinolide in turfgrasses.

Key words: Brassinosteroids, shoot growth, turfgrass, leaf firing, salt tolerance

SOMATIC EMBRYOGENESIS OF SOME CYCLAMEN SPECIES ENDEMIC TO TURKEY

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Abstract

The origin of 20 *Cyclamen* taxon belongs to Primulaceae is Mediterranean region and grown under tree and bushes. There are 10 *Cyclamen* species grown naturally in our country. Five endemic *Cyclamen* species are grown in Turkey where is a gene center of many plant species. To investigate *in vitro* propagation possibilities of *Cyclamen* which is an important genetic resource in our country, the media of somatic embryogenesis was optimized using different plant growth regulators (2,4-D and 2iP) and different explant types (Ovule, ovary, leaf and petiole) for *C. cilicium*, *C. parviflorum*, *C. Mirabile* and *C. Pseudibericum* species.

Key words: *Cyclamen*, endemic plant, embryogenic callus, ornamental plant

DEVELOPMENT AND TESTING NEW SSCP MARKERS IN *CYCLAMEN*

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Abstract

The genus *Cyclamen* (Primulaceae family) occupies an important position in the world pot plant industry. There are 10 *Cyclamen* species grown naturally in Turkey. Six endemic *Cyclamen* species are grown in Turkey where a gene center of many plant species is. In the present study 15 SSCP (Single strand conformation polymorphism) degenerate primers were developed for further molecular studies in *Cyclamen*. These degenerate primers were designed using cyclamen sequences obtained from National Center for Biotechnology Information (NCBI). Different cyclamen sequences obtained from *Cyclamen persicum*, *Cyclamen cilicium*, *Cyclamen parviflorum*, *Cyclamen intaminatum*, *Cyclamen pseudibericum*, *Cyclamen trochopteranthum*, *Cyclamen hederifolium*, *Cyclamen pseudibericum*, *Cyclamen trochopteranthum*, *Cyclamen intaminatum*, *Cyclamen graecum* were alignment and the SSCP primers were designed based on polymorphic regions using ClustalX software. Forty *Cyclamen* genotypes collected from the natural flora of Turkey where they grow naturally were amplified with 15 degenerate primer, denatured, and run throughout 12 hours on the GMA (Gene Mutation Analysis) gels optimized to screen point mutations. From the results of GMA gels, all polymorphic profiles were scored and polymorphism rate was calculated for each primers. Whether SSCP primers are able to used or not in *Cyclamen* molecular studies were discussed.

Key Words: *Cyclamen*, SSCP, degenerate primer, molecular markers

INSPIRE DIRECTIVES ASSESSMENT OF MULTIPLE GEOSPATIAL INFORMATION FOR VEGETABLE PRODUCTION

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Abstract

This report is concerned to spatial data infrastructures about vegetable production and performance by GIS. Based on INSPIRE Directives and International Organization for Standardization (ISO) the purpose is creating conceptual model for assessment of horticulture land using. The report presents an integrated view of the heterogeneity of data components and used in geographic information. One of the main concept is collecting and analyzing information from real investigation, then convert it in spatial data and develop into multiplicity vegetable production maps. The volume of data include information about Cadastral Maps, Coordinate Reference Systems, Elevation, Hydrography, Atmospheric Conditions, Meteorological Geographical Features, Land cover and Land Use, Soil, Monitoring and Agricultural Facilities, etc. The extensive scope requires deep analysis, significant and possibly influence between all aspects about vegetable production. As a result converting all spatial data about vegetable development into detailed maps allows illustrating links between all substantial and additional information. This kind of representation facilitates working with huge amount of data, without repetitive manual intervention.

Key words: GIS modeling, INSPIRE, vegetable crop production, conceptual model, spatial data, horticulture

DIFFERENCES IN SOD AND POD ACTIVITIES AS WELL AS ACCUMULATION OF PROLINE AND CHLORIDE IN PEPPER GENOTYPES UNDER SALT STRESS

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ABSTRACT

Salinity stress affects the metabolism of plant cells leading to severe crop damage and loss productivity. Oxidative stress is one consequences of salinity that may be responsible for much of the damage. The effects of salinity levels (0.0, 25, 50 and 100 mM/l NaCl) on the growth, proline content, chloride, POD and SOD activities in some pepper genotypes under *in vitro* conditions were studied. The normal growth significantly decreased in all tested genotypes under higher salinity level (100 mM), in addition to, this decreasing was started from mediate salinity level (50 mM) in wild specie *C. microcarpum*. However, lower salinity levels were more favourable for normal growth comparing to control, especially in cultivated cultivars. Cultivated cultivars (New Mexico 6-4 and Shatta Balady) restricted entry of Cl⁻ into roots and translocation to leaves in addition to relatively higher proline accumulation more efficiently than did the wild species (*C. annuum* L. var. *glabriusculum*' and '*C. microcarpum*'). With regard to antioxidant enzymes, activities of POD differed with time, but SOD activities were more stable with time. In cultivated cultivar 'New Mexico 6-4', the activity of POD decreased with salinity up to 50 mM (favorable concentrations), then decreased under toxic concentration (100 mM), especially at 6 weeks. However, in wild specie the activity was lower at toxic concentration (50 mM). Regarding SOD, there was a difference between cultivated cultivar and wild specie, in terms of number of bands, where cv. 'New Mexico 6-4' had four bands and three bands in '*C. microcarpum*'. SOD activities increased with salt, especially in lower two bands of cv. 'New Mexico 6-4'. However, the activities was unchanged in '*C. microcarpum*'. These results suggested that, leaf tissues of cv. 'New Mexico 6-4' are protected better from NaCl stress induced oxidative damage due to enhanced total SOD activity together with a higher POD activity under salinity stress. To our knowledge, this is the first report describing antioxidant enzyme activities under salinity stress in pepper.

Abbreviations: AgNO₃: silver nitrate; APS: Ammonium persulfate; DTT: Dithiothreitol; EDTA: Ethylenediaminetetraacetic acid; 2-ME: 2-mercaptoethanol; 4-MN: 4-methoxy- α -naphthol; NBT: nitro blue tetrazolium; TEMD: N, N, N, Tetramethylethylene diamine; POD: peroxidase; ROS: reactive oxygen species.

IN VITRO SALT TOLERANCE OF PEPPER AS AFFECTED BY THE STAGE OF PLANT DEVELOPMENT AND EXISTENCE OF ROOTS

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ABSTRACT

In order to examine the influence of plant stage and the existence of roots on salinity tolerance, pepper plantlets of the two cultivars 'Yolo Wonder' and 'Shatta Balady' with or without root systems were grown on MS medium containing 0.0, 50 and 100 mM NaCl under *in vitro* conditions. Salinity significantly decreased morphological parameters (shoot length, leaf number, shoot fresh weight, root number and root fresh weight), especially under the highest NaCl level. However, salt tolerance of plantlets with rooted shoots and relatively late stage was higher than those with removed roots and relatively early stage. The reduction in shoot growth by higher salt level was less in 'Shatta Balady' than in 'Yolo Wonder'. Shoot and root calcium and potassium contents decreased with increasing salinity levels. This reduction in Ca^{++} and K^+ was lower in case of using rooted shoots and late stage. This was compensated for by more accumulation of sodium in early plant stage and less accumulation in late plant stage. Also, chloride increased, especially in plantlets with intact roots in both plant stages. Salinity also increased shoot proline content, especially when shoots with intact roots in early plant stage and when roots were removed in late plant stage.

Key words: *Capsicum annuum*, NaCl, salt resistance and root removal

Abbreviations: NaCl: sodium chloride; AgNO_3 : silver nitrate; HNO_3 : nitric acid

REDUCTION OF NITRATE CONTENT IN RESPONSE TO SALICYLIC ACID IN SPINACH AND PARSLEY FERTILIZED WITH TWO DIFFERENT NH-SOURCES

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Abstract

Spinach and parsley are from hyper-nitrate accumulators vegetables, thereby constituting a possible human health risk. For that, pot as well as open-field experiments were conducted to investigate the effect of exogenous salicylic acid (SA) application on yield, nitrate contents and another quality characteristics in spinach and parsley using two different ammonium fertilizers, ammonium sulfate (AS) and urea. Factorial pot experiment(N x SA) obvious that, AS-fertilized plants produced maximum yield compared to urea-fertilized ones, but showed higher level of nitrate content (up to 942.6 and 604.5 mgKg⁻¹ FW in spinach and parsley, respectively). Application of 5μM of SA reduced nitrate content by about 18 and 10 % in AS-fertilized plants and by 50 and 7 % in urea-fertilized plants, in both spinach and parsley, respectively. Under open-Field conditions, using only urea fertilizer, nitrate was decreased to minimum levels, 679.0 and 395.6 mg/kg⁻¹ FW, in spinach and parsley, sprayed with 20 and 10 μM-SA, respectively. This reduction was associated with induction of nitrate reductase (NR) activity. The maximum percentage of NR activity over control (74%) was recorded in spinach treated with 20 μM of SA and reached to 60 % in parsley treated with 5 μM-SA in comparison to control. Also, spraying SA increased vitamin C and total free amino acids contents in both tested leafy plants. It was concluded that, SA application preserved nitrate content in safe limit for human consumption.

Key words: Nitrogen, leafy vegetables, vitamin C, yield, nitrate reduction

DETERMINATION OF YIELD AND TECHNOLOGICAL PROPERTIES OF KAPIA PEPPER INBRED LINES THAT DEVELOPED BY SINGLE SEED DESCENT IN SAMSUN LOCATION

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Abstract

This study is carried out in Black Sea Agricultural Research Institute within the Project of "Development of Qualified Line and F1 Hybrid Varieties Suitable for Outbreeding in Pepper" in 2013. 24 inbred line developed by single seed descent and 2 standart cultivar was used as control in the study. Study was established in pepper experiment field of the institute according to randomized block with 2 replication. Some pomological and technological features were measured including yield, single fruit weight, fruit length, fruit diameter, taste, dry matter (%), Brix (%) values. As a result, the highest yield were obtained from BK-2-4-1 and SE-20 inbred line with 3417.31 and 3098 Kg/da, respectively. The least yield was obtained from BK-1-5 with 1948 kg/da. Brix value of the examined lines have ranged from 5.15 to 8.25%. The highest brix value were measured from SE-18 and 15 inbred lines with 8,25 and 7,65% , respectively. The highest dry matter ratio was measured from SE-18 and 15 inbred lines as 11,6 and 9,83%, respectively. At the end of the study, BK-2-4-1 and SE-20 inbred lines in terms of yield, SE-18, 15 and SN-1 inbred line in terms of brix and dry matter were determined as promising inbred lines.

Key words: Kapia pepper, ecology, single seed descent, inbred line, yield, brix, dry matter

ELICITATION OF SYSTEMIC RESISTENCE IN TOMATO (*LYCOPERSICON ESCULENTUM*) USING SALICYLIC ACID PRODUCING RHIZOBACTERIA

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Abstract

Salicylic acid (SA) is a ubiquitous signaling molecule, involved in various physiological phenomena of plants, including the activation of defense responses to attacks by fungi, bacteria or virus. Thus, the application of SA has found a particular attention recently in modern agriculture. In this study thirty (30) isolates of fluorescent *Pseudomonas* were isolated from tomato rhizospheres collected from three sites in the region of Sidi Bel Abbès, Algeria, to evaluate their capacity to produce salicylic acid. The latter is extracted and detected by the colorimetric method of FeCl₃, which the best production is obtained by strains IE10. The yield of the strain most suitable "IE10" identified as a *Pseudomonas fluorescens* was obtained when using a concentration of 2% casein and 0.5% of succinic acid in a minimum medium. Treatment of tomato plants with this most effective strain has induced a systemic resistance against *Fusarium oxysporum f.sp radicis lycopersici* and *Botrytis cinerea*. Inducing a systemic resistance using rhizobacterial strains is a powerful mode of action in biological control which can be effective against a range of plant pathogen; this technology may contribute significantly to reduce the input of plant protecting chemicals.

Key words: Salicylic acid, production, optimization, fluorescent *Pseudomonas*.

REGENERATION OF TOMATO (*LYCOPERSICON ESCULENTUM* MILL.): SOMATIC EMBRYOGENESIS AND SHOOT ORGANOGENESIS FROM COTYLEDON, HYPOCOTYL AND MATURE EMBRYO EXPLANTS

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Abstract:

Tomato (*Lycopersicon esculentum* L.) is one of the most important vegetables in the world. Numerous works research were devoted to *in vitro* culture either for mass production of elites genotypes or OGM. In this work the effects of genotype, explants and medium culture on organogenesis and somatic embryogenesis were studied in five cultivars of tomato (Rio Grande, Heinz, Agora, Top 48 and Aicha). The hypocotyl, cotyledon and mature embryo explants of seedlings grown on *Murashige and skoog* (MS) medium supplemented with 6-benzyladenine were subcultured on MS medium supplemented with BAP at different concentrations. Regeneration through Somatic embryogenesis and Shoot Organogenesis occurred in explants of all treatments, even on explants from seedlings grown on basal medium and subcultured to medium without growth regulators. The results showed that cotyledons produced the greatest number of organs and embryos on MS medium supplemented with BAP. Somatic embryos and shoots developed into complete plants on a medium lacking growth regulators. *In vitro* rooting was achieved on MS medium augmented with 0, 1 mg/l NAA (naphthalene acetic acid) in all the genotypes. Somatic embryos developed into complete plants on a medium lacking growth regulators.

Key words: Tomato, organogenesis, somatic embryogenesis, BAP, cotyledon, hypocotyl, mature embryo.

BREEDING OF LOW TEMPERATURE TOLERANT PEPPER (*Capsicum annuum*) GROWN IN GREENHOUSE

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Abstract

Sweet pepper (*Capsicum annuum* L.) is an important greenhouse crop in the world. In 2013, the total greenhouse production area in the world exceeded 1230 ha. In general, *Capsicum* requires relatively high temperatures to grow and produce fruit. Especially in the northern hemisphere, average yearly air temperatures are too low to grow sweet pepper in open fields or unheated greenhouses. Low temperatures are not only hampering plant growth and fruit quality, but also reduce the number of viable pollen grains per flower. To be able to produce sweet peppers during the whole year in the Turkey, the plant is grown in greenhouses heated by energy sources. As a consequence, the energy input needed to grow sweet pepper is very high, especially during winter time: on average, a greenhouse sweet pepper crop requires approximately 42 m³ natural gas per m² per year. A simple approach resulting in energy use reduction is to lower the greenhouse temperature. An obvious disadvantage of this approach is that it leads to a decrease in production when the plants used are not adapted to these lowered temperatures. One way to get around this is to breed cultivars that are tolerant to lowered temperatures without yield losses. In several crops the presence of genetic variation for tolerance to lowered temperatures has been demonstrated, indicating that there is a perspective for breeding for such plants. In *Capsicum* little information is available on low temperature tolerance. In this study the possibility is investigated to breed for sweet pepper cultivars which are able to grow under lower temperatures than current standard cultivation temperatures, without a significant loss in production. As obtained results, 10 sweet pepper cultivars were improved which suitable for greenhouse production.

Key words: Pepper, low temperature, breeding

EVALUATION OF PEPPER GENOTYPES IN DIFFERENT ORGANIC PRODUCTION SYSTEMS

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Abstract

The aim of this study was to estimate the response of eight pepper varieties, accessions and breeding lines with different fruit shape and direction of usage in four systems of organic production and conventional variant used as a control. The field experiment was carried out during the period 2008-2010 at the Maritsa Vegetable Crops Research Institute, Plovdiv, Bulgaria. The total yield and some morphological characters of the fruit - length, diameter at the base and weight were analyzed. The influence of the sources of variation on these characters was also determined. An organic production system with identical behavior of studied pepper materials concerning the analyzed characters was not outlined during the whole experimental period. In ranking of the applied systems those ones with biopesticide usage followed the control variant by fruit length in lines from Kapia type and K558 (Kalinkov type) but in variety Buketen 50 (pepper for powder) – are ahead of the control. The variety Buketen 50, accession K558 and line 1266/07 showed very good results by most morphological characters of the fruit in the systems with biopesticides use. Variety Stryama realized its yield potential in all organic production systems that confirmed its good adaptability. The exceeding towards the control variant of growing was with 15.70% in the system with Lumbrikal use and without plant protection and up to 35.79% in use of natural soil fertility and free of biopesticide application.

Key words: *Capsicum annuum*, yield, fruit, variance

.OPTIMIZING OF SYSTEMS FOR NUTRITION IN INTEGRATED PEPPER PRODUCTION

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Abstract

The effect of organic fertilizers on the growth and productive manifestations of pepper variety Kurtovska pepper 1 was studied in field conditions. Organic products Amalgerol and Biofach were tested on the basic fertilization with Lumbrikal and Biosol. The studies were conducted during the period 2010-2013 in the "Maritsa" Vegetable Crops Research Institute, Plovdiv. Bioproducts have a positive impact on the number and average weight of the fruit. Fertilization with bioproducts Biofach and Amalgerol on background Biosol results in increase of the number of fruits in pepper averagely with 3.1fruits/plant. It was established an increase of the yield in pepper from 6.2% /background Lumbrikal/ to 16.9% /background Biosol +Amalgerol / towards the control. Feeding with Amalgerol and Biofach on background Biosol results in further increase of the value of this index, as yields are statistically unproven towards that grown on Lumbrikal background. Bioproducts have a positive effect on the average fruit weight. The results in the biochemical analyzes of fruits demonstrate more remarkable variations in the vitamin C content.

Key words: pepper, biofertilizer, weight of pepper fruit, number of fruits per plant, yield

GIS BASED ANALYSIS OF TOMATO AND PEPPER GROWING REGIONS IN BULGARIA

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Abstract

Tomato and pepper production is priority sector of horticulture. In the last few years the agricultural lands with main vegetable crop were dynamic and unsustainable. Uncompetitive capacity of market system, unorganized and wrong land use has resulted in degradation scenario of horticultural output. In this study tomato and pepper areas under cultivation and yields in Bulgaria for the period 2008 to 2012 are analyzed and assessed. The results are presented by GIS tool in accordance with common classification of territorial units in Bulgaria. The GIS analysis has been applied in a wide variety of situations for defining and managing processes. On the base of assessment of statistical information, a map of regions with dynamic combine graphs of the areas under cultivation and yields is created. Obtained from the analysis results, determined South Central Region as a major tomato and pepper production region. This GIS based analysis will be helpful for the farmers to make an appropriate decision for management practices. The results will be higher yields according to EU directives and production quality.

Key words: vegetable crop production, GIS based analysis

NUTRITIONAL AND PHYTOCHEMICAL ANALYSES OF SOME OF SOLANUM SPECIES

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Abstract

Solanum, a widespread plant genus of the family *Solanaceae*, has over 1000 species worldwide these include a number of valuable crop plants such as eggplant, tomato, and pepper. Eggplant is a good source of minerals especially iron but it has less sugar and antioxidant activity. In this study, chemical analyses were carried out to determine the nutritional and phytochemical constituents of fruits of 4 eggplant species, *S. melongena*, *S. americanum*, *S. villosum* and *S. sisymbriifolium* in ripe fruits. It was obtained highest value in vitamin C (1021,23 mg/kg), total carotenoid (49,9 mg/kg) and total soluble solid (TSS) (5,2 %) from *S. sisymbriifolium*. The highest antioxidant activity value was obtained from *S. americanum* with 89,50 %. The lowest values were obtained for all parameters from *S. melongena*.

Key words: *S. melongena*, vitamin c, antioxidant activity, total carotenoid

INVESTIGATION THE RELATIONSHIP "YIELD – EVAPOTRANSPIRATION" BY STAGES OF ROOTED CELERY, VARIETY "IBIS" IN THE REGION OF PLOVDIV

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Abstract

The purpose of this study was to be established the parameters of the "Yield – ET" by stages of turnip rooted celery (celeriac), variety "IBIS", using drip irrigation in the conditions of Plovdiv. The experiment was conducted on the experimental field of Department of Melioration and Land Surveying, Agricultural University – Plovdiv during 2010-2012. The parameters of the relationship have been established based on existing formulas as follows: first and second degree of exponent formulas of Davidov D. and linear formula of FAO. The used data are the yield and ET by stages of celery with the following variants: 1) irrigation with 130% of the irrigation rate m ; 2) irrigation with 100% of the estimated irrigation rate m - 1 control; 3) irrigation with 70% of irrigation rate m ; 4) irrigation with 50% of irrigation rate m ; 5) irrigation with 30% of irrigation rate m ; and 6) without irrigation - control 2. For the purpose of the investigation the growing season of celeriac is divided into three sub-stages (from transplant of seedlings to the beginning of celery root formation, start of root growth; intensive root growth). The investigated relationship for the conditions of the experiment is best represented by a second degree formula of Davidov D. at $R = 0.939$. The exponent for the entire growing period is $N = 1.4$. The values of the exponents for the different sub-stages of growing period are as follows: $M_1 = 0.13$; $M_2 = 1.03$ and $M_3 = 1.06$. This means that the celery root production is very susceptible during the second and third sub-stage of growth.

MODIFICATIONS IN MEDIA TO REDUCE BROWNING AND CONTROL MICROBIAL GROWTH IN VITRO CONDITIONS OF ARTICHOKE (*Cynara cardunculus* L. var. *scolymus*)

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Artichoke is an important crop which is native to the Mediterranean area. Turkey is the 11th country by 36.000 tones artichoke production. The total antioxidant capacity of artichoke flower heads is one of the highest reported for vegetables. Besides nourishment, artichoke is also used in cosmetic and pharmaceutical industry. Vegetative reproduction is the basic multiplication method for artichoke. In vitro techniques are necessary for mass production of healthy and high quality plants. Browning problems due to the high phenolic components and disinfection difficulties are limiting factors of in vitro production. Because of these problems, artichoke is a problematic plant in terms of in vitro production. In the present study, it was aimed to solve the infection and browning problems, which are among the most common problems in *in vitro* culture of artichoke. To solve the infection problem, in addition to disinfection procedures, various sterilizing agents were used as additive to the culture medium. To investigate the problem of browning, plants were kept in the dark for two days, liquid MS without gelling agent was used as growth media and phenolic traps were added to the culture medium. The explants were supplied from the orchard collection of artichoke located in Ege University, Department of Horticulture fields. Irrigation started at 7th August of 2006, then the shoot tips were collected from the "Sakız" type plants during the year for in vitro researches. To repress the microbial activity, standard MS media was modified by addition of Rifampicin (30 mg l⁻¹), sodium hypochlorite (NaClO, 2.5 ppm), Huwasan[®] [(570g l⁻¹ hydrogen peroxide H₂O₂) + (0,36g l⁻¹ colloid silver), 2.5 ppm] and silver nitrate (AgNO₃, 100 mg l⁻¹) which were proven to suppress bacterial growth. And to block the browning of the tissues, 2 g l⁻¹ activated charcoal, 2 g l⁻¹ and 4 g l⁻¹ polyvinyl pyrrolidone (PVP) used as phenolic traps by adding the growth media. And the liquid MS media was used as a control for both trials. To further hinder browning of the tissues, plantlets were kept in dark conditions for 2 days at the beginning of the culture period. Reducing the microbial activity, best response was obtained by the addition of silver nitrate which gave the highest number (61%) of healthy plantlets ($p \leq 0.01$) during the 2 weeks observation period. The least browning ratio was observed in the medium containing 4 g l⁻¹ PVP by 15%. There were no significant differences ($p \leq 0.01$) between 2 g l⁻¹ doses of both PVP and activated charcoal addition. The browning ratio of the medium added 2 g l⁻¹ activated charcoal and 2 g l⁻¹ PVP were 29% and 24 % respectively.

Key words: *in vitro* artichoke culture, explant browning, microbial contamination

**SCREENING, CHARACTERIZATION AND POTENTIAL USE OF PLANT GROWTH PROMOTING
RHIZOBACTERIA IN PROTECTION AND PRODUCTION OF ORGANIC TOMATO (*LYCOPERSICON
ESCULENTUM*)**

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Abstract:

The search for microorganisms that enhance plant growth and protection is a promising integrated nutrient management system that is needed to maintain agricultural productivity and protect the environment from the continued use of chemical fertilizers. 30 bacterial strains were isolated from different rhizospheres collected from 3 sites in the region of Sidi Belabess, Algeria, and tested *in vitro* of their effect of plant growth promotion on the basis of their ability to produce some particular metabolites (salicylic acid, indole acetic acid and hydrogen cyanide), to solubilise phosphorus and to fix atmospheric nitrogen, in addition to their antifungal activity against the tomato pathogenic fungus *Fusarium oxysporum f.sp. radicum lycopersici*. The most powerful isolates were identified and used *in vivo* as inoculum to treat tomato seeds (*Lycopersicon esculentum*) and showed two beneficial effects: protection against the attack of the phytopathogen and promotion of the growth of tomato plants. Thus, the use of this plant growth-promoting rhizobacteria (PGPR) as bioinoculants and biocontrol agents presents a great promise in agricultural crop production and protection.

Key words: rhizosphere, promotion, antifungal activity, protection.

SECONDARY BROCCOLI PRODUCTION DEPENDING ON SOWING AND PLANTING DATES

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Abstract

The investigation was carried out during the period of 2009-2011 at the Institute of Agriculture – Kyustendil, located in the Southwest Bulgaria. Four broccoli (*Brassica oleracea* var. *italica* Plenck) hybrids were grown by the technology of late field production with different sowing and planting dates. The purpose of this study was to determine the influence of the timing of planting to obtain additional yield of broccoli. Some morphological characteristics and production traits of an additional yield of broccoli side shoots were studied. Different variants and hybrids formed from 441,0 to 1038,5 kg/da additional production during the years of the experiment. Fiesta F1 has the highest number of secondary flower heads per a plant (4,9), average for the period. The largest lateral flower heads formed hybrid Marathon F1 - 0,092 kg. The secondary yield ranges from 18,6 to 33,1 % of total broccoli yield and can compensate the low yields obtained from primary head production.

Key words: broccoli, hybrids, sowing and planting dates, lateral flower heads, yield

EFFECTS OF ASCORBIC ACID APPLICATION IN STRAWBERRY PLANTS DURING HEAT STRESS

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Abstract

Frigo seedlings of 'Redlands Hope' (R. Hope) and 'Festival' strawberry cultivars, which are heat-tolerant and heat-sensitive, respectively were grown in a controlled greenhouse. When the seedlings had 5-6 leaves (11 weeks old); half of the plants were sprayed with 3 mM ascorbic acid (AA) every three days for 3 weeks (7 applications) in order to investigate whether AA is effective on heat stress tolerance of the cultivars, the other half ones were used as control plants. Plants were then transferred to a climate chamber and exposed to gradually increased high temperature up to 44° C. The samples were taken from the plants exposed to 44 °C for six hours. AA content, total chlorophyll content, leaf relative water content (RWC), loss of turgidity and peroxidase (POX) isozyme activity were evaluated in leaf tissues. AA application and heat stress increased AA content in 'R. Hope' while decreased in 'Festival'. Total chlorophyll content of cultivars was increased with high temperature in control plants in contrast to AA applicated plants. RWC content of 'R.Hope' was higher than in 'Festival' at the high temperature, while loss of turgidity of 'Festival' was higher than in 'R. Hope'. In addition, AA application decreased loss of turgidity in both cultivars. A basic POX band was observed in the samples on native PAGE with different intensities. The intensities of the band were generally higher in 'R. Hope' than in 'Festival'.

Key Words: Strawberry plants, heat stress, ascorbic acid, peroxidase.

VARIATION IN HEAT STRESS-INDUCED SOME PHYSIOLOGICAL CHANGES AND PEROXIDASE ACTIVITIES AMONG THREE TOMATO (*Lycopersicon esculentum* Mill.) CULTIVARS

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Abstract

Variation in heat stress-induced some physiological changes and peroxidase (POX) activities were studied in three tomato (*Lycopersicon esculentum* Mill.) cultivars, Çaltı, Pembe and Yaren. For this purpose, the leaves were collected from tomato plants at the first bloom and yield stages. The leaves were subjected to heat stress treatments in water bath at 35, 40, 45, 50, 55 and 60 °C with gradual increments every half an hour. The leaves were then analysed for ion leakage, loss of turgidity, soluble peroxidase (S-POX) and cell wall-bound peroxidase (CWB-POX) activity. In general, effects of heat stress on the variables studied were significant. Results revealed that ion leakage and loss of turgidity were increased parallel to the temperatures. In addition, loss of turgidity values were higher in the yield stage than those in the first bloom stage. Considering the POX activities, the S-POX activity was greater in the first bloom stage than in the yield stage in all cultivars. Moreover, the highest and the lowest enzyme activity were detected in cvs. Yaren and Pembe, respectively. In contrast to S-POX activity, the CWB-POX activity was greater in the yield stage than in the first bloom stage in cvs. Çaltı and Pembe. The highest CWB-POX activity was detected in cv. Çaltı while the lowest activity was detected in cv. Pembe. Data also indicated that, generally CWB-POX activity was high in the samples in response to heat stress treatments.

Key Words: Tomato, heat stress, ion leakage, loss of turgidity, peroxidase.

**EFFECTS OF DIFFERENT *TRICHODERMA SPP.* STRAINS ON SOME GROWTH PARAMETERS OF ONION
(*ALLIUM CEPA L.*)**

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Onion (*Allium cepa*L.) is one of the most important horticultural product for Turkey. It is produced using traditional methods for hundreds of years. Several works have been published about *Trichoderma harzianum*'s beneficial effects on plants. In this study, open pollinated onion cultivar "Kantartopu-3" used as a plant material. The trial was planned according to completely randomized block design with three recurrence and every recurrence has three pots. In this trial commercially produced *T. harzianum* Rifai T22 KRL-AG-2 and non-trichoderma applications used as a control. Beside this three different trichoderma types used and some growth parameters (plant height, leaf area and dry weight., etc.) were measured. Applications showed different responses to different parameters.

Key words: Onion, Trichoderma, Kantartopu-3

**INVESTIGATION of PROLINE and CHLOROPHYLL CHANGES UNDER DROUGHT STRESS in
KANTARTOPU 3 and AKGUN 12 ONION (*Allium cepa* L.) CULTIVARS**

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Onion (*Allium cepa* L.) is an important crop that is now cultivated globally. Drought is one of the major limitations for vegetable growth and productivity all over the World. In this study the effects of drought stress on proline and chlorophyll a/b were investigated in some onion (*Allium cepa* L.) cultivars (Kantartopu-3 and Akgun-12) under the early plant growth phase. Seeds were germinated in peat material and transferred to plastic pots after 21 days of sowing. The plants have been grown in vermiculite by “substrate culture” technique. Three different irrigation applications (field capacity (FC) FC-90 (90% of FC), FC-70 (70% of FC, FC-40 (40% of FC) were tested under greenhouse conditions. After six weeks of transferring, leaf parts were isolated and studied for various indices. Irrigation rates affected significantly the proline and chlorophyll a/b amounts of onion. The results indicated that amount of proline and chlorophyll a and b increased significantly under drought stress.

Key words: Onion, Abiotic Stress, Drought, Proline, Chlorophyll

INFLUENCE OF PRE-SOWING ELECTROMAGNETIC TREATMENT ON SOME MAIN CHARACTERS OF ECONOMIC CHARACTERISTIC OF HEAD CABBAGE

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Abstract

A pre-sowing electromagnetic treatment of cabbage standard dry seeds from variety Balkan was carried out in a field of AC corona discharge field. The full planned experiment 2² type was performed in four variants of treatment with selected values of controllable factors: voltage $U=20$ and 10 kV, duration of treatment $\tau=10$ и 30 s and length of stay of sowing seeds to 33, 26, 12 and 5 days. It was established that the variants with pre-sowing electromagnetic treatment in the field of AC corona discharge field have a different effect on the studied characters. Positive and negative influences of stimulation and reduction of the character values were observed as only regarding the vegetation manifestations identical to those recorded in the control were registered. The variants with electromagnetic treatment with $U=20$ kV and $\tau=30$ s and $U=20$ kV and $\tau=10$ s in stay after seed treatment 12 and 19 day, respectively demonstrated the most significant effects for cabbage weight increase and yield increase from total and standard produce. In these expositions, the cabbage weight exceeded that of the control with 29-30 % as it was registered total and standard yield higher with 20-21 % and 24-27 % towards those obtained in the control variant. Considerable increase of the standard yield with 25 % was reported also in variant with treatment $U=10$ kV and $\tau=10$ s and stay of the seeds for 12 days. A decrease of vegetation period with 5-7 days was observed in these variants of electromagnetic impact.

Key Words: AC Corona Discharge Field, Electromagnetic Treatment, Head Cabbage, Vegetation Period, Weight, Total Yield, Standard Yield

EFFECT OF GENOTYPE AND STORAGE ON TEXTURAL PARAMETERS IN POTATO TUBERS

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Three potato lines selected by interspecific hybridization of *Solanum tuberosum* L. were evaluated on their textural properties in two consecutive years. The plants were grown under mountain conditions at 1600 m altitude and were harvested in the end of October. Textural parameters were studied right after harvesting, 3 and 6 month storage under ambient conditions. The test was performed using a Warner-Bratzler blade for obtaining the maximum force to shear the tubers. The dynamic of yield force, young modulus, deformation work and rupture force showed stronger influence of storage duration than the genotype. Based on the studied physical qualities line E 1096 was the most appropriate for long-term storage. This line had the smallest softening during the storage and showed the most homogenous parameters of the texture. The decrease of difference between the rupture force and yield force is due to the softening of the potato flesh.

Key words: *Solanum tuberosum* L, Breeding lines, Yield force, Rupture force, Long-term storage

ECONOMIC EFFICIENCY OF BROCCOLI PRODUCTION DEPENDING ON SOWING AND PLANTING DATES

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Abstract

An experiment was set up to the economic effect of different sowing and planting dates. The field trial was conducted in the experimental garden of the Institute of Agriculture - Kyustendil over the period 2008-2011 via the block method in four replications. Three sowing and six planting dates were examined for the four broccoli hybrids: Fiesta F1, Coronado F1, Marathon F1 and Parthenon F1. The plants were grown according to the adopted methodology for late field production. The flower heads were harvested at the most proper stage of development. The production costs of broccoli growing are within the range 400.5 to 795 lv/da and depend on the different volume of agro technical practices undertaken over the years and the resulting output. The highest net income of the studied hybrids is obtained by Parthenon F1 in all variants, which is due to the higher yields obtained by the plants of this hybrid. The most efficient for the region of Kyustendil broccoli sowing date is 15 -16.06. and planting of the 30-day seedlings on 15-16.07.

Key words: broccoli, gross production, net income, rate of profitability

EFFICIENT PRODUCTION OF TRANSGENIC MELON VIA *AGROBACTERIUM*-MEDIATED TRANSFORMATION

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Abstract

Oriental melon (*Cucumis melo* L. var. *makuwa*) is an important fruit for human consumption. However, this plant species is one of the most recalcitrant to genetic transformation. The lack of an efficient *in vitro* system limits the development of a reproducible genetic transformation protocol for Oriental melon. In this study, an efficient transgenic production method for *Agrobacterium*-mediated transformation using cotyledon explants of Oriental melon was developed. Cotyledon explants were pre-cultivated for two days in the dark, and the optimal conditions for transformation of melon were determined to be a bacteria concentration of OD₆₀₀ 0.6, inoculation for 30 min, and two days of co-cultivation. Transgenic melon plants were produced from kanamycin-resistant shoots. A total of 11 independent transgenic plants were regenerated with a transformation efficiency of 0.8% of the inoculated explants. The transgenic plants were phenotypically normal and fully fertile, which might be a consequence of the co-cultivation time.

Key words: *Agrobacterium tumefaciens*; *nptII*; Genetic transformation; Transgenic melon

DETERMINATION OF VARIATION OF SAVOY CABBAGE (*Brassica oleracea* var. *sabauda* L.) POPULATIONS IN TURKEY

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Savoy cabbages are also known as curly cabbage. The leaves are more loosely layered and less tightly packed than green or red cabbage, although its uses are similar. It is delicious thinly sliced in salads or quickly stir-fried. Savoy cabbage landraces have quite common usage in district. The aim of this study was to determine similarities and differences regarding morphological variation and to do morphological characterization in savoy cabbage genetic resources collected from of Turkey. 27 genotypes were collected from this region. Data obtained from examining properties of genotypes in the field and laboratory experiments conducted between 2012 and 2013 were analyzed using multivariate analysis. Principles component analysis (PCA) and cluster analysis were applied. PCA and cluster analysis based on 36 morphological traits, respectively. Principal component analysis revealed that the first three PC axes explained 67.9 % of the total multivariate variation. Cluster analysis identified 3 groups. In addition, dendrogram was formed to evaluate morphological similarities and differences among the savoy cabbage types. A great morphological variability was determined among the savoy cabbage genotypes of Bafra Plain. We must consider that conservation and maintenance of these valuable genetic resources are necessary, because these populations are important source of diversity which can be used in future breeding programmes

Key words: Savoy cabbage, Genetic resources, Characterization, Variation, Cluster analysis

ADAPTABILITY AND STABILITY OF STANDARD YIELD IN PRODUCTION OF CERTIFIED SEEDS FROM BULGARIAN POTATO VARIETIES

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Abstract

The experiment was performed in the Maritsa Vegetable Crops Research Institute, Plovdiv and Experimental station, Samokov during the period 2009-2011. The aim of this study was to evaluate the adaptability and stability of standard yield in production of certified seeds from four Bulgarian potato varieties. Three factors field experiment was set with 12 combinations to established effect of the factors - fertilization rate, planting density and term of leaf striping on the standard yield of the seed fractions in varieties Rozhen, Perun, Kalina and Bor. It was established that varieties Bor, Perun and Kalina are described with a complex value, combining high level, relatively stability and adaptability of standard yield in change of the environmental conditions in the variant including higher level of nitrogen and potassium fertilization, higher planting density and earlier term of leaf striping. High level of stability and adaptability, but lower productivity is recorded in variety Rozhen in the variant including fertilization rate N₁₆ P₁₄ K₁₈, higher planting density and earlier term of leaf striping.

Key Words: potato, certified seeds, adaptability, stability, yield

PAVELSKO – A NEW BULGARIAN POTATO VARIETY SUITABLE FOR CHIPS

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Abstract

The variety Pavelsko is bred in the Maritsa Vegetable crops Research Institute, Plovdiv, by the method of individual clone selection in the hybrid progeny of Britta and line ML 75.25/18yN. It is approved by the Executive Agency for Variety Testing, Approbation and Seed Control, Sofia in 2014. Mid-early variety suitable for mid-early and late production. The variety forms 11–13 mid-large tubers. They are round-oval with yellow netlike skin, shallow eyes and yellow flesh. They possess russet gene determining their high adaptability for industrial processing. The dry matter content is within 25 – 26%, starch 18 – 19% and reducing sugars 0.15 – 0.20%. It is characterized with very good taste and non-discolored flesh. Pavelsko is suitable for fresh consumption and chips. The variety possesses high field resistance to virus diseases and tuber blight. It is resistant to potato cyst nematodes *Globodera rostochiensis*. It is stored very well during winter-spring season.

Key Words: potato, breeding, varieties, chips, nematode resistance

**VEGETATIVE AND PRODUCTIVE BEHAVIORS OF CAPE GOOSEBERRY (*PHYSALIS PERUVIANA* L.),
GROWN BY DIRECT SOWING OUTSIDE UNDER CONDITIONS OF BULGARIA**

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Abstract

Cape gooseberry is a new crop for Bulgaria. Therefore, the establishment of appropriate technology is important. The main aim of this study was to evaluate the effect of different date of direct sowing outside under Bulgarian condition on the morphological development and on the productivity of cape gooseberry. The experiments were carried out with two varieties cape gooseberry - first Bulgarian variety Plovdiv and Columbian ecotype Obrazec 1 in region of Plovdiv, Bulgaria. Three dates of direct sowing outside - 1.04, 15.04 and 30.04 were investigated. Phenological observations were carried out. In phases of flower bud, flowering and fruiting the height of the stem; number of branches, weight, number and area of leaves, total vegetative mass were established. The total yield was determined. The content in the fruit of dry matter, sugars, total acids, ascorbic acid and pectin were analyzed. Highest yield for both varieties was obtained by sowing 30.04 - 387 kg/da 341 kg and kg/da for Plovdiv and Obrazes 1, respectively. In this date of sowing and also in 15.04, the plants developed the highest stem, the biggest number of branches and leaf area. The contents of the above mentioned chemical components were highest in the fruits of Plovdiv when sowing was done on 15.04, while for Obrazes 1 – on 30.04.

Key words: cape gooseberry, morphology, seedlings, yield, pectin, sugar,

INVESTIGATION OF THE POSSIBILITIES FOR AFTER HARVEST RIPENING THE FRUITS OF CAPE GOOSEBERRY (*PHYSALIS PERUVIANA* L.), DEPENDING ON THE APPLIED AGROTECHNOLOGY

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Abstract

The main goal of the present study was to establish the possibility of post-harvest ripening of fruit of cape gooseberry (*Physalis peruviana* L.). Some part of the cape gooseberry can not ripen until the end of the growing season. Therefore, it is necessary to be carried out the studies in relation with after harvest ripening. This results to an increase in overall productivity. The experiments were carried out with two genotypes of cape gooseberry – first Bulgarian variety Plovdiv and Columbian ecotype Obrazec 1. The plants were grown by different technological approaches and date of sowing: with pricked and non-pricked seedling, by direct sowing outside and also with nitrogen fertilization in several levels. In the end of vegetation normal development fruits, without damage and injuries, but not ripe were placed for after harvest ripening in ambient conditions. Through period of 7 days the quantity of ripening and damaged fruits, the content of dry matter and sugars and weight of the fruits were established. The highest percentage of ripe fruits is found in variants with non pricked out of seedlings and sowing date of 15 and 30.03 and of direct sowing outside on 15.04 - 67.0, 52.56 and 57.34% for variety Plovdiv and for Obrazec 1 are 62.67, 42.67 and 67.56% respectively. Dry matter and sugar content increased, while the fruit weight decreases. The periods for economic efficiency of after harvest ripening were 21 days for Obrazec 1 and 35 days Plovdiv.

Key words: cape gooseberry, after harvest ripening, chemical components, technology, fruit,

SENSORY, CHEMICAL AND MORPHOLOGICAL CHARACTERIZATION OF *CUCURBITA* GENOTYPES FROM DIFFERENT GEOGRAPHICAL ORIGINS

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Abstract

During the period 2012-2013 eleven *Cucurbita* genotypes originated from different geographical regions were tested on their morphological characters, basic chemical components and sensory profile. According to the fruit characteristics and plant habitus significant differences were recorded. It was established considerable variation in the content of dry matter, ascorbic acid, total sugars, total pigments, β -carotene and sensory assessment of the boiled fruits. Variety Moskatna had the best flavour and chemical composition. Cluster analysis and Principle component analysis were applied in order to identify similarities of different genotypes. The studied cucurbit genotypes are good basis for performing a breeding program aimed to improve the sensory quality of fruits and to increase some basic chemical components especially those with antioxidant effect.

Key words: Squash, Dry matter, Ascorbic acid, Total sugars, Beta-carotene, Flavour

BIOACTIVE COMPONENTS AND ANTIOXIDANT ACTIVITY OF MOROCCAN PAPRIKA (*CAPSICUM ANNUUM L.*) UNDER DIFFERENT STORAGE CONDITIONS

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Abstract

The effects of the drying process on active total polyphenols and flavonoid concentration, as well the antioxidant capacity of a Moroccan red pepper cultivar (*Capsicum annuum L.*) were investigated. The concentrations of total phenolic compounds, flavonoids, and the extractable red color measured in the units of the American Spice Trade Association (ASTA) varied significantly with temperature, humidity (4 % / 28 ° C , 7 % / 28 ° C , 12 % / 28 ° C , 4 % / 45 ° C , 7 % / 45 ° C , 12 % / 45 ° C), and light exposure treatments. Drying in a hot-air oven induced a significant loss of epicatechin, cyanidin -3 -O-galactoside, phloridzin and quercetin glycosides concentrations. Vacuum-drying red peppers at different temperatures, ranging from 20 to 45° C, had no significant effect on concentration of all phenolic compounds compared to the conventional drying method (28-45 °C). The antioxidant activity was proportional to the samples' moisture and decreased initially from 45.25% to 35% and 28% at a humidity level of 4% and 12%, respectively. Flavonoid concentrations were sensitive to thermal processing. Flavonoid rates were reduced significantly ($p < 0.0024$) under all thermal conditions at both 4% and 12% humidity. Light exposure had significant effect on red pepper bioactive compounds. Light-exposed samples recorded lower total polyphenol concentrations, flavonoids, and antioxidant activity compared to those stored in darkness. Compared to other drying methods, hot-air oven drying resulted in a significant reduction in antioxidant capacity measured in terms of the absorption capacity of oxygen radicals. As expected, different storage conditions affected the concentration of few bioactive compounds. However, under appropriate storage conditions, the Moroccan red pepper cultivar showed promising future use in the agro-industry.

key words: bioactive compounds, capsicum anuum, antioxydant activity, drying process

YASEN F₁ – NEW BULGARIAN PEPPER VARIETY

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Abstract

The new pepper variety Yaseen is bred at the “Maritsa” Vegetable Crops Research Institute, Plovdiv, Bulgaria. The F₁ hybrid is developed as a result of combining of gene male sterility and heterosis effect. It is suitable for greenhouses, early and mid-early field production. The fruits are drooping, predominantly with one apex, light green before maturity and red at botanical maturity. The fruit exocarp is very thin, tender in fresh consumption. The fruit shape is moderately triangular in longitudinal section. The produce is suitable for fresh consumption and processing. During the period 2004-2007 the new variety was compared with standard Zlaten medal 7 and father component by different economic and morphological characters. Yaseen F₁ exceeded them by earliness, total and standard yield. The vegetative period of new variety was 106 days from germination to first harvest. This variety formed mid-high (56.25 cm) plants with strong stem (15.45 cm) and 3 branches from first order. The fruit length was on average 11.63 cm, the diameter at the base – 4.73 cm and the fruit weight - 75.35 g.

Key words: *Capsicum*, hybrid, male sterility, yield, fruit

PRELIMINARY ANALYSIS OF AGRICULTURE LAND FOR VEGETABLE FARMING SYSTEM

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Abstract:

Vegetable sector is one of the important components of Bulgarian agriculture where diversity in vegetable cropping brought by different agro-ecological regions of the country. The main aim of the article is to analyze and evaluate the state of the sector and Bulgarian agriculture land for vegetables crop production with relevance for GIS database. The article suggests that the results in the horticulture sector are far below of biological potential of vegetables and effectively using of lands. The analysis will be the basis for creating a GIS database for vegetables crop production. The using of GIS database in vegetables crop production will help to increase the knowledge of the vegetable growers relating with the selection of areas, selection of suitable productions direction and varieties and applying of good agricultural practices for sustainable vegetable production sector.

Key words: vegetables crop production, GIS database, using of lands

QUALITY OF TOMATO SEEDLING IN APPLICATION BIOPRODUTS

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Abstract:

The study was performed during the period 2009 - 2011 in the "Maritsa" Vegetable Crops Research Institute, Plovdiv. The effect of organic products Baikal EM – 1Y, Biogloblin and Biolan on the quality of seedlings from tomato variety Yana was studied in unheated glasshouses ro-ON type. Plants were grown on three substrates: peat-perlite substrate, substrate with Lumbrikal and substrate with Baikal. The post-effect of the applied bioproducts on the plant productivity was studied in field conditions. Tomato seeds from Yana variety treated with Biogloblin and Baikal EM1 have a stronger influence on biometric indexes of the seedlings. The best expressed of this is established in weight of a plant and the diameter of the stem, which is decisive for the quality of seedlings. Using substrate with Lumbrikal and treatment of seeds with bioproducts result in increased of plant bio mass averagely with 19.2%, and on Baikal EM1 background - an average of 10.5% compared to the untreated. The greatest increase of yield compared to the control is observed in seeds treated with Biogloblin and Baikal EM1 - with 29.4 and 28.5%, respectively. Analogous results are obtained for number and weight of fruits per plant. The applied bioproducts does not significantly affect the biochemical characters of the fruits.

Key words: tomatoes, biofertilizer, seedlings, tomato fruit weight, number of fruits per plant, yield.

THE STATUS OF VEGETABLE GROWING AND PRODUCTION ANALYZING IN MERSIN-SILIFKE DISTRICT

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Abstract

Almost all kinds of fruits and vegetables are grown in Silifke district because of the appropriate climate. Greenhouse vegetable cultivation is also quite advanced as well as open field vegetable growing. Silifke is providing 0,85% of total vegetable production of Turkey. Tomato, cucumber, eggplant, peppers are the most widely grown vegetables. In addition to this, in recent years, the cultivation of Pepino (*Solanum muricata*) and golden berries (*Physalis peruviana*) are increased. One of the biggest problems of greenhouse farmers is diseases and pests. The former type of greenhouses, especially lack of ventilation space, is inviting to bacterial and fungal diseases. Also, another problem is unconscious using of fertilizing and pesticides. In this study, the potential of the current vegetables has tried to find out of Silifke. In addition, the problems faced by farmers have tried to determine and the solutions were required.

EFFECT OF SILICON ON ANTIOXIDANT ENZYMES ACTIVITY AND PHOTOSYNTHESIS IN LEAVES OF CUCUMBER PLANTS (*CUCUMIS SATIVUS* L.)

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Abstract

The effects of exogenous silicon (Si) on changes of photosynthesis and the activities of major antioxidant enzymes (superoxide dismutase, SOD; guaiacol peroxidase, GPX; siringaldasine peroxidase, SPX; catalase, CAT, and antiradical activity, DPPH) as well as content of phenols and photosynthetic pigments were investigated in leaves of young cucumber plants (*Cucumis sativus* L.), cv. Gergana. Plants were grown as a water culture in climatic boxes, under a PPFD of $350 \mu\text{mol m}^{-2} \text{s}^{-1}$. Five treatments consisting of a control (basic Hoagland nutrient solution without Si) and basic nutrient solution with 0.5 mM Si, 1.0 mM Si, 1.5 mM Si and 2.0 mM Si, were investigated. Plants were grown 20 days and analyses were performed at the end of experiment on the third leaf, which was fully developed. It was established that Si treatment increased photosynthetic activity of leaves, photosynthesis of variant with 1.5 mM Si being the highest. Activity of main antioxidant enzymes decreased in plant leaves and roots. Content of phenols increased in roots and decreased in leaves of Si-treated plants. Content of pigments increased and highest values were established in variant with 1.5 mM Si. These results suggested that exogenous Si application in nutrient solution was useful to increase cucumber antioxidant capacity and photosynthesis.

Key words: cucumber (*Cucumis sativus* L.), silicon, antioxidant enzymes, photosynthesis.

PLANT PROTECTION

HISTORY OF THE USE OF BIOLOGICAL CONTROL IN ALGERIA: EXAMPLES

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ABSTRACT

It was in 1922 that the first attempts to use auxiliaries were made in Algeria, with *Novius cardinalis* to fight against *Icerya purchasi* on citrus. In 1925, *Pharoscymnus ancharago* and *Cybocephalus seminulum* were used to fight against *Parlatoria blanchardi* in palm groves. In 1931, *Cryptolaemus montrouzeiri* was released against *Pseudococcus citri* which infested citrus and greenhouse plants. - *Trichogramma embryophagum* was used against *Ectomyelois ceratoniae* in citrus orchards in 1983 and in palm groves in 1986. *Cales noacki* was introduced to fight against *Aleurothrixus floccosus* in 1981 on citrus. *Phyllocnistis citrella*, a citrus pest, was recorded in Algeria in 1994. Four parasitoids were introduced by the service of INPV in 1996 (*Ageniaspis citricola*, *Semiolachar petiolatus*, *Cirrospilus quadristriatus* and *Sympiesis sp*); only the species *S. petiolatus* could acclimate in 1997. - *Tuta absoluta*, a tomato pest, was observed in Mostaganem in 2008. A predatory bug, *Nesidiocoris tenuis*, was released in 2008 to combat this bioaggressor. Meanwhile, pheromone traps were installed. Interesting results were obtained by the combination of these two methods. - The strain *Metarhizium anisopilae* var. *acridium* was obtained by the Department of Locust of the INPV, El Harrach as a biopesticide called "Green Muscle", which is formulated in an oil concentration of spores. The study that was conducted in Algeria, in the region of El Oued (Oum and Thiour) in 2005 on the larvae of locusts, *Schistocerca gregaria*, has recorded a rate between 59% and 94% mortality, which was reached after the 7th day and after a treatment applied in UBV with a dose of 2.5×10^{12} conidies / ha.

Key words: pest, culture, parasites, predators, biological control, Algeria.

EVALUATION OF MORPHOLOGICAL MANIFESTATIONS OF NEW BULGARIAN KOHLRABI VARIETY GROWN IN THE CONDITIONS OF ORGANIC CROP PRODUCTION

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Abstract

A new Bulgarian kohlrabi variety Niki was studied in two systems of organic crop production: organic system without fertilizer and without pesticide treatment of the plants and organic system by use of biological fertilizer and plant protection with biological insecticides and biofungicides. The morphological characteristics: size of leaf rosette, number and weight of rosette leaves and weight, height and diameter of the kohlrabi (knob) were investigated. It was established that the new kohlrabi variety demonstrates relatively good biological potential for realization in organic crop production systems although the values recorded for almost all studied characters of the morphological characteristics were lower compared to those recorded in the conditions of conventional crop production. The phenotypical manifestations of the variety were better in organic system production with use of bioproducts for fertilization and plant protection where the values of the characters from the morphological characteristics were with 6 % to 23 % lower than those recorded in conventional production system. The values of the studied characters of kohlrabi grown in organic production without application of products for fertilization and plant protection were with 15 % to 34 % lower compared to the recorded in the conventional production. The average weight of the kohlrabi (knob) was 1,110 kg in organic system production with use of bioproducts for fertilization and 0,897 kg by growing in organic production without application of products for fertilization and plant protection which were smaller compared to the registered knob weight in conventional production 1,256 kg.

Key Words: Kohlrabi, Organic Production, Morphological Characters

ENTOMOFAUNA OF THE OLIVE TREE IN THE REGION OF BLIDA. APPROACH TO POPULATION DYNAMICS *BACTROCERA OLEAE* GMEL (*DIPTERA*, *TEPHRITIDAE*)

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Abstract

Olive trees can be attacked by a group of depredators that lower the performance and threat the farming and for this it will be interesting to conduct a study about the Entomofauna of the olive tree in the region of Blida. Approach to population dynamics *Bactrocera oleae* GMEL 1788 (Diptera, Tephritidae). Our work is done in the region of Blida Soma Station during July 2011 to June 2012. Regarding the study of entomofauna, we picked at human height of 20 cm of twigs and leaves. On the other side the study of population dynamics of *B.oleae*, is made with two types of fly catchers and the collection of olives. The inventory shows the presence of 3744 individuals spread over 30 species of the class of insects belonging to 25 families and eight orders: : Diptera and Homoptera are best represented with 8 families each. Diptera include 10 species, the most important is *Bactrocera oleae*. The presence of *Ceratitis capitata* should be pointed. We met 9 Homoptera all enfeoffed t to the olive tree. They are followed by beetles all three predator species, 3 Hymenoptera and 2 Lepidoptera. The values of the frequency for centesimal orders shows Homoptera occupy the first position with a very high rate of 91.82%, followed by Diptera with 6.30% .The other orders are very rare and do not exceed 1%. Those species confirm that Homoptera species are the most frequent. In fact, values of the highest relative abundances are noted for; *Parlatoria oleae* (46.44%) and *Saissetia oleae* (39.63%). *Bactrocera oleae* represents 4.51% of harvested species. The frequency of occurrence shows four classes; ubiquitous species represented by two mealybugs of olive tree (*Saissetia oleae* and *Parlatoria oleae*) and the olive tree psyllid. The olive fly, the whitefly black and PSoC are constants. Bycatch species are formed by *Liothrips oleae*, *Aphid* sp., *Pseudococcus* sp., *Pullus subvillosus*, *Crematogaster scutellaris* and *Borborida* sp. Other insects belong to the class of by catch species. The Shannon-Weaver indices show that biodiversity values are very interesting for the sampling period. The species do have a tendency to be in balanced with each other. As is confirmed by the index and SIMPSON HILL. The results obtained on the study of population dynamics of *B. oleae*, demonstrate the almost continual presence of winged fly in the olive grove and also fluctuations in densities of this insect in relation to climatic factors and the presence of fruit. In contrast, the fluctuations of the infestation on olives show that attacks begin in September and are significant in November.

Key words: Olive tree, entomofauna, inventory, Wildlife Management, *Bactrocera oleae*, flycatcher, Blida.

MAJOR DISEASES OF APPLE TREES IN KYUSTENDIL REGION OF BULGARIA

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ABSTRACT

Surveys were done in different apple orchards at the Institute of Agriculture –Kyustendil and private orchards and nurseries in Kyustendil region of Bulgaria between 2004 and 2013. It was used generally accepted methods in plant pathology. Fungal diseases scab (*Venturia innaequalis*) and powdery mildew (*Podosphaera leucotricha*) are the most important diseases of apple in Kyustendil region and crop losses depending on the frequency of infection periods of *V. innaequalis* and cultivar susceptibility. Damages by black rot (*Botryosphaeria obtusa*) of trunks and branches are problem at biological growing system and apple orchards with cut-wounded, cold, hail or insect-injured apple trees. Brown rot (*Monilinia fructigena*) and blue mold (*Penicillium* spp) radically infect apple fruits damaged by *Cidia pomonella*. Bacterial disease fire blight (*Erwinia amylovora*) occurs in some years, depending on certain abiotic and biotic factors in region and caused damages. The most common virus infected apples in Kyustendil region is *Apple chlorotic leaf spot virus* (ACLSV), followed by *Apple stem grooving virus* (ASGV). *Apple mosaic virus* (ApMV) has not been detected in the species *Malus domestica* in the region. In our study, it was identified the phytoplasma ‘*Candidatus* Phytoplasma mali’ the agent caused Apple proliferation disease (AP).

Key word: apple, diseases, fungi, bacteria, viruses, Bulgaria

DETERMINATION OF DISEASE PREVALENCE OF *Plasmopara viticola* IN TEKİRDAĞ, ÇANAKKALE AND EDİRNE

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Abstract

Plasmopara viticola (downy mildew) is an important fungal disease agent causing the loss factor in the vineyards yield and quality. Downy mildew, which is seen on leaves and grapes of *Vitis vinifera*, optimum conditions are required for reproduction and infection. The disease is seen in many parts of the world from time to time create significant economic losses. In this study, surveys were carried out in some vineyards of Tekirdađ, Çanakkale and Edirne, to determine *P. viticola*'s disease prevalence in June and July 2014. It is determined that, disease is common in all area for surveys. Disease severity varies depending on grown grapevine varieties and various factors. According to observations in those regions, Yapıncak grape varieties were found most susceptible.

Key words: Grapevine Downy Mildew, Disease Prevalence, Tekirdađ, Çanakkale, Edirne

SOURCES OF RESISTANCE TO COMMON BACTERIAL BLIGHT, HALO BLIGHT AND BACTERIAL WILT IN *PHASEOLUS VULGARIS* L. ELITE LINES

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Abstract:

Field inoculation tests were performed in 2009-2013 with 32 snap bean lines (*P. vulgaris* L.) from six crosses for their leaf and pod reaction towards two isolates of *Xanthomonas axanopodis* pv. *phaseoli* [*Xap*] – the causal agent of common bacterial blight, and two races of *Pseudomonas savastanoi* pv. *phaseolicola* [*Psp*] - the causal agent of halo blight. The disease response of the lines to an isolate of *Curtobacterium flaccumfaciens* pv. *flaccumfaciens* [*Cff*] – the causal agent of bacterial wilt was also studied. A differential reaction of lines to *Psp* races was observed for each of the reactions on leaves and pods. Response of the lines to bacterial wilt differed by each of the symptoms – necrotic lesions, stunting and wilting. A positive correlation ($r= 0.89$) between the genotype disease reaction and the virulence of the *Xap* isolates included in the study was obtained. Among the studied genotypes, three lines of hybrid combination #952 demonstrated highly to moderately resistant on both leaves and pods to *Psh* and *Xap*.. They possessed green flat snap pods, determinate growth habit Ia and good agricultural characters. Three lines resulting from crosses #1074 and #1056 were highly to moderately resistant to halo blight and bacterial wilt on. Above outlined genotypes were suitable sources of resistance to bean bacterioses in Bulgaria and their incorporation in the snap bean breeding program would allow selecting of cultivars with resistance to a considerable part of the pathogens' populations.

Key words: snap bean, bacterial diseases, resistance

**DETERMINATION OF GARLIC FUNGAL DISEASES FROM FIELD AND STORAGE GARLIC IN TAŞKÖPRÜ,
KASTAMONU, TURKEY**

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ABSTRACT

Taşköprü is one of the major garlic producing areas in Turkey and economic significance of garlic in Taşköprü is quite considerable. Pests and diseases cause loss of yield and quality in the cultivation of garlic. This study was carried out in order to determine fungal diseases of garlic in field and storage between 2010 and 2011 in Taşköprü district, Kastamonu province. The samples that were taken from field and storage garlic in different locations of Taşköprü, were cultured under the laboratory condition and examined. *Penicillium* spp., *Fusarium oxysporum*, *F. solani* ve *F. Culmorum* were determined as genus and species from taken samples in storage. Besides, *Penicillium* spp., *Fusarium oxysporum*, *F. solani* *Puccinia allii*, *Stemphylium vesicarium*, *Sclerotium cepivorum* were determined from field samples. Field soilborn diseases were similar to storage. It is show that bad storage condition and unhealthy seed to be used caused soilborn diseases and loss yield.

Key Words : Garlic, disease, *Allium sativum*, Taşköprü

XANTHOMONAS GARDNERI – CHARACTERIZATION AND RESISTANCE OF BULGARIAN TOMATO VARIETIES

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Abstract

Xanthomonas gardneri and *X. vesicatoria* are the causal agents of bacterial spot of tomato in Bulgaria. *X. gardneri* was identified in the area of our country on variety Bela for the first time in 2010. Symptoms on the leaves were dark, circular to irregular, water-soaked spots surrounded by chlorotic halos on fruit formed scabs. *X. vesicatoria* and *X. gardneri* can be identified through bacterial isolation only. *X. gardneri* was gram-negative, aerobic rods with a single flagellum. Bacterial colonies on peptone sucrose agar were yellow and raised with smooth margins. Starch and pectate hydrolysis tests were positive. BIOLOG™ GN2 (Biolog, Inc., Hayward, CA, USA) microplates were used for obtaining metabolic fingerprints. The metabolic profile of tomato isolates with bacterial spot symptoms was typical for *X. gardneri*. The distribution of *X. gardneri* on tomato crops around the country required a research on the resistance of the Bulgarian tomato varieties. Immune tomato varieties were not identified. Resistant genotypes (with mean score 0,01-0,60) were Nikolina F₁ - determinate large-fruit variety for mid-early field production and IZK Alia - variety of cherry type. Highly sensitive (with mean score over 3.0) were two determinate varieties - Bela and Venera, suitable for industrial processing.

SOURCES OF RESISTANCE TO RACES OF *XANTHOMONAS VESICATORIA* – CAUSAL AGENT OF BACTERIAL SPOT OF TOMATOES

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Abstract

Bacterial spot on tomatoes is caused by the bacteria *Xanthomonas vesicatoria* and it is economically significant for Bulgaria, affecting quality and yield of tomato crops, especially in warm and wet seasons. Current investigation aimed to identify sources of resistance to races T1, T2 and T3 of *X. vesicatoria* in 14 tomato breeding lines. A differential reaction of the lines to pathogen races was observed. An individual plant selection of healthy and hypersensitive progenies was made for three generations within the lines with resistant reaction. Redistribution of the percentage of plants by disease rating was observed in the progenies. As a result pure lines with greatest number of healthy and hypersensitive plants were selected. These could be used as sources for resistance to bacterial spot on tomatoes, caused by *X. vesicatoria*.

CHARACTERIZATION OF THE POPULATION OF *PHYTOPHTHORA INFESTANS* (MONT.) DE BARY IN THE REGION OF AÏN DEFLA, ALGERIA

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Abstract

Late blight of potato, caused by the oomycete *Phytophthora infestans* (Mont.) of Bary is the disease most feared in this culture. To assess the importance of this disease in the region of Ain Defla, several surveys were conducted during the crop year 2011-2012. During these surveys, we noticed that the attacks of late blight of potato were present in all plots with frequencies and severities vary localities surveyed. Sexual compatibility test based on a comparison of nine isolates of *P. infestans* collected from the leaves of the potato crop in the region of Ain Defla revealed the presence of two mating types A1 and A2. Three isolates of the A1 mating type isolates and 6 of the A2 mating type. In addition, an in vitro assay was performed to evaluate the behavior of nine isolates against metalaxyl. This test showed the following phenotypes: moderately susceptible, moderately resistant and resistant to metalaxyl.

Key-word: Late blight, *Phytophthora infestans*, surveys, Sexual type, metalaxyl.

ANTIFUNGAL ACTIVITY OF ESSENTIAL OILS OF THREE AROMATIC PLANTS FROM WESTERN ALGERIA AGAINST FUNGAL PATHOGENS OF TOMATO (*LYCOPERSICON ESCULENTUM* MILL)

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Abstract

The antifungal effect of the essential oils from *Thymus capitatus* L., *Daucus crinitus* Desf. and *Tetraclinis articulata* Vahl., aerial parts was evaluated in vitro against five phytopathogenic fungi of tomato (*Fusarium oxysporum*, *Alternaria solani*, *Aspergillus niger*, *Penicillium sp1* and *Penicillium sp2*). Our results showed that among the three plant species tested, *T. capitatus* oil was the most potent antifungal against the fungi (inhibition of mycelial growth of 100 % at a concentration of 2 µg mL⁻¹). Furthermore, the essential oil of *T. articulata* was also effective against *F. oxysporum*, *A. solani*, *A. niger*, *Penicillium sp1* and *Penicillium sp2* with an inhibition of mycelial growth greater than 57 % at a concentration of 5 µg mL⁻¹. *D. crinitus* essential oil was less effective. *T. capitatus* essential oil was dominated by carvacrol (69.6 %) and p-cymene (12.4 %). The isochavicol isobutyrate (44.9 %) and isochavicol 2-methylbutyrate (9.7 %) were the major compounds in *D. crinitus* essential oil, while the most abundant compounds in *T. articulata* were α-pinene (32.0 %), cedrol (11.0 %) and 3-carene (9.6 %). The plant essential oils were found to be an effective antifungal against of mycelial growth and, therefore, can be exploited as an ideal treatment against disease rot of tomato or as a new potential source of natural additives for the food and/or pharmaceutical industries.

COMPARISON OF *TUTA ABSOLUTA* MEYRICK, 1917 CATCHES BY PHEROMONE TRAPS ON TOMATO IN DOUAOUA - STAOUELI (ALGERIAN COAST) AND OUARGLA (ALGERIAN SAHARA)

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Abstract:

Tuta absoluta or tomato leafminer is a micro moth Gelechidae that attacked Solanaceae. This bioaggressor was reported for the first time in Algeria in August 2008 near Mostaganem in western Algeria. Chemical control was first used, then the pheromone traps have been proposed as alternative control in Algeria. It is within this framework that we have considered using pheromone traps for the capture of *T. absoluta* in two stations of Algiers coastal; Douaouda and Staoueli, and in a Saharan region Ouargla. - The Algerian coastal stations are located in the sub humid bioclimatic warm winter. The number of male moths captured in a greenhouse by the water trap with a pheromone capsule in 2009 is 114 individuals. Meanwhile the Delta pheromone trap captured 194 males. - The Ouargla region is located in south east of Algeria, 800 km from Algiers. It belongs to the bioclimatic Saharan mild winter. Catches with pheromone traps were made under greenhouse tomato in 2010. With pheromone water traps we obtained 10,500 subjects and 527 with the Delta trap. We notice from these results that the catches are more significant in Ouargla and for both two types of traps. Note also the large difference in catches with the water trap (10500 in south against 114 in the north). This is due to the fact that this type of trap is a bucket filled with water and equipped with a pheromone capsule in Ouargla while on the coast they are MC Phail traps filled halfway with water and which are ineffective and inadequate.

Key words: *Tuta absoluta*, water traps with pheromone, pheromone traps with Delta, coastal area, Sahara.

**EVALUATION OF SUNFLOWER GENETIC RESOURCES TO CHARCOAL ROT CAUSED BY
*MACROPHOMINA PHASEOLINA***

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Sunflower charcoal rot is considered as one of the most important diseases on crops and infects more than 400 plants worldwide. In the current investigation, to achieve tolerant sources of sunflower, among restorer lines, the seeds were sown in research field located at research complex fields of Seed and Plant Improvement institute, Karaj, Iran. The pathogen, *Macrophomina phaseolina*, was collected from infected sunflower plants during last cropping season at the same area. It was first isolated and sub-cultured using single hypha technique and then mass-produced on potato dextrose agar medium for three days. The culture medium plugs with mycelium and some micro sclerotia produced by the pathogen were provided from the edge of Petri plates as 5 mm diameter round plugs. The stems of treatment plants were injured at seed filling stage and then the plugs were put onto which were covered with a small piece of wet cotton wool to provide humidity. The complex was covered finally with two layers of Parafilm to keep the humidity for infection progress. The lesion length produced, was measured at days 7, 14, and 21 post-inoculation. For greenhouse experiments, 75 days oil sunflower restorer plants were inoculated the same technique as the field evaluation process. To monitor the disease process, the lesion length on inoculated plants was measured at days 9 and 14 post inoculation. The analysis of data resulted in significant differences between genotypes showing reaction to the disease, and also days of measurements. On the basis of field evaluations, the lines R-140 and R-201 demonstrated resistance reaction to the pathogen. In greenhouse experiments, four lines including R-133, R-139, R-140, and R-141 showed the same reactions.

Key words: Sunflower, genotypes, charcoal rot, *Macrophomina phaseolina*, disease resistance.

IDENTIFICATION OF SUNFLOWER DOWNY MILDEW PHYSIOLOGICAL RACES AND REACTION OF THE HOST GENOTYPES TO THE DISEASE UNDER CONTROLLED CONDITIONS

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Sunflower downy mildew is one of the important diseases of the main crop production areas in Iran. The use of resistant varieties and hybrids is an effective method to avoid its damage. The soil samples containing the pathogen isolates, *Plasmopara halstedii*, were collected, refreshed and mass-produced on susceptible variety Record, using whole seedling immersion method. The isolates were inoculated on standard differential lines to investigate the physiological changes. Based on existence of a dominant race (race 100) of the pathogen in sunflower planting areas, 77 new Iranian sunflower genotypes including hybrids, restorer lines, CMS lines and individuals were evaluated against the disease under controlled conditions. Fifteen days post inoculation, the treated plants were evaluated based on six qualitative disease characteristics including damping-off, sporulation on cotyledons, sporulation on leaves and cotyledons, stunt, leaf mosaic or chlorosis and deformation. They were then converted to quantitative means based on their importance in disease development. Finally the average of the means as disease severity index (DSI) was used for evaluations. The all tested hybrids showed significantly resistance against the downy mildew. Furthermore, their related restorer lines have been tested and demonstrated resistance reaction in the experiments. Totally, 64 genotypes were categorized as resistant and the rest were identified as moderate-resistant, moderate-susceptible, susceptible, and highly susceptible.

Key words: Sunflower, *Plasmopara halstedii*, disease severity index, resistance.

**STUDY OF MYCELIAL GROWTH AND AGGRESSIVENESS OF *FUSARIUM CULMORUM* (WG SM.) SACC.
THE CAUSAL AGENT OF ROOT ROT AND HEAD-BLIGHT DISEASE OF WHEAT**

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Abstract

Fusarium culmorum is an ubiquitous soil-borne fungus able to cause foot and root rot and *Fusarium* head blight on different small-grain cereals, in particular wheat and barley. It causes significant yield and quality losses. This study was designed to evaluate the effect of temperature on the growth *in vitro* of isolates belonging to *Fusarium culmorum* involved in root rot of wheat. The study showed that a difference exists for the optimum growth between isolates of the same species. Thus, the *in vivo* test performed to compare the aggressiveness of isolates of *F. culmorum* showed that isolates obtained from the ear are capable of causing symptoms at the crown. In addition, a highly significant difference in the degree of pathogenicity of isolates was observed.

Key words: Wheat, *Fusarium culmorum*, Root rot, *Fusarium* head blight.

SYMPTOMS, ETIOLOGY AND CONTROL OF SOOTY BLOTCH AND FLYSPECK OF APPLE IN BULGARIA

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Abstract

Sooty blotch and flyspeck of apple (*Malus domestica* Borkh) is a disease complex (SBFS) that superficial blemishes fruits, leaves and stems. The cosmetically damages the cuticle occur in humid temperate regions. This resulting in shorten the storage life of fruits due to increased water loss. Fungi associated with SBFS were not described in Bulgaria, yet. We obtained a few isolates from discrete sooty blotch and flyspeck symptoms on apple fruits and leaves, cv. Melrose, Idared and Winter banana. Two of them were identified as *Peltaster fruticola* Jonson and *Geastrumina polystigmata* Batista & M.L. Farr using morphological and cultural characteristics in vitro and primary pathogenicity test. A screening of fungicides was carried out under laboratory conditions using Thornberry method. It showed that the most efficient against *Geastrumina polystigmata* were Tiram 80% (as Tiram) - 97.8%, followed by Cyprodinil (as Chorus) - 71.81% and Folpet + Triadimenol (as Shavit) - 64.63% inhibition on mycelial growth. Copper hydroxide 87.7% (as Vitra) - 98.66%. Tiram 80% (as Tiram) - 98.54%, Cyprodinil (as Chorus) - 95.76% and Copper hydroxide 77% (as Funguran) - 95.69% have highly inhibited the radial growth of *Peltaster fruticola*.

ASSESSMENT OF FUSARIUM PATHOGENICITY AND BIOFONGICIDE “ FONGIBACTER” USE FOR BIOLOGICAL CONTROL OF FUSARIUM HEAD-BLIGHT.

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Abstract

Fusarium head blight and root are majors diseases in wheat (*triticum durum*) . They are caused by different species of the genus *Fusarium* and *Microdochium nivale*, they induce a significant yield losses, affect technological and sanitary quality Due to mycotoxins accumulation. Our study aimed to asses the pathogenicity of some isolates of different species of the genus *Fusarium* and *M.nivale* . The biological control assay against *Fusarium* spp. And *M.nivale* using a biofungicide (fongibacter) containing 6% of *Trichoderma Harzianum* and 1% of *Pseudomonas* spp. showed a significant efficiency.

Key words: Wheat, *Fusarium*, *Microdochium nivale*, *Trichoderma harzianum*, biological control, Fongibacter.

**SPREADING, INFESTATION AND DAMAGE RATES AND ADULT POPULATION MONITORING OF
TOMATO LEAF MINER [*TUTA ABSOLUTA* (MEYRICK) (LEPIDOPTERA: GELECHIIDAE)] ON TOMATOES
GROWN IN OPEN FIELD IN THE SOUTH MARMARA REGION OF TURKEY**

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Abstract

Tomato leaf miner, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) is one of the most important pest that injures on tomatoes and other plants from the Solanaceae family. It originates in South America but, this pest has spread rapidly into the European countries within past few years. It was detected for the first time in Turkey in 2009. It was appeared in tomato fields in the South Marmara Region too. This study was conducted in order to determine spreading, infestation and damage rates and adult population monitoring of *T. absoluta* on tomatoes grown in open field in the South Marmara Region (Bilecik, Bursa, Kocaeli, Sakarya and Yalova provinces) in 2011-2012. As result of study carried out according to systematic sampling method, it was determined that all locations in every province were infested by this pest. When it views to infection rates, they were varied between 1% and 10% in the processing tomato production areas and between 5% and 10% in late season fresh tomato production areas. Also, with respect to damage rates related to tomato fruits, there was no damage in the processing tomato production areas but, Damage on fresh tomato area produced in late season was varied between 3% and 5%. In the population monitoring, adults were observed on traps in the months of April and May for first time. The highest population densities were encountered in the months of August, September and October. Adults were caught on traps up to end of every year.

Key words: Tomato, *Tuta absoluta*, Population monitoring, spreading, Marmara Region

COMPARAISON OF THE EFFECTIVENESS OF BIOLOGICAL AND CHEMICAL CONTROL AGAINST *BOTRYTIS CINEREA* PERS.: AGENT OF GREY MOLD ON GRAPEVINE

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Abstract

Botrytis cinerea is a pathogen fungi responsible of grey mould on grapes, it causes serious damages on vignyard all over the world. The coming work is based upon the use, *in vitro*, of two means of control: biological control by the study of the antagonist's effect of two species of *Trichoderma* genera: *T. longibrachiatum* (T4) and *T. atroviride* (Ta13), in addition to chemical control by studying the efficiency of fungicide (Switch) on mycelial growth. The study was on nine strains of the pathogen agent *Botrytis cinerea* which was isolated from grapes and branches (That show typical symptoms of the disease). The results show that the biological control gives more efficient results disregarding the application of the antagonist agent. It was noticeable that (Ta13) isolate shows the best results with 95.23% of mycelial growth reduction for direct confrontation and 57.32% for distant confrontation. The percentage reduction in growth Supreme confront direct equal to 98.89% and have been recorded at the duo (Ta13 * BCV16) The lower it is equivalent to 79.25% was recorded when confronting isolate I3 with T4, with regard to the confrontation remote, the lower the percentage of growth equal to 40.05% recorded when confronting isolate I3 with T4 the highest proportion equal to 78.60% and has recorded at I6 cope with isolate Ta13 The results of Switch efficiency essay on mycelial growth show weak resistance with a highest inhibition rate of 100% was noticed on the two isolates BCV 16 and BCV 19. The lowest rate equals to 81.1% recorded at the isolate I3.

Key words: grapevine, biological control, chemical control, *Trichoderma sp*, grey mold,

MYCORRHIZAL STATUS IN LEGUME SPECIE: *ACACIA SALIGNA* (LABILL.) WENDL. COLLECTED FROM ALGERIAN NURSERIES

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Abstract

Soil fungi play a crucial role in producing fundamental ecosystem services such as nutrient cycling, plant community dynamics and soil fertility. Among this fungi, arbuscular mycorrhiza fungi are considered the most important because their effect on plant growth by the formation of the mycorrhizal fungi. Arbuscular mycorrhiza is by far the most widespread and ecologically important plant endosymbionts along with nitrogen fixing bacteria. *Acacia saligna* is known to be associated with the two of them. In Algeria, little is known about the identity of arbuscular mycorrhizal fungi and the mycorrhizal status of the exotic species *Acacia saligna*. This study is a contribution towards the evaluation of arbuscular mycorrhiza fungal status, to search for structures related to possible functional status of the symbiosis, their identification and infection intensity in species of *Acacia saligna* collected from different nurseries of Algeria. Among the 54 plant samples collected from different nurseries, 49 were colonized with endotrophic mycorrhizal fungi in varied extents (presence of arbuscules, vesicules, extramatricial hyphae, appressorium and spores). Extracted AMF spores were belonged to two genera *Glomus* and *Scutellospora*. Spores belonging to the genus *Glomus* were the most frequent in this survey.

Key words: Arbuscular mycorrhiza, *Acacia saligna*, Nursery, Algeria.

THE EFFECTS OF DIFFERENT CROPS ON THE ABUNDANCE OF ARBUSCULAR MYCORRHIZAL FUNGI SPORES IN RHIZOSPHERES

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Abstract

Arbuscular mycorrhizal fungal (AMF) species may adapt to a wide range of hosts and edaphic conditions. One means by which AM fungi survive is the production of spores although the bad conditions in field soils. Furthermore, different plant species may respond differently to specific AMF species. The responses changed from plant species to specific. The aim of the study was to determine the effect of different two vegetation species (Gramineae and Amaranthaceae) on AMF spores numbers in the rhizosphere belong to Alibey serie of Konya-Çumra Plain. The number of mycorrhizal spores was recorded in the wheat rhizosphere between 35 and 259 (number/10 g soil), while the number of mycorrhizal spores was recorded in the sugar beet rhizosphere between 17.19 and 149.19 (number/10 g soil). Also the numbers of AMF spores among the wheat and sugar beet vegetation were found to be statistically significant ($P < 0.05$).

Key words: Arbuscular mycorrhiza, spore, wheat, sugar beet.

STUDY OF THE INFLUENCE OF WHEAT VARIETIES IN THE PROTECTION BY *TRICHODERMA ATROVIRIDE* P. KARSTEN AGAINST SOME ISOLATES OF *FUSARIUM* SPP. CAUSING ROOT ROT AND *FUSARIUM* HEAD BLIGHT OF WHEAT

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Abstract

Fusarium head blight and root rot are serious fungal diseases of wheat caused by several species of *Fusarium* and *Microdochium nivale*. In addition to the huge yield losses, the contamination of the grains with mycotoxins is a serious problem to human and animal health. The evaluation of efficiency of the antagonist species *T. atroviride* (Ta.13) against two isolates of *F. culmorum* (FC 03-12) and *F. graminearum* (FG 01-12) obtained from wheat collars and spikes exhibiting typical symptoms of disease was carried out using *in vitro* and *in vivo* based bioassay. The ability of *T. atroviride* to reduce the growth of *Fusarium* spp. *in vitro* was measured by two techniques: the direct and indirect confrontation. Direct confrontation of the colonies of *T. atroviride* with those of the pathogen results in an inhibition of growth. In the indirect confrontation a reduction in colony diameter was observed, this can be explained by the ability of *Trichoderma* to produce volatile antifungal substances. The *in vivo* test carried out on the evaluation of the effectiveness of the isolate Ta.13 in protecting wheat seedlings against *Fusarium* spp. in using four wheat varieties showed that the seed treatment by Ta.13 isolate before sowing in a soil already infested by the pathogen led to a significant decrease of disease severity compared to the untreated control. The highest percentage of disease reduction is obtained with Hiddab variety. Thus, it is important to indicate that there is a difference in the protection against the disease according to the wheat variety used.

Key words: *Fusarium*, wheat, *Trichoderma*,

WHEAT RUST SITUATION IN THRACE REGION IN 2014

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Abstract

Wheat rusts are major diseases of wheat in Turkey and they can cause significant yield losses in years with suitable conditions. However their prevalence changes from year to year and from region to region depending on climatic conditions. This study was conducted to monitor occurrence of the wheat rust in Thrace region of Turkey in 2014. Two different survey trips were conducted to examine wheat fields in the Thrace region. In total, over 750 km was traveled and 32 wheat fields were examined for presence of yellow, leaf and stem rusts. Fields located after 20 km or nearest were inspected on designated routes and plants were examined for rust presence and severity from corner to corner. In the survey program, 27 fields (84%) were infected with yellow rust, 9 fields (28%) were infected with leaf rust. Stem rust was not observed. Percentage of infected plants ranged between 5 – 80 % and severities reached 90 S for yellow rust and 70 S for leaf rust. Yellow rust was very effective on some susceptible cultivars in fields which fungicide non treatment.

Key Words: Yellow rust, Leaf rust, wheat, Thrace region

Study is financed and supported by General Directorate of Agricultural Research and Policy of the Ministry of Food, Agriculture and Livestock of Turkey (Project no: TAGEM/TBAD/14/A12/P01/002)

RACE AND VIRULENCE DYNAMICS OF *Puccinia triticina* AND EFFECTIVENESS OF LR GENES IN BULGARIA DURING 2005 – 2009

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ABSTRACT

Durable and efficient resistance of wheat to *Puccinia triticina* can be ensured only through good knowledge on the structure of the pathogen population. During 2005-2009 the structure and variability in the population of brown rust was investigated at Dobroudja Agricultural Institute – Bulgaria. Eight standard races were identified, which was an indication that the great race variability of the pathogen can not be encompassed by using the standard differential set. Therefore the race variability was determined with the help of isogenic lines applying the nomenclature suggested at COST 817. During the investigated period, 172 phenotypically different pathogens were identified, pathotypes 63562 (41%), 63573 (20%) and 63572 (19.4%) being predominant. The genetic variability within the population was represented through 236 gene formulae of virulence, 106 of which were detected for the first time in the population. Highly efficient were genes *Lr1*, *Lr9*, *Lr15*, *Lr28* and *Lr42*. During the period of investigation, pathotypes overcoming the resistance of gene *Lr19* were identified thus decreasing significantly its efficiency.

Key words: wheat; brown rust; pathotypes; virulence; genes

ISOLATION AND IDENTIFICATION OF BINUCLEAT *RHIZOCTONIA* SPP. FROM WHEAT FIELD SOILS IN THE CENTRAL ANATOLIA REGION, TURKEY

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ABSTRACT

Current study was conducted to identify the anastomosis groups and pathogenicity of binucleate *Rhizoctonia* species from soil samples in wheat production areas of Konya, Ankara, Yozgat, Eskişehir, Kırıkkale, Kayseri, Kırşehir, Nevşehir and Aksaray provinces in the Central Anatolia Regions during 2009-2012 growing season. One thousand and two hundred fifty six (1256) soil samples were collected from wheat fields and isolations were made from the soil that using colonization of bait tissue. Species identification were done according to the basis of hyphal and colony morphology, anastomosis reaction with known tester isolates. Pathogenicity test was conducted with agar-plate assay with all isolates. Fifty one isolates were identified as binucleate *Rhizoctonia* and those isolates were found to be belonged to AG A, AG C, AG D (*R. cerealis*), AG E, AG G, AG H, AG I and AG K. In consequence of the pathogenicity tests performed, the groups other than AG D were not found to be pathogenic on susceptible wheat cultivar. AG C identified in this study is first record for Turkey, and also AG A, AG E, AG G and AG H groups were determined to be first in the wheat field soils in Turkey.

Key words: Binucleat *Rhizoctonia* spp., anastomosis group, wheat, soil

ANTAGONISTIC EFFECTS OF *TRICHODERMA* SPECIES AGAINST SOME SOIL-BORNE PLANT PATHOGENS

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Abstract

In this study, *in vitro* antagonistic activities of four *Trichoderma* species; *T.atroviride*, *T. longibrachiatum*, *T. hamatum* and *T. harzianum*, against *Botrytis cinerea*, *Fusarium oxysporum*, *Pythium deliense*, *Rhizoctonia solani*, *Sclerotium rolfsii* and *Sclerotinia sclerotiorum* were investigated by dual plate culture and antibiosis tests. In the dual plate culture, all *Trichoderma* species inhibited the mycelial growth of the pathogens in different rates. When the effects of *Trichoderma* species on all the pathogens were evaluated together, there was no statistically significant difference among the inhibition rates. Similar results were obtained when the inhibition rates were separately evaluated for each pathogen, except *S. rolfsii*, that *T. harzianum* showed 59% inhibition on this pathogen, while *T. hamatum* showed only 26% inhibition. When we compare the pathogens in terms of their susceptibility to the antagonists, *F. oxysporum* and *P. deliense* were the most susceptible and *B. cinerea* and *S. sclerotiorum* were the most resistant ones. As a result of antibiosis test, effects of *Trichoderma* species differed depending on the doses of culture filtrates and lowest dose (25%) showed low inhibition rates except *T. harzianum* which showed 65% inhibition against *S. sclerotiorum*. Culture filtrates of the antagonists at the dose of 50% showed no inhibition against *F. oxysporum*, while *P. deliense* was successfully inhibited by most of the antagonists. Highest inhibition rates were obtained by the 75% dose, and *T. atroviride* totally inhibited the mycelial growth of *P. deliense* and *S. rolfsii* while *T. hamatum* showed similar effect on the first pathogen.

Key words: *Trichoderma* spp., parasitism, antibiosis.

DETECTION AND DISCRIMINATION OF *SCLEROTINIA* SPP. OBTAINED FROM DIFFERENT HOST BY MULTIPLEX PCR

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Abstract

The genus of *Sclerotinia* includes the important plant pathogenic species that cause severe yield losses in a wide range of economically important plants, including annual vegetables, ornamentals, and field crops. Different species can cause similar symptoms on the same host. The identification of these species is based on conventional methods that are quite time consuming and labor intensive. Thus, PCR-based techniques have been routinely used in studies detecting and discriminating of *Sclerotinia* species. This study evaluated the applicability of a multiplex PCR method for detecting and discriminating of *S. minor* and *S. sclerotiorum* isolates associated with sunflower, Jerusalem artichoke and lettuce. Multiplex-PCR assay was performed using specific-primer sets SMLcc2 F/R for the laccase-2 gene of *S. minor* and primer pairs SSaspr F/R for the aspartyl protease gene of *S. sclerotiorum*. The primer set SMLcc2 F/R amplified the expected 264 bp DNA fragment from all *S. minor* isolates while the primer set SSaspr F/R amplified 171 bp fragment from all *S. sclerotinia* isolates. No amplicons were obtained from DNA of the closely related fungi species and host-plants. This method was very useful for detecting and discriminating of *Sclerotinia* species and could easily be used in routine tests.

Key words: *Sclerotinia* spp., Detection, Multiplex PCR

MORPHOLOGIC, PHENOTYPIC AND PHYLOGENETIC VARIABILITY OF *ALTERNARIA BURNSII*, THE CAUSAL AGENT OF ALTERNARIA BLIGHT IN *CUMINUM CYMINUM*

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Abstract

Cumin (*Cuminum cyminum*) is an important seed spice crop that is widely cultivated in Central Anatolia region of Turkey, accounting for about 6% of world cumin production. Cumin blight caused by *Alternaria burnsii* is one of the most serious biotic constraint in cumin growing areas worldwide. This study evaluated morphologic, phenotypic and genotypic variability among *A. burnsii* isolates obtained from different cumin growing areas. All isolates were tested for their sporulation, spore size and growth ratio on eight different culture media with two different light periods. Also, the radial growth of all isolates was evaluated at temperatures of 20°, 25° and 30 °C. The highest sporulation was determined when the isolates were incubated on PCA medium for 15 days at 23 °C in a 12:12h L:D cycle or on V88 medium for 5 days at 23 °C in dark, 1 day at 18 °C in light and then 4 days at 23 °C in dark. The optimum growth temperature was found to be 25°C for all isolates. Significant differences were observed in the isolates grown on both culture media in respect of conidia length, conidia width and number of septa. DNA sequencing analysis revealed that *A. burnsii* was phylogenetically distant to other species-groups of *Alternaria*.

Key words: Cumin, *Alternaria* blight, sporulation, culture conditions, genetic diversity

DIAGNOSIS, CONTROL METHODS AND STATUS OF THE CAUSAL AGENT OF POTATO WART (*SYNCHYTRIUM ENDOBIOTICUM*) IN TURKEY

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Potato wart disease caused by *Synchytrium endobioticum* was recently considered to be the most destructive fungal disease of potato. Potato wart is caused by *S. endobioticum* an obligate pathogen. Due to the significant crop losses this disease can cause and the long-term persistence of the pathogen in soil it is an important quarantine pest throughout the world.

Potato wart is spread by infected seed tubers and by movement of infested soil. The control practices have had great limitations, according to the fact that disease is a soil borne; therefore, infected fields were quarantined in the world. Naturally the disease spreads slowly, so regulatory restrictions have been used effectively to limit disease spread. Typical symptoms of the disease occurring on tubers are cauliflower-like warts or tumours of different size. The disease can cause symptoms on the underground parts of potato plants including the crown, stolons and tubers, but not roots. Recently, the disease has been well managed by strict quarantine measures and resistant varieties. However, it has still causing serious losses due to the existence of different races in different locations. In addition, some cultural methods are important to prevent the dispersal of this disease and, to date, there is no effective chemical application program against it. Despite control methods, the disease still remains economically significant. In this study, some informations about potato wart disease, including general characteristics of the disease, signs and symptoms, status in Turkey, disease management, are presented.

Key words: *Synchytrium endobioticum*, Potato, control methods

PATHOGENIC AND GENETIC VARIABILITY OF *SCLEROTINIA SCLEROTIORUM*, CAUSING WHITE MOLD DISEASE IN *HELIANTHUS TUBEROSUS*

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Abstract

Jerusalem artichoke (*Helianthus tuberosus*) is a vegetable, fodder crop used for a source of inulin for food and industrial purposes. Also, this crop provides genetic resources as a part of sunflower breeding programs for disease resistance. White mold disease caused by *Sclerotinia sclerotiorum* is referred as one of the main limiting factor that affected Jerusalem artichoke cultivation worldwide. The pathogen causes soft and watery necrotic tissues covered with a whitish mycelium, dark sclerotia on stem, and eventually wilted and died of infected plants. The aim of this study was to characterize pathogenic and genetic differences within the populations of *Sclerotinia sclerotiorum* collected from Ankara province, accounting for approximately 92% of the total production of Turkey. *Sclerotinia sclerotiorum* isolates tested for pathogenicity showed significant variation in their ability to infect and spread on stem and pathogenic variability among the isolates ranged 3 to 11.57. To determine mycelial compatibility group (MCG) of *Sclerotinia sclerotiorum*, the isolates were paired in all possible combinations and 16 MCGs were identified, out of those nine were represented by single isolates. The results will contribute to the development of disease management methods to control this pathogen.

Key words: *Helianthus tuberosus*, *Sclerotinia*, white mold, pathogenicity, MCG

DETERMINATION OF FUNGAL DISEASES ON SEEDS AND PLANT OF PEANUT IN OSMANIYE

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Osmaniye is the most important province for peanut planting areas and productions amounts in Turkey. If the seed production, harvest, storage, in terms of plant health takes into consideration in peanut cultivation of Osmaniye, crop losses will decrease and contribute to the national economy. The study was carried out to determine fungal diseases in peanuts areas of Osmaniye in 2009. The study was performed as field trials and survey in six different farmer fields. In the study, plants were examined as a symptomatology from emergence to the harvest and samples of root, stem and leaf showing symptoms of disease were taken and used isolation studies. Crown rot (*Aspergillus niger*), stem rot (*Sclerotium rolfsii*) and leaf spot disease (*Cercosporidium personatum*) were determined in all field trials and survey areas. *Aspergillus niger*, *A. flavus*, *F. solani*, *F. oxysporum*, *F. sambucinum*, *F. semitectum*, *Rhizoctonia solani*, *Macrophomina phaseolina*, *Penicillium* sp. ve *Rhizopus stolonifer* were isolated on seed samples taken from the post-harvest and storage. As a results, fungal problems occurred in peanut cultivation areas were determined and *Aspergillus niger*, *Aspergillus flavus*, *Sclerotium rolfsii* and *Cercosporidium personatum* were identified as potential pathogens.

Key words: Peanut, fungal diseases, seed diseases, Osmaniye

REACTIONS OF TURKISH WHEAT LANDRACES TO YELLOW RUST IN 2013-2014 GROWING SEASON

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Abstract

Yellow rust caused by *Puccinia striiformis* is one of the important diseases affecting wheat yield and quality in Turkey. Landraces of wheat are important sources of useful genes for resistance breeding program. In this study 200 wheat landraces collected from different location were evaluated for adult plant reactions to yellow rust at Central Research Institute for Field Crops (Ankara-İkizce and Yenimahalle locations). The study was carried out two replication in the 2013–2014 growing season. Fields were inoculated with yellow rust population (virulent on Yr2, 6, 7, 8, 9, 24, 26, 27). Inoculum was applied as sprays in water and mineral oil. Yellow rust was scored in June and coefficients of infection (CI) were calculated. Genotypes which were CI value less than 30 were selected as resistant. Twelve (6%) genotypes were found resistant to local yellow rust population in both locations. These could be potentially new sources of resistance to yellow rust.

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DETERMINATION OF THE REACTIONS OF SOME BARLEY GENOTYPES DEVELOPED BY THRACE AGRICULTURAL RESEARCH INSTITUTE TO SCALD AND BARLEY LEAF STRIPE UNDER GREENHOUSE CONDITIONS

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Abstract

Barley is the second most cultivated crop after wheat in Turkey. Scald caused by *Rhynchosporium commune* and Barley leaf Stripe caused by *Drechslera graminea* reduce the yield and the quality of barley. Development and using resistant cultivars is the most economical way of controlling to the diseases. This study was performed at Central Research Institute for Field Crops (Ankara - Yenimahalle location) greenhouse condition. Seedling reactions of 45 barley genotypes were determined under greenhouse conditions to three isolates of scald and one isolate of barley stripe disease. In the greenhouse, for scald; plants were inoculated with the 3 single spore isolates obtained from different location at growth stage 11. Eighteen days after inoculation, evaluations were made on the leaves, using a 0-4 scale. For barley leaf stripe inoculation were made using a single spore culture with a modified sandwich test method. 2 months after inoculation evaluations were made after 2 months from inoculation following the Tekauz's procedure. There were differences among the reactions of the genotypes to the isolates of the fungi. Twenty one (47%), 17 (38%), 30 (67%) genotypes were found resistant to isolate 1, 2, and 3 of scald, respectively. Thirty three (73%) were resistant to barley leaf stripe and 10 (22%) genotypes were resistant to both scald and barley leaf stripe. This work enabled the identification of candidate lines resistant to scald and barley leaf stripe.

Acknowledgement: This study was financed and supported by General Directorate of Agriculture Research and Policy, Republic of Turkey Ministry of Food, Agriculture and Livestock (Grant no: TAGEM/TA/12/03/01/001).

THE REACTIONS TO YELLOW RUST OF SOME WHEAT LINES DEVELOPED BY ANTHER CULTURE

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Abstract

Turkey is the largest producer of wheat (*Triticum* spp.) in the world. One of the limiting factors for wheat production is the presence of fungal diseases, including yellow/stripe (*Puccinia striiformis*) rust. Development of resistant genotypes and use of genetic resistance are very important to control of the rust diseases. In this study 77 double haploid (development anther culture) lines and 9 standard cultivars were evaluated for adult plant reactions to yellow rust at Central Research Institute for Field Crops (Ankara-İkizce and Yenimahalle locations). The study was carried out with two replications in the 2013–2014 growing season. Fields were inoculated with yellow rust population (virulent on Yr 2, 6, 7, 8, 9, 24, 26, 27). Inoculum was applied as sprays in water and mineral oil. Coefficients of infection (CI) were calculated and values ≤ 20 were considered resistant. Forty four (58%) genotypes were found resistant to local yellow rust race/races in İkizce and Yenimahalle condition. These lines could be potentially new candidate cultivars of resistance to yellow rust.

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DETERMINATION OF THE REACTIONS OF SOME TURKISH *AEGILOPS* AND *TRITICUM* MATERIAL TO STEM RUST

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Abstract

Turkey is one of the origin centers of some plant species like *Aegilops* and *Triticum*. Looking for new sources for resistance, *Aegilops* and *Triticum* species were evaluated for seedling resistance to stem rust caused by *Puccinia graminis* f. sp. *tritici* at Central Research Institute for Field Crops (Turkey) in 2012. The accessions were represented by 6 *Aegilops* species (*Ae. biuncialis* (7 genotypes), *Ae. caudata* (5 genotypes), *Ae. columnaris* (8 genotypes), *Ae. crassa* (7 genotypes), *Ae. triuncialis* (9 genotypes), *Ae. umbellulata* (4 genotypes)), and 4 *Triticum* species (*T. dicoccoides* (3 genotypes), *T. dicoccon* (4 genotypes), *T. boeoticum* (4 genotypes), *T. urartu* (4 genotypes)). Material were inoculated with suspension of urediospores of stem rust population (virulent on *Sr5*, *21*, *9e*, *7b*, *6*, *8a*, *9g*, *36*, *9b*, *30*, *17+13*, *9a*, *9d*, *10*, *Tmp*, *Mcn* and avirulent on *11*, *24*, *31*, *38* in mineral oil (Soltrol 170) at Zadoks growth stage 12. Following inoculation, seedlings were placed in a dew chamber overnight at 20 to 22°C and then transferred to greenhouse adjusted at 20 to 25°C. Disease was scored according to 0-4 scale after 15 days. All material was susceptible to stem rust population.

Acknowledgement: This Study is financed and supported by General Directorate of Agricultural Research and Policy of the Ministry of Food, Agriculture and Livestock of Turkey (Project no: TAGEM/TA/12/03/01/001)

Key words: *Aegilops*, *Triticum*, Steam rust

DETERMINATION OF THE REACTIONS OF SOME TURKISH *AEGILOPS* AND *TRITICUM* MATERIAL TO YELLOW RUST

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Abstract

Turkey is one of the centers of origin of *Aegilops*, *Triticum* species. Yellow rust, caused by *Puccinia striiformis* the most common rust disease of wheat in Turkey. Looking for new sources for resistance, *Aegilops* and *Triticum* species were evaluated for seedling stage resistance to yellow rust at Central Research Institute for Field Crops (Turkey) in January 2012. The material for seedling stage test was planted in plastic pots. The material and the susceptible checks were sown in small pots and they were kept in the greenhouse until scored time. The accessions represented 6 *Aegilops* species (*Ae. biuncialis* (7 genotypes), *Ae. caudata* (5 genotypes), *Ae. columnaris* (8 genotypes), *Ae. crassa* (5 genotypes), *Ae. triuncialis* (9 genotypes), *Ae. umbellulata* (4 genotypes), 4 *Triticum* species (*T. dicoccoides* (3 genotypes), *T. dicoccon* (4 genotypes), *T. boeoticum* (4 genotypes), *T. urartu* (4 genotypes). Seedlings were inoculated with yellow rust population (virulent on Yr2, 6, 7, 8, 9). Inoculum was applied as sprays with mineral oil. Infection types (ITs) were recorded using the 0 - 9 scale at twice time on the 15th and 18th after inoculation. Three genotypes of *Ae. biuncialis* (TUR 00047, TUR 00307, TUR 00425), 3 genotypes of *Ae. columnaris* (TUR 00211, TUR 00490, TUR 01025), 1 genotype of *Ae. crassa* (TUR 01638), 8 genotypes of *Ae. triuncialis* (TUR 00002, TUR 00103, TUR 00252, TUR 00402, TUR 00704, TUR 01524, TUR 01730, TUR 01778), 1 genotype of *Ae. umbellulata* (TUR 00787), and 1 genotype of *T. boeoticum* (TUR 00871) were found to be resistant. Resistant genotypes will be incorporated into the Turkey breeding program as potential sources of resistance.

Acknowledgement: This Study is financed and supported by General Directorate of Agricultural Research and Policy of the Ministry of Food, Agriculture and Livestock of Turkey (Project no: TAGEM/TA/12/03/01/001)

Key words: *Aegilops*, *Triticum*, Yellow rust

DETERMINATION OF THE REACTIONS OF SOME TURKISH *AEGILOPS* AND *TRITICUM* MATERIAL TO LEAF RUST

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Turkey is one of the origin centers of some important plant species like *Aegilops* and *Triticum*. Looking for new sources for resistance, *Aegilops* and *Triticum* species were evaluated for seedling resistance to leaf rust (*Puccinia triticina*) at Central Research Institute for Field Crops (Turkey) in 2012. The accessions were represented by 6 *Aegilops* species (*Ae. biuncialis* (7 genotypes), *Ae. caudata* (5 genotypes), *Ae. columnaris* (8 genotypes), *Ae. crassa* (5 genotypes), *Ae. triuncialis* (9 genotypes), *Ae. umbellulata* (4 genotypes)), and 4 *Triticum* species (*T. dicoccoides* (3 genotypes), *T. dicoccum* (4 genotypes), *T. boeoticum* (4 genotypes), *T. urartu* (4 genotypes)). Materials were inoculated with suspension of urediospores of leaf rust population (virulent on Lr2c, 3a, 16, 12, 3ka, 11, 17a, 30, B, 10, 14a and avirulent on Lr1, 2a, 9, 24, 26, 19, 29, 36) in mineral oil (Soltrol 170) at Zadoks growth stage 12. Following inoculation, seedlings were placed in a dew chamber overnight at 18°C and then transferred to greenhouse adjusted at 18 to 22°C. Disease was scored according to 0-4 scale after 14 days. Three genotypes of *Ae. biuncialis* (TUR 00047, TUR 00307, TUR 00425), 3 genotypes of *Ae. columnaris* (TUR 00211, TUR 00490, TUR 01025), 1 genotype of *Ae. crassa* (TUR 01638), 8 genotypes of *Ae. triuncialis* (TUR 00002, TUR 00103, TUR 00252, TUR 00402, TUR 00704, TUR 01524, TUR 01730, TUR 01778), 1 genotype of *Ae. umbellulata* (TUR 00787), and 1 genotype of *T. boeoticum* (1 genotype; TUR 00871) were found to be resistant to leaf rust population. Resistant genotypes will be incorporated into the Turkish breeding program as potential sources of resistance.

Acknowledgement: This Study is financed and supported by General Directorate of Agricultural Research and Policy of the Ministry of Food, Agriculture and Livestock of Turkey (Project no: TAGEM/TA/12/03/01/001)

Key words: *Aegilops*, *Triticum*, Leaf rust

EFFECTS OF PATHOGEN AND ANTAGONIST INOCULATIONSON THE AMOUNT OF PHENOLIC COMPOUNDS IN TOMATO LEAVES

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Abstract

Phenolic compounds are important for plants' defense against pathogens. Pathogens as well as antagonistic microorganisms can induce phenolics accumulation in plant tissues. In this study, phenolic compounds in the leaves of tomato plants inoculated with two pathogens; *B. cinerea* and *F. oxysporum* f. sp. *lycopersici* (FOL), with or without mycoparasitic *Pythium* species; *P. acanthophoron*, *P. lycopersicum*, *P. oligandrum* and *P. paroecandrum*, were investigated. As a result of chromatographic analyses performed by using the leaf samples taken from tomato seedlings 12, 24, 48 and 72 hours after inoculation with FOL, 7 from the 12 standard phenolic compounds; catechin, chlorogenic acid, caffeic acid, epicatechin, syringic acid, p-coumaric acid and o-coumaric acid, were detected. It was also found that the significant increases were in the amounts of chlorogenic acid, caffeic acid and epicatechin and occurred 48 hours after inoculation. Chromatographic analyses performed by using the leaves of tomato seedlings inoculated with two pathogens and/or mycoparasites and taken 48 hours after the inoculations, epicatechin amounts had the most meaningful increases for all cultivars, when compared with the uninoculated plants. Mycoparasites caused increases in the amounts of phenolics especially in the resistant cultivars and more significant increases were obtained when they were inoculated with the pathogens. This showed that the mycoparasites could be effective to induce defence mechanisms in tomato plants. Among them, *P. oligandrum* was the most effective mycoparasite regarding the induction of phenolics.

Key words: *Solanum lycopersicum*, *Fusarium oxysporum* f. sp. *lycopersici*, *Botrytis cinerea*, *Pythium* spp., phenolics, HPLC

**STREPTOMYCIN SENSITIVITY LEVELS of *Erwinia amylovora* (Burr.) Winslow *et al.* STRAINS ON
POME FRUITS TREES IN BURSA and YALOVA**

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Abstract

In this study, the sensitivity levels to streptomycin were determined of 136 *Erwinia amylovora* strains which were identified by morphological, physiological and biochemical tests. In our study, 0.1, 0.3, 1, 3, 10, 30, 100 µg/ml doses of streptomycin were used. Bacterial cultures were grown on NA for one day, suspended in physiological saline water and the concentration adjuster to 10⁸ cfu ml⁻¹. Into the petri dishe with different doses of streptomycin, 4 repeating spread seedings were done for every dose by taking 0.1 ml and incubated for 48 hours in 27^oC and colonies were counted in every petri. These were used for controlling in NA without streptomycin. ED₅₀ values were determined in log-probit paper by calculating the percentage of improvement. The streptomycin ED₅₀ values (µg/ml); of strains are determined as; 2 of them (%1.4) are <0.1 µg/ml and high sensitive, 22 of them (%16.1) are between >0.1-0.3 µg/ml and sensitive, 111 of them (%81.6) are between >0.3-1 µg/ml and mid-sensitive, one of them (%0.7) is between >1-3 µg/ml and less sensitive. It was revealed with this study that there is a decrease in the sensitivity levels of *Erwinia amylovora* strains, obtained from Bursa and Yalova, to streptomycin.

Key words: *Erwinia amylovora*, sensitivity, ED₅₀, streptomycin

THE PREVALENCE OF MUMMY DISEASE IN THE QUINCE ORCHARDS OF EDİRNE, THE PATHOGENICITY OF PATHOGENS AND DETERMINATION OF RESISTANCE OF QUINCE CULTIVARS

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Abstract:

The objectives of this study were to determine; a) prevalence of mummy disease on quince cultivated in Edirne province, b) morphological characteristics of *Monilia* species isolated from pome and stone fruits infected by the pathogen and their pathogenicities on quince fruit c) the resistance of some important quince cultivars of our country to the pathogens. The isolates with different virulence degrees were also compared for mycelial growth rate and dry mycelial weight which were known as important factors for the penetration and growth into the plant tissue. Morphological characteristics, mycelia growth rate and dry mycelia weight were determined using V8 juice media. Agar plug of most virulent isolate was inserted to the incisions on quince fruits in the pathogenicity and resistance tests. Prevalence rate of the disease in the commercial orchards was 63 % and the disease rate was 13.32%. Characteristics of colonial growth and spore dimensions differed according to species and isolates. In the pathogenicity tests, there were differences among isolates for the lesion diameters on quince fruit. The largest lesion diameter was obtained with the inoculation of the isolate MON-17 isolated from the infected quince, followed by the isolate MON-14. These isolates caused significantly small lesion diameter on native wild quince when they were inoculated to three cultivars cv.Eşme, cv. Ekmek and native wild quince. High virulent isolates grew faster than the less virulent isolates and had high amount of dry mycelial weight. However no significant association was found between pathogenicity and mycelia growth, and mycelial dry weight.

Key words: Quince (*Cydonia oblonga*), Mummy (*Monilia linhartiana*), Prevalence, Pathogenicity, Resistance

DETERMINATION OF FUNGICIDE RESIDUES IN GRAPE LEAVES (CV. YAPINCAK) GROWN IN TEKİRDAĞ PROVINCE, BEFORE AND AFTER PICKLING

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Abstract:

The fresh and pickled leaves of grape (cv. Yapıncak), which was grown in Tekirdağ province, have been using for making 'dolma (traditional Mediterranean food)'. These leaves have been subjected to the fungicides with active ingredients with myclobutanil, triadimenol, captan, and folpet to control downy mildew, powdery mildew and Phomopsis cane and leaf spot until their harvest time. In this study, the residues of these fungicides were determined in the fresh and pickling leaves of the cv. Yapıncak collected from vineyards of the growers at Central and Şarköy distinct of Tekirdağ province. To make pickling leaves, leaf samples were put in the water containing salt (NaCl) of 10% and they were subjected to fermentation at room temperature for 3 months. Fungicide residues in the samples were analyzed by gas chromatography/mass spectrometry (GC/MS). The residue of triadimenol was present in most of the fresh leaf samples. The residue of Folpet was observed in few of the samples. The residues of these fungicides were decreased in the samples pickled leaves. However, the residue of triadimenol in some of pickled leaves was higher than maximum residue limits (MRL). This study showed that growers must be careful for the use of triadimenol during control of powdery mildew in the cv. Yapıncak.

Key words: Edible grape leaf, Fungicide residue, Pickling

RESISTANCE OF WHEAT LANDRACES TO YELLOW RUST IN 2013-2014 GROWING SEASON

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Abstract

Yellow rust caused by *Puccinia striiformis* one of the important diseases affecting wheat yield and quality in Turkey. Landraces of wheat are important sources of useful genes for resistance breeding program. To find new sources for resistance to yellow rust, 2142 bread wheat and 733 durum wheat landraces collected from different location in Turkey within the framework of International Winter Wheat Improvement Program (IWWIP) were evaluated at milk stage during 2013-2014 growing season. The study was carried out at Ankara-İkizce research station of Central Research Institute for Field Crops. The genotypes at booting-heading stage were inoculated with yellow rust population (virulent on Yr 2, 6, 7, 8, 9, 24, 26, 27) in April and May. Yellow rust was scored in June when the susceptible check cv. Little Club reached 90S-100S and coefficients of infection (CI) were calculated. Genotypes which were CI value less than 20 were selected as resistant. 196 (9%) bread wheat and 267 (36%) durum wheat genotypes were found resistant to local yellow rust population. These could be potentially new sources for resistance to yellow rust.

Key Words: Yellow rust, wheat landraces, Turkey

Acknowledgement: This study was financed by General Directorate of Agriculture Research and Policy, Republic of Turkey Ministry of Food, Agriculture and Livestock (TAGEM-13/AR-GE/19).

WHEAT YELLOW LEAF SPOT (TAN SPOT) DISEASE REPORT OF AZERBAIJAN REGIONS

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Abstract

In some countries where is wheat cultivated, biological adversities are led by foliar disease. Wheat yellow leaf spot disease a serious problem in many areas where the wheat is principal crop. Disease caused by saprophytic fungus *Pyrenophora tritici repentis* (*Drechslera tritici repentis*) and induced losses that reached from 20%-40% of the yield and its destructive on durum, winter and spring wheat. In 2013-2014 growing period tan spot developed in favourable environment conditions of Azerbaijan grain cultivated regions. The prevalence of the yellow spot of wheat found in all research stations. But infection rate is very different levels. All leaf and stem infection samples prepared according to methods of phytopathological analyses. The first time we are studying growth of the pathogen objects yellow leaf spots (*Pyrenophora tritici repentis*) colonies in the laboratory conditions. *P. tritici-repentis* colonies were observed for anatomic and morphological characterization. It is necessary for pathogen biodiversity and pathotype diverse, especially, prevalence areas of pathogens. It was revealed that in 2012 year Shaki, Zakatala, Terter regions is prevalence areas of its pathogen, and differentiated gray and black colony colour from the other regions. (V-juice agar medium -15%). In 2014 vegetation season yellow spot infection area is very expanded. Cultivated varieties Kroshe, Dagdash, Gonen, Factor, Tanya, Kizil bugda, Kirmizi bugda, Fatima, Agali and other local and introduction varieties to show different reaction from moderately resistant to susceptible. Some infected varieties are damaged stems, flags and spikes.

OBSERVATION BARLEY FUNGAL DISEASE INTERNATIONAL NURSERIES FOR BREEDING PROGRAM IN AZERBAIJAN

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In our studies carried out local and introduction material observation nursery of barley (*Hordeum vulgare*). Our studies show that 2013-2014 research years is very favourable conditions for barley fungal diseases. Common barley diseases is observed irrigated or non-irrigated zones of Azerbaijan region. Scald (*Rhynchosporium secalis*), Net blotch (*Pyrenophora teres*), Spot blotch (*Pyrenophora graminea*), Leaf rust (*Puccinia hordei*), Loose smut (*Ustilago tritici*), Covered smut (*Ustilago hordei*), Powdery mildew (*Blumeria graminis f. sp. hordei*) the major diseases of barley of our studies and all diseases is spread of which is the all barley growing areas Azerbaijan. 1st GBYT, İBYT –W, 1stGSBSN (Set2), 1stGSBSN (Set5), İBYT-W, 1stGSBYT (Set7) -580 samples was scored disease severity and determined resistant and durable hybrids and lines, selected positive economic value and good evidence for head and leaf fungal diseases in field condition (Absheron). Other nurseries is located different agro-climatic zones (Shaki, Zakatala, Tartar, Gobustan, Jalilabad, Ujar) there is also spread different rate diseases severity. Total 2138 international nurseries lines from ICARDA 1stGBON, İBYT-Hİ, İBYT-Hİ, İBYT-W (set 32), İBON-W's samples also studied other breeders.

FIRST REPORT OF BETWEEN ALFA-ALFA (*Medicago sativa* L) RUST SEVERITY AND SOME YIELD INDICATORS

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Abstract

Forage legumes play an essential role in the productivity and sustainability of the world production system. Their symbiotic association with rizobium makes the atmospheric nitrogen available for themselves and other crops in the rotation. Alfa-alfa (*Medicago sativa* L) is considered one of the major forage legumes crops of the world in too, Azerbaijan. In our condition alfa-alfa harvested 3-4 times for year. In this case alfa-alfa is important as profitable green and dry feed for cattle-breeding. Last years we are observed alfa-alfa fungal disease and some pests which is the influence some indicators of yield. Be revealed that alfa-alfa is only infected rust diseases (*Uromyces striatus* J. Schroet., *U. striatus* var. *medicaginis* (Pass) Arthur.) in the 2013 year in (observation nursery) Absheron research station. We are find out the first time between rust disease infection severity, seed yielding and mass of green and dry part of plant. Alfa-alfa rust infected leaf, branches and green beans. It were found relation between more infected samples and most biomasse. But its don't reduce seed production than in earlier years yield indicators. Only two samples is infected strongly and was necrosis, its seed productivity is very low than non-infected checks.

COPPER SULPHATE SENSITIVITY of *Acidovorax citrulli* CAUSAL AGENT of WATERMELON FRUIT BLOTCH DISEASE

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Abstract

Bacterial fruit blotch of watermelon caused by *Acidovorax citrulli* (Schaad et al. 1978) Schaad et al. 2009 comb nov, in an economic important disease of watermelon growing areas in the world including Turkey. The disease was determined in 2005 firstly, and then the major outbreaks were observed in 2009 and 2010 in the Eastern Mediterranean region. Contaminated areas have been quickly quarantined by the Ministry of Food, Agriculture and Livestock. Despite the absence of registered plant protection products against fruit blotch disease in Turkey, plant protection products containing copper compounds are used intensively against foliar fungal pathogens from nursery to field. In this study the sensitivity levels to copper sulphate were investigated of 25 *Acidovorax citrulli* strains which were identified by traditional methods and species specific PCR. In study 30, 100, 200 and 300 µl/ml doses of copper sulphate were used. After *Acidovorax citrulli* strains were grown on King B medium, it is suspended in physiological saline buffer and concentration adjusted 10⁸ cfu/ml. 100 µl *Acidovorax citrulli* suspension were spread into the petri dishes, four repetitive, containing different doses of copper sulphate and incubated for 48 hours in 26°C. As a result of assessment, 9 strains which isolated from Adana province were grown on medium containing 30 µl/ml copper sulphate, but they weren't grown the others copper sulphate doses. 16 strains which isolated from Osmaniye province were grown medium containing 30, 100 and 200 µl/ml copper sulphate but these strains weren't grown 300 µl/ml copper sulphate dose. As results that, while 9 strains were susceptible 100 µl/ml dose copper sulphate, 16 strains were susceptible to 300 µl/ml copper sulphate dose. This situation indicated that, the chemical compounds containing copper shouldn't use alone against the foliar diseases on watermelon, alternative control methods and alternative chemicals should be integrated into the disease management programs.

Key words: *Acidovorax citrulli*, sensitivity, copper sulphate

DYNAMICS OF DISTRIBUTION OF THE CAUSE AGENT OF POWDERY MILDEW *BLUMERIA GRAMINIS TRITICI* ON WHEAT DURING 2005-2009

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Abstract

Powdery mildew is one of the most important diseases on wheat in regions with cool and moderate climate. Depending on the climatic conditions, yield losses may vary from 5 % to 45 %. The harmfulness of the pathogen is dependent both on the climatic factors and on the resistance of the cultivars. The dynamics of development and distribution of *Blumeria graminis tritici* in the region of Dobrudzha Agricultural Institute was followed during 2005 – 2009. Twenty lines and varieties of wheat were involved in the investigation. The dynamics of propagation of the pathogen's population in the wheat crop was highly variable over years according to the climatic conditions and the presence of virulence in the distributing population of the pathogen. Significant propagation was observed in the individual years when the maximum temperatures were over 10 °C. When temperatures exceed 25 °C, the formation of conidiospores ceased gradually. Regardless of the variable conditions over the investigated years, the observation is that there is predominance of certain virulence, which is an indication that there is effect of the genetic potential for resistance of the cultivars as well. Highest attacking rate was registered in the populations of the pathogen with virulence V-1, V-2+, V3c, V-4a, V-4b, V-6, V-7, V-8, V-2+8 and V-Mil. The virulent populations V-2+6, V-2+4+6, V-5+6 and V- Mld had low rate of propagation.

Key words: Powdery mildew, *Blumeria graminis tritici*, Virulence, Pathogen, Wheat

POSSIBILITIES FOR CONTROL OF CORKY ROOT (*PYRENOCHAETA LYCOPERSICI SCHN., GERL.*) IN TOMATO GROWN IN CULTIVATION FACILITIES

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Abstract

A study for establishment of the effect of variety and fertilization on the index of infestation by corky root (*Pyrenochaeta lycopersici Schn., Gerl.*) in tomato plants grown in cultivation facilities was carried out. The experiment was performed in the conditions of natural infestation with 16 tomato varieties and lines at three systems of fertilization – mineral, integrated and organic. Effective microorganisms were applied additionally in the variants with integrated and organic production (EM). The studied varieties were divided in three groups depending on the susceptibility to the agent of corky root: with index of infestation 25% - 3 varieties, up to 50% - 6 varieties and over 50% - 6 varieties. The lowest index of infestation is recorded in the variants with integrated and organic production including the application of vermicompost, rock phosphate and EM. The yield recorded in this variant was lower compared to the variant with mineral fertilization but the differences were not mathematically significant.

Key Words: *Pyrenochaeta lycopersici*, tomato variety, vermicompost, effective microorganisms, yield

PREVALENCE OF CEPHALOSPORIUM STRIPE (HYMENULA CERALIS) IN THE EASTERN MEDITERRANEAN REGION OF TURKEY

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Abstract

Wheat growing areas of Adana, Mersin, Hatay, Kahramanmaraş, Gaziantep, Kilis and Osmaniye were investigated disease caused by *Hymenul ceralis* in 2013-2014. In both years, the disease was not found except Adana province. The disease was detected only in a particular area in Aladağ district of Adana in 2013. In 2013, it was disseminated in all wheat cultivated fields of Aladağ whereas no record of the disease was found in 2014 since no wheat was cultivated.

Key Words: Wheat, Cephalosporium stripe, Prevalence

SURVEY OF WHEAT POWDERY MILDEW (*ERISYPHE GRAMINIS*) IN CUKUROVA

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Abstract

Wheat growing areas of Mersin, Adana, Hatay and Osmaniye, was investigated for the prevalence of powdery mildew caused by *Erysiphe graminis* in 2013-2014. Powdery mildew was determined as one of the most widespread fungal diseases with rust and septoria leaf spot in these provinces. In 2013, the rate of powdery mildew was recorded as 84, 73, 58 and 79% in the provinces, respectively. In 2014, these rates were found as 86, 75, 64, and 81 % in the provinces, respectively. It was observed that disease symptoms were reached up to the spikes in the areas where no fungicide applications were done. On the other hand, the disease was much spreaded in the dry year of 2014.

Key Words: Wheat, powdery mildew, Prevalence

PCR-BASED DETECTION OF THE FUNGAL PATHOGEN *SCLEROTIUM ROLFSII* CAUSING SOUTHERN BLIGHT IN TOMATO

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Abstract

Tomato is produced in Turkey a total of 11 003 433 tonnes. This consolidates its position of the fourth largest producer of tomatoes, after China, India, United States in 2011. Fungal diseases are the most important limiting factor during tomato production. *Sclerotium rolfsii* Sacc. is an omnivorous, soil borne fungal pathogen affecting a wide range of agricultural and horticultural crops. At least 500 species across 100 families distributed over a wide geographic range are susceptible to *S. rolfsii*. The wide host range, which includes tomato, and prolific growth of the pathogen are attributed for the economic losses. The conventional method to detect *Sclerotium rolfsii* have often relied on interpretation of symptoms, biochemical or morphological identification, usually following isolation and culturing of the organism *in vitro* and sometimes on further characterization based on pathogenicity tests. Although these methods are fundamental to diagnostics, the accuracy and reliability of these methods largely depend on skilled taxonomical expertise. In addition, diagnosis requires a culturing step, which is time consuming and labour intensive. Furthermore, identification based on these culturing techniques is considered relatively inaccurate and unreliable. In contrast, more recently developed methods that are based on molecular approaches such as polymerase chain reaction is increasingly being used to detect and identify *S. rolfsii*. PCR method is rapid and can be used for detecting presence of the fungus in the soil or planting material, therefore allowing implementation of early control measures. During summer 2013-2014, tomato stem and roots showing a fan-like mycelial growth at their surface and severe soft rot symptoms were observed in a traditional tomato at Aegean region (West of Turkey). Fungal isolation revealed the involvement of *Sclerotium rolfsii* in this decay. Pathogenicity of the isolates was confirmed by inoculating healthy tomato plants. *S. rolfsii* was isolated from two naturally infected plant parts; stems and roots of tomato in İzmir and Balıkesir provinces after the 2013/2014 cropping season. Pure cultures of the final isolates were maintained on PDA slants in bottles and kept in the refrigerator until required. Large white colonies were picked and confirmed by colony PCR for the presence of insert. The isolated *Sclerotium rolfsii* DNA was amplified using SSU-F/SSU-R1 primer pair. PCR reaction using the SSU-F/SSU-R1 primer pair, yielded single amplicon of ~500 bp in all the two isolates of *S. rolfsii*. Future studies might involve detailed comparison of morphology, physiology and sequence data. To our knowledge, the PCR-based detection of southern blight (*Sclerotium rolfsii*) in tomato is reported first time in Turkey.

Key words: Tomato, PCR, *Sclerotium rolfsii*

SCREENING OF SOYBEAN VARIETIES FOR RESISTANT TO *MACROPHOMINA PHASEOLINA* (TASSI) GOID

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Abstract

Charcoal rot is serious when stress conditions such as excessive heat or drought follow periods of good growth. The fungus is reported to be soil, seed and stubble borne. The fungus can survive for more than 10 months under dry soil conditions. Charcoal rot, caused by *Macrophomina phaseolina*, significantly reduces yield in second crop soybean more than most other diseases in the Adana, Turkey. There are no commercial genotypes marketed as resistant to charcoal rot. The reaction of soybean varieties to charcoal rot under field conditions in Doğankent, Adana was evaluated to suggest an alternative strategy for evaluation and selection of resistant germplasm. Out of 33 soybean varieties screened for their resistance against *M. phaseolina* in Doğankent, Adana experiments on naturally in second crop soybean field in 2013. Charcoal rot scores were measured using a 1–5 scale. According to results, 6 varieties (4 no infection) were found to be highly resistant, 2 varieties resistant, 8 varieties moderately resistant, 5 varieties moderately susceptible, 12 varieties susceptible. Genetic resistance is the most important strategy for control, since it is a cheap and easy. The idea of developing common soybean cultivars that produce high yields and show resistance to biotic (diseases, insects, weeds) stresses over is attractive to soybean breeders. Thus, it is important to establish appropriate criteria for quick and efficient selection of resistant germplasm. Also, the disease is controlled by managing crops to minimise plant stress.

Key Words: *Macrophomina phaseolina*, Charcoal rot infestation, Soybean, resistance, screening

USE OF PREDICTING MODELS TO FORECAST THE APPEARANCE OF PLANT DISEASES

Thomas Thomidis

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Abstract

The system of precision agriculture has been introduced in European countries in the last decade of the 20th century. It spreads rapidly mainly in order to reduce chemical inputs (pesticides-fertilizers) in agricultural industry. So far, the introduction of this system in agriculture demonstrates the significant contribution to the protection of consumer health, to produce quality and safe agricultural products, to increase the economic performance of farm and environmental protection. Plant protection is probably the most important and also the most difficult part of these systems. In particular, regarding the management of pests and diseases, forecasting models assist producers in estimating the possibility of disease in their crops and in the selecting and timing of preventative applications. The aim of this study was to evaluate the accuracy of weather-driven models for predicting infection by *Plasmopara viticola*, *Botrytis cinerea* and *Erysiphe necator* in vineyard located in Giannakochori Naoussas, Macedonia, Greece. A spray programme applied based on the models index was compared with the conventional spray programme applied by growers. The results showed that the use of the model for scheduling spray applications reduced the number of sprays relative to the conventional spray programme while achieving similar levels of disease control. This work indicated that the forecasting model can be used to predict infection by *Plasmopara viticola*, *Botrytis cinerea* and *Erysiphe necator* and to schedule fungicide applications. Thus, growers in Greece should spray their vineyards only when the model predicts a risk for infection. Further investigations should be conducted to correlate the level of risk with by *Plasmopara viticola*, *Botrytis cinerea* and *Erysiphe necator* incidence in order to determine when fungicide sprays are economically justified.

Key words: *Botrytis cinerea*, disease forecast model, *Erysiphe necator*, *Plasmopara viticola*, vineyard

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PLANT PROTECTION PROBLEMS AND APPLICATIONS IN TEKİRDAĞ VITICULTURE

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Abstract

Tekirdađ provinces are important for table and wine grape cultivation in viticulture. In this region which has a long-established culture of viticulture, each year crop losses have been seen in varying proportions due to problems of plant protection. The amount of damage varies depending on the climate conditions. In process of time elapsed since 2010, rainfall regime and period hovered outside the normal season. Especially the first six-month period of 2014, more rain and hail has been seen. It is due to damaged most of the products. With interruption of cultural applications and the other practices because of rainfall, especially diseases and weed control has become difficult. In this study we explain viticulture problems caused by plant protection (diseases, pests and weeds) in Tekirdađ provinces in the last three years.

Key words: Viticulture, Plant Protection Problems, Tekirdađ

PLANT PARASITIC NEMATODES ASSOCIATED WITH LENTIL (*LENS CULINARIS* L.) AND CHICKPEA (*CICER ARIETINUM* L.) GROWING AREAS IN ADIYAMAN PROVINCE, TURKEY

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Abstract

In this study, plant parasitic nematodes determined in lentil (*Lens culinaris* L.) and chickpea (*Cicer arietinum* L.) growing in Adıyaman (Turkey) were examined as faunistically and taxonomically. Nematode species which were obtained from thirtynine soil and root samples (18 samples for lentil and 21 samples for chickpea) were taken during March to May in 2010-2011 and samples taken from eight towns (Besni, Gerger, Gölbaşı, Kahta, Samsat, Sincik, Tut and Adıyaman Central) were measured and identified by preparing their permanent preparations. The descriptions, synonyms, possible variations, distribution, habitats and literature records of each species are presented in this study. As a result of the study, totally 13 genera belonging to 8 families of 6 superfamilies (Tylenchoidea, Hoplolaimoidea, Aphelenchoidea, Dolichodoroidea, Dorylaimoidea and Anguinoidea) of order of Tylenchida, Dorylaimida and Aphelenchida were determined. This was the first record since there was no literature record regarding to the nematodes in Adıyaman of lentil and chickpea growing area. The most common nematode genera in this study are *Ditylenchus* spp., *Aphelenchus* spp. and *Longidorus* spp. in lentil and *Ditylenchus* spp., *Pratylenchoides* spp. and *Pratylenchus* spp. in chickpea respectively.

Key words: Plant parasitic nematodes, nematofauna, lentil, chickpea, Adıyaman, Turkey

STUDY OF THE ARTHROPODOFAUNE IN TWO MEDIUMS: CULTIVATED AND NATURAL IN THE AREA OF DJANET (TASSILI NATIONAL PARK SOUTH ALGERIAN).

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Abstract:

The present study relates to the arthropodofaune in two mediums, cultivated and natural in the area of Djanet. So a qualitative and quantitative inventory is carried out during two seasons, summer and winter. Three sampling procedures are used, namely the pots Barber, the sweep net, the yellow plates. On the whole, 4480 individuals are inventoried, distributed on 191 species of arthropods, 4 classes, 21 orders, 108 families, in four stations of studies, namely the station of Lokmane and El Mihane for the cultivated medium and the station of Teghargharte and Iffoutten for the natural environment. The full number of species of arthropods captured by the Barber pots is of 112, with predominance about Hymenoptera with a rate of 68.67%. The use of the sweep net, one could capture 65 species of arthropods. The order of Orthoptera is captured the most with a rate of 36.21%. The yellow plates made it possible to capture 82 species of arthropods. The order of Diptera is attracted the most by this type of trap with a rate of 37.99%. Orthoptera which one could inventory in the area of Djanet are 17 species, distributed between 7 families and 2 orders, whose species *Tridactylus variegatus* is most abundant.

Key words: Arthropodofaune, *Schistocerca gregaria*, Djanet, cultivated medium, natural environment, Orthoptera, Barber pots, sweep net, yellow plates.

CHARACTERIZATION OF POWER ACCUMULATOR OF XANTHORIA PARIETINA AND HYLOCOMIUM SPLENDENS CONTAMINATED WITH LEAD AND IMPACT ON THEIR PHYSIOLOGY

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ABSTRACT

Our work concerns the characterization of power accumulator two species, a lichen species "Xanthoria parietina" and another foam species "Hylocomium splendens" taken in the region of Bir El Djir "Oran." In the laboratory, these two species were infected with different concentrations of lead nitrate to determine firstly the ability of plants to accumulate lead and secondly the impact of the latter on some physiological parameters of these plants (chlorophyll, proline). The results show that both species have a high capacity to accumulate pollutants "Lead" in their tissues, causing disruption of metabolism including an increase in pH, the proline content and decreased chlorophyll content, by consistent they can be considered as excellent indicators of organic pollution.

Key words: Lichens - foams - Lead - Power battery, Oran.

TOXICITY OF AQUEOUS EXTRACTS OF "DATURA STRAMONIUM L" AND "URGINEA MARITIMA L" ON MELOIDOGYNE LARVAE (NEMATODA-MELOIDOGYNIDAE)

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Abstract:

The root knot nematode "*Meloidogyne*" are one of major factors limiting vegetable crops productivity. Chemical control is the most frequently used, but it is not able to provide a solution to the problem posed by these parasites. In order to develop alternative control strategies for chemical means and protect the environment and cultures we conducted this study. It aims to assess the toxicity of aqueous extracts of two medicinal plants "*D. stramonium*" and "*U. maritima*" in vitro on *Meloidogyne* larvae (l2). We tested six different doses for each extract (20, 40, 60, 80, 100 and 120 g / l). Juveniles are exposed for three times 24, 48 and 72 hours. The results revealed a nematicide effect of aqueous extract of "*D. stramonium*" and "*U. maritima*" on *Meloidogyne* larvae. However, the biocidal effect varies significantly depending on the organs tested, concentrations and immersion time. The aqueous extract from the mixture (leaves/roots) of *U. maritima* and (fruits/leaves) of *D. stramonium* showed a higher toxicity; 100% mortality was recorded from dose 60g / l after 72 hours of exposure.

Key words: Aqueous Extract, *Datura stramonium*, *Urginea maritima*, *Meloidogyne*, Nematicidal Activity,

**BIOMETRIC ANALYSIS OF POPULATIONS OF *SCHISTOCERCA GREGARIA* AND *LOCUSTA MIGRATORIA*
IN *CINERASCENS* REGION OF ADRAR (ALGERIA)**

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Abstract:

Locust and Migratory locust locusts are two that are a constant threat to Africa and southwest Asia. To address this problem, the plant protection services are resorting to the use of harmful chemicals which impact on the environment is no longer evident; thus, scientific interest was directed towards preventive control, It is in this light that guides our work aims at a better understanding of these locusts through an etho-ecological study. This study is performed in the Tsabit station Adrar region. This region has experienced over the past decade the massive installation of irrigation pivots for cereal crops and vegetable crops. This has encouraged the development of the phytophagous insect fauna. Samplings were made using a sweep net and a palm date palm for maximum individuals *Schistocerca gregaria* and *Locusta migratoria* encountered at random. To determine their phasal states we calculated their morphometric indices. The evaluation of the density and the analysis of the biometrics of two locust species have revealed that the two locusts are the dissociens transient state tending towards the solitary state.

Key words: *Schistocerca gregaria*, *Locusta migratoria*, biometric analysis, Tsabit, Algeria.

**PLANT PARASITIC NEMATODES ASSOCIATED WITH STRAWBERRY GROWING AREAS IN SAKARYA
AND ELAZIĞ DISTRICT, TURKEY**

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In this study, plant parasitic nematodes determined in strawberry (*Fragaria* spp.) growing in Sakarya and Elazığ (Turkey) were examined as faunistically and taxonomically. Nematode species which were obtained from forty soil and root samples were taken during June and August in 2013 and samples were measured and identified by preparing their permanent preparations. The descriptions, synonyms, possible variations, distribution, habitats and literature records of each species are presented in this study. As a result of the study, totally 14 species belonging to 10 genera of 7 families of superfamilies, Tylenchoidea, Hoplolaimoidea and Anguinoidea of order of Tylenchida and Aphelenchida were determined. This was the first record since there was no literature record regarding to the nematodes in Elazığ and Sakarya of strawberry growing area. The most common nematode species in this study are *Filenchus thornei* Andrásy, *Aphelenchus avenae* Bastian, *Geocnamus brevidens* Allen, *Boleodorus thyllactus* Thorne and *Pratylenchus thornei* Sher and Allen respectively.

Key words: Plant parasitic nematodes, nematofauna, strawberry, Sakarya, Elazığ, Turkey

DIVERSITY OF PREY STARLING STURNUS VULGARIS CAPTURED IN THE EASTERN PART OF THE MITIDJA-ALGERIA

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In the region that includes the Mitidja plain and Great Kabylie, the European starling is considered a major pest of the olive tree especially the cultivated one. It is a question of specifying the trophic components of this species in Mitidja which belongs to its wintering area. The study of the diet of the European starling by the analysis of the contents of the digestive tracts of *Sturnus vulgaris* captured in the oriental part of Mitidja (Algeria) highlights 157 sorts distributed between 1100 individuals. Among which Invertebrates distributed between 5 classes : *Gastropoda*, *Arachnida*, *Myriapoda*, *Crustacea* and *Insecta* which are the most sought by the bird with 240 indiv. to Rouiba (88.6 %), 159 indiv. to El Alia (77.2 %) and 450 indiv. to Larbaâ (69.8 %). These insects belong to 9 orders : Blattoptera, Orthoptera, Dermaptera, Mallophaga, Heteroptera, Homoptera, Coleoptera, Hymenoptera and Diptera. Coleoptera is the most consumed by the starling (401 indiv.) (47.1 %) follow by Hymenoptera with 351 indiv. (41.3 %). Insects social as Formicidae with *Tapinoma nigerrimum* (92 indiv.) and *Messor barbara* (84 indiv.) are strongly ingested. Among the botanical species those who dominate are fruits of *Pistacia lentiscus* (111 seeds) and olives (49 seeds). In the Starling's food menu, the vegetal part is mainly not olives, but dominated by Pistachio-mastic fruits. As for the animal part, far more important than the vegetal part, is mainly insects Coleoptera and Hymenoptera. A better understanding of the diet of this Sturnidae will improve the methods to fight against it.

Key words : European starling, *Sturnus vulgaris*, *Olea europaea* , food intake, wintering area, Algeria

THE UTILISATION OF ELECTROSTATIC NOOZLE TUNNEL PULVARIZATOR AND TURBO ATOMISER ON PEST AND DISEASE MANAGEMENT IN VITICULTURE

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Abstract:

Considering factors such as the right application method of pesticide and the selection of eligible pulverization machine, the harmful effects of the chemical scan be reduced to the minimum level. Different machines have already been used in viticulture and researches have already been done to develop new techniques against minimizing undesirable drifts of the pesticides. This Project was carried out to obtain highest yield and quality by the idea of achieving effective pulverization by application of less pesticide to all selected areas. On this purpose the aim of this Project was to evaluate the performance of turbo atomizer and electrostatic nozzle tunnel pulverization machine. Observations were carried out by monitoring Powdery mildew, mildew and grapevine moth damage regularly and the performance of both these machines in the chemical pest management was assessed. After the analysis of the data with t test insignificant results were obtained from applications against powdery mildew, downy mildew and grapevine moth. On the other hand compared to performances of both machines Turbo atomizer was found more effective than Tunnel sprayer against powdery mildew in 2008. Insignificant results were obtained from the performance experiments of all machines against pest and diseases in 2009. As a result of all experiments Tunnel sprayer was determined as more effective than turbo atomizer against powdery mildew management on leaf and cluster. These results indicated that Electrostatic Nozzle Tunnel Sprayer is eligible machine to utilize in the management of pest and diseases of grapevines.

Key Words: Electrostatic Nozzle Tunnel Type Pulverization Machine

STUDY OF THE BIOLOGICAL IMPACT OF THE EXTRACT OF *DATURA INNOXIA* ON *SCHISTOCERCA GREGARIA* FEEDING ACTIVITY

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Abstract

Interrupt the dynamics of a locust plague involves excessive use of chemical inputs. These insecticides are very persistent in soil, groundwater, plant tissues and animal fats which constitute a threat to the environment and public health and a brake to the development and culture. Already, the insecticidal effects of some plants have been proven. In this context adds our study is to measure the effect of the aqueous extract of *Datura innoxia* on the feeding activity of the larvae of the fifth stage of *Schistocerca gregaria*. The measured parameters are: Ingéra (ingested), Egesta (excrement), consumption index (CI) and the growth index (Grl).The results showed that the extract significantly reduced the amount of food ingested treated individuals and consumption index (CI) and growth (Grl) are estimated to be 0.06 and 0.027; whereas in controls they are 0.12 and 0.057.

Key words: Biological control, biopesticides, plant extracts, locust.

COCCINELLIDAE (COLEOPTERA) SPECIES DETERMINED IN THE VINEYARDS OF IZMIR AND MANISA

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Abstract:

The study was carried out in Menemen and Kemalpaşa districts of İzmir Province and in Center, Alasehir, Ahmetli, Salihli, Sarıgöl, Saruhanlı and Turgutlu districts of Manisa Province between 2009 and 2011 years in order to find out predatory species belonging to Coccinellidae family in Sultani Cekirdeksiz (*Vitis vinifera* L.) vineyards. The sampling was done in 4 vineyards at every district and in 25 vine trees at every vineyard between April-September, weekly. Coccinellidae adults were collected by beating. Samples were taken into poison bottle until preparation. As a result of the study, 970 adults were collected from Coccinellidae family. A total of 18 Coccinellidae species was recorded. According to the intensity and prevalence frequency of species; *Stethorus gilvifrons* (Mulsant) (852 individuals), *Propylaea quatuordecimpunctata* (L.) (39 individuals), *Coccinella septempunctata* (L.) (25 individuals), *Synharmonia conglobata* (L.) (17 individuals) *Scymnus apetzii* Mulsant (17 individuals), *Scymnus frontalis* (Fabricius) (5 individuals) and *Scymnus rubromaculatus* (Goeze) (3 individuals) were found respectively. On the other hand, adults of *Myrrha octodecimguttata* (L.) (2 individuals) *Harmonia quadripunctata* (Pont.), *Hippodamia (Adonia) variegata* (Goeze), *Scymnus bivulnerus* Capra, *Scymnus interruptus* (Goeze), *Scymnus inderihensis* Mulsant, *Adalia fasciatopunctata revelierei* Mulsant, *Adalia bipunctata* (L.), *Scymnus (Pullus) flagellisiphonatus* (Fürsch), *Psyllobora vigintiduopunctata* (L.) and *Coccinella undecimpunctata* (L.) were quite rare (**1 individual per species**). *S. gilvifrons* was determined as the most common and abundant species in Center (170 individuals), Kemalpaşa (112 individuals), Salihli (108 individuals), Turgutlu (106 individuals), Saruhanlı (88 individuals), Alasehir (83 individuals), Menemen (83 individuals), Sarıgöl (70 individuals) and Ahmetli (32 individuals) districts respectively. Abundance and composition of species according to the districts were determined. Kemalpaşa has the highest number (11 species) followed by Alasehir (8 species), Center (8 species) and Salihli (7 species), respectively.

Key Words: Sultani seedless grape, Coccinellidae, İzmir, Manisa.

TOXIC ACTIVITY OF THE ENTOMOPATHOGENIC FUNGUS *M.ANISOPLIAE VAR ACRIDIUM* "GREEN MUSCLE" ON THE MIDGUT OF THE DESERT LOCUST *SCHISTOCERCA GREGARIA* (FORSKÅL, 1775).

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Abstract:

Locust is causing significant losses in agricultural production in the countries concerned by the invasion. Up to the present control strategy has consisted only of the spreaders chemicals; they have proven harmful to the environment. For this, a new control method appeared it comes to the biological control based mostly by using microorganism. It is in that sense is we've made our contribution by the use of an entomopathogenic fungus *M. anosopliae var acridium* "Green Muscle" on part of the digestive tract the larval midgut of fifth instar locust *Schistocerca gregaria* (Forskål, 1775). Preliminary test on the study of the pathogenicity of *Metarhizium anosopliae var acridium* biocontrol agent, was conducted in the laboratory on L5 *S. gregaria*, on which we inoculated treatment in the digestive tract and it administrant 20µl of entomopathogenic solution orally at a dose $DL_{50} = 3.25 \times 10^7$ sp./ ml (median lethal dose estimated at earlier), 5 days after treatment individuals are sacrificed. After dissection of the digestive tract and Recurring we conduct histological sections and according to this technique and Martoja Martoja-Pierson (1967). Microscopic observation revealed alterations in the midgut resulting in destruction of the intestinal epithelium, the junction of these cells has been disrupted.

ROLE OF THREE ESSENTIAL OILS IN THE CONTROL OF A PEST OF WHEAT STOCKS RHIZOPERTHA DOMINICA F. (COLEOPTERA: BOSTRYCHIDAE).

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Abstract

Managing storage infrastructure should aim to diminish the activity of the deterioration factors in these environments. Among these factors, insects are a major cause of deterioration in stocks. the control of insects in wheat storage places is focused on the application of synthetic pesticides, but the problems caused by these on human health and the environment have contributed to the renewed interest in the discovery and development of new plant molecules. It is for this reason that we evaluated the insecticidal effect of three essential oils extracted from three plants namely Algerian laurel *Laurus nobilis*, eucalyptus *Eucalyptus globulus* and juniper *Juniperus phoenicea* obtained by extraction steam. These oils are applied to adult of *Rhyzopertha dominica* at laboratory (33 ± 2 ° C, RH = $60 \pm 5\%$), in two modes of penetration. The results show a high toxicity of these oils by inhalation and contact. Oils of eucalyptus and laurel are the most toxic, the LD50 calculated by contact mode are respectively 0.57 ml/cm^2 , 0.58 ml/cm^2 , and 2 ml/cm^2 . With inhalation method, LC50 is 0.36 ml/cm^3 for eucalyptus and laurel and 0.65 ml/cm^3 for juniper. The duration of action of the three oils is 15 days but the eucalyptus oil is the most interesting, percent mortality recorded after eight days of treatment was 46%.

Key words: alternative control, *Rhyzopertha dominica*, essential oils, toxicity, persistence of action

SOME DATA ON A PEST OF STONE FRUIT TREES *CAPNODIS TENEBRIONIS* L. (COLEOPTERA: BUPRESTIDAE) AT LARBAA NATH IRATHEN (TIZI-OUZOU)

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Abstract

Capnodis tenebrionis L. is the species of the genus *Capnodis* most harmful to stone fruit Mediterranean basin and neighboring regions. Larvae attack the roots of trees and where it digs galleries that lead to the death of damaged plants. This study concerned some aspects of adult and oviposition in a cherry orchard at Larbaa Nath Irathen (near Tizi-Ouzou) to determine the duration of their presence in the orchard, start of the oviposition periods and the factors that govern their distribution in the study area. It is from these data that we could eventually propose a suitable method of control against this pest in the study area. Adult onset is observed in early May and mating occurs during the last week of the same month. First egg laying are noted in mid June, the duration of the oviposition in 2008 is 65 days. The adults increase to its maximum in August. The south and east orientation are preferential direction for adults respectively with 44.04% and 27.46%. Eggs are laid at the base of the trunk or at a distance of 10 cm with a rate of 68.84%.

Key words: *Capnodis tenebrionis*, adult emergence, Egg laying period. Distribution of adults, Tizi-Ouzou (Algeria).

**BIOMETRY AND ECOLOGY OF EGGS MASSES AND PUPAE OF THE PINE PROCESSIONARY MOTH
THAUMETOPOEA PITYOCAMPA ON THE ATLAS CEDAR (BLIDA).**

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Abstract

The study of biometrics, ecological and biological processionary, *Thaumetopoea pityocampa* phase of infestation in the Atlas cedar forests is elucidate. The biometric analysis of *Thaumetopoea pityocampa* pupae from the cedar of the Atlas showed an average length of 26.85 mm. The results of counting eggs on spawning from Atlas cedar gave an average of 253 eggs with three categories: hatched (58%), unhatched (31%) and parasitized (11%). Three eggs parasitoids were identified, *Baryscapus servadeii*, *Ooencyrtus pityocampae* and *Trichogramma embryophagum*. The emergence of 70% of the populations of the three parasitoids was performed after 12, 10 and 15 days respectively for the species, *Baryscapus servadeii*, *Ooencyrtus pityocampae*, and *Trichogramma embryophagum*. Biometrics pupae of the processionary in cedar plantation gave an average length of 17.37 mm and a width of 6.48 mm for male pupae. Among the female population, the average length and width of females was respectively 20.90 mm and 7.87 mm.

Key words. processionary, egg, pupae, Chréa National Park.

PRESENCE, INFESTATION AND CONTROL OF *AMPHICERUS BIMACULATUS* (COLEOPTERA: BOSTRYCHIDAE) ON POMEGRANATE TREES IN THE PREFECTURE OF PIERIA

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Abstract

Amphicerus bimaculatus (Coleoptera: Bostrychidae) is a polyphagous wood boring insect causing severe damage on *Acacia* sp., *Vitis vinifera*, *Ficus carica*, *Punica granatum*, *Malus communis*, *Prunus amygdalus*, *Cerasus* sp., *Citrus* sp. and *Tamarix* sp. In Greece pomegranate, which is an expanding crop, is among the most important hosts of *A. bimaculatus*. During the years 2011–2013 infestations on pomegranate orchards were recorded in Vrontou area of the prefecture of Pieria at Northern Greece. Adults were collected from infested trees and subsequently identified using appropriate identification keys. All developmental stages of *A. bimaculatus* were observed in the laboratory by rearing them on pomegranate branches. Adults of the observed population were about 1.1 cm long and 0.3 cm wide while pupae slightly bigger (about 1.2 cm long). Adults start to excavate tunnels in the pomegranate branches in April and lay eggs. Later in the season these tunnels are filled with wooden scraps and frass. Hatched larvae develop within the tunnels until pupation. It is noticed that weak branches/trees or young trees are among the most preferred and most often infested. Infested twigs, branches or trees become much less vigorous and productive and their leaves may become even reddish. Moreover, chemical control was applied against adults just when they started to borrow their mines, in an orchard which was not going to be harvested. End of April 2013 treatments with one and two applications with 10 days interval were carried out, using in total 3 replications and 4 trees per plot. The following insecticides were applied: metaflumizone 24% w/v (25 cc/100 lt), chlorpyrifos 48% w/v (100 cc/100 lt) and alpha-cypermethrin 10% w/v (30 cc/100 lt). All insecticides were applied twice. Efficacy of all insecticides was quite satisfactory suggesting that they could be used to control this pest.

IMPORTANCE OF FOUR SPECIES OF BIRDS DAMAGING INSECTS IN AGRICULTURE IN ALGIERS (ALGERIA)

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ABSTRACT

The study was conducted in Algiers. The rainfall is 600-900 mm per year. The influence of the sea in the class bioclimatic subhumid. Human activities have transformed the landscape into a mosaic of gardens, orchards, houses and forest enclaves eucalyptus, Aleppo pine, maritime pine or scrub oak undergrowth pistachio, mastic, of oleasters and brambles. We chose suburban environments represented by the Garden of test Hamma and national park of El Harrach, and natural habitats such as forests and scrub Bâinem and Tixraïne. The diet of four bird species was studied. This is the Bulbul *Pycnonotus barbatus*, the Blackbird *Turdus merula*, the Common Starling *Sturnus vulgaris* and Gobe fly *Muscicapa striata*. These birds are polyphagous, they also consume a lot of fruits and animals, and especially insects. To highlight this type of feeding behavior, we collected droppings in four stations. The results show that animals elements, consist essentially of insects, especially Hymenoptera, which are well represented in the spring with 30.9% of the items and was 24.6%, which corresponds to the period of reproduction. Family Formicidae is the most dominant with *Messor* sp., *Componotus* sp. and *Tapinoma sirothi*. Beetles come second, but as important as the Hymenoptera. The Curculionidae are in high demand by the four species.

KEY WORDS: Insectivory, Algiers, *Pycnonotus barbatus*, *Turdus merula*, *Sturnus vulgaris*, *Muscicapa striata*, Hymenoptera, Coleoptera, Curculionidae and Formicidae

DOLYCORIS BACCARUM L. DAMAGE IN SUNFLOWER FIELDS IN DENİZLİ PROVINCE

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Abstract

Sunflower which is consumed as oil and confectionary is an important industry plant. It is cultivated in 605.000 ha area and is produced 1.523.000 ton in Turkey (Anonymous, 2013). Denizli province is with 34 000 ton producing covers 20% of the total confectionery sunflower production of Turkey. On 28.07.2012 population of *Dolycoris baccarum L.* (Hem: Pentatomidae) damage was observed intensely in sunflower in Medet village of Denizli province. It was carried out an investigation in a total of 23 ha areas which belongs to 3 different farmers. According to the investigation, it was detected approximately 30 adult pests some sunflower head exist and it was dried without growing. It was monitored that stems secreted gummy sap where leaves are connected to stem and became black. Because of this, it was concluded that stems were broken from that point in some cases. Additionally, when the seed was monitored, it was figured out that insight the seed were emptied because of soak of the pest. The pest was monitored as local. Based on the literatures, the species of the pest exist in sunflower but it doesn't have economic importance in Turkey. However, some studies indicated that an infestation in 1977 with a mass population of *Dolycoris baccarum L.* (Pentatomidae) was observed in a sunflower field in Israel as same as in Denizli province. Based on the study results, these rare damages of *D. baccarum L.* in sunflower was observed and informed in Turkey too.

Key Words: Sunflower, Damage, *Dolycoris baccarum L.*,

THE LC₅₀ AND LC₉₀ CONCENTRATIONS OF ALPHA-CYPERMETHRIN ON DIFFERENT LIFE STAGES OF *ARCHIPS ROSANA* (LEPIDOPTERA: TORTRICIDAE)

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ABSTRACT

In the present study, we aimed to identify the effective concentrations of the insecticides Alpha-cypermethrin (CYP) on different live stages of *Archips rosana* (Linnaeus, 1758), using their commercial forms (Super Takimethrin 100 EC), as test substances at the field recommended dose and at 10¹, 10², 10³, 10⁴, 10⁵, 10⁶ fold diluted concentrations of the recommended dose. The field recommended concentration that is offered in application of CYP contains 20 µM of active substance in orchard agriculture. The localities from which we made our collections are chemical-free areas, and not used for agricultural purposes, and we also collected from different areas of the Edirne region, which is known for being unexposed to any kind of pesticides. We used 10 larvae, pupae and adults of *A. rosana* in our experiments, which we replicated three times. We determined the mortalities of larvae, pupae and adults on the basis of completion of their life cycles as each stage, and registered the mortality rates of larvae and pupae every 24 h until the organisms reached the adult stage. We used the data collected to calculate the mortality percentages for each development stage. We analyzed the percentage mortality data for all exposures using one-way analysis of variance, and calculated LC₅₀ and LC₉₀ values by probit analysis, using the SPSS programme (version 15.0). The LC₅₀ and LC₉₀ concentrations of CYP for larvae, adult and pupae forms were given in Table 1. We showed that diluted concentrations of LCT insecticide still have 80% mortality at the larvae, pupae and adult stages. As a consequence, the results showed that *A. rosana* was more sensitive to CYP on pupa stage.

Key words: Alpha-cypermethrin, *Archips rosana*, LC₅₀, LC₉₀, Lepidoptera

THE SEASONAL POPULATION FLUCTUATION OF THRIPS PESTS ON SOLANACEOUS VEGETABLES AND WEEDS IN BURSA AND YALOVA

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Abstract

This study was conducted to determine plant parasitic thrips species and their population fluctuations on tomato, pepper and eggplant plants and their around Solanaceous weeds namely thorn apple (*Datura stramonium* L.) and black nightshade (*S. nigrum* L.). Through this study thrips that're from the weeds to the crop plants around of them as a potential source of contamination were established. Population fluctuation studies were carried out weekly intervals in three fields at Bursa and Yalova, which were located in different ecological areas, (May–September) during 2010 and 2011. In this study, the thrips species were found as: [*Thrips tabaci* L. and *Frankliniella occidentalis* (Pergande) (Thysanoptera: Thripidae)]. The population density of the thrips on vegetables and weeds began to increase in end of May and peaked five times from mid-June, approximately in Bursa in 2010. In Yalova, the thrips emerged in end of June and occurred two peaks in mid-July and mid-August in the year of 2010. In 2011, thrips populations are counted separately, as *T. tabaci* and *F. occidentalis*. *Thrips tabaci* emerged in mid-June and peaked mid-July, *F. occidentalis* emerged in end of June and peaked mid-August in Bursa. In Yalova, *T. tabaci* emerged in mid-June and peaked mid-July, *F. occidentalis* emerged in beginning of July and peaked end of August in 2011. As a result, on weeds, thorn apple and nightshade, the plant parasitic thrips species were observed similar time period with vegetables. It showed that Solanaceous weeds around tomato, pepper and eggplant fields are important hosts for the transmission of thrips.

Key words: Plant parasitic thrips, population, Solanaceae, vegetable, weed.

RISK ESTIMATION AND TEMPORAL FLUCTUATION OF PHYTOPHAGOUS INSECTS

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Abstract:

The distribution of ecological niches of major pests of tomato under greenhouse in hybrid Kartier and differences in stability of communities of phytophagous in the order of arrival of these pests at the technical institute of vegetable crops and industrial ECMI Staoueli located at the coast of Algiers was examined in this study. Sampling week, from December 2011 to May 2012 were carried out on three levels of plants. The results showed that the infection rate is higher in *Tuta absoluta* than *Frankliniella occidentalis* and *Liriomyza sp*, it varies according to the three leaf levels and sampling periods. According to the order of arrival, the results indicate that it is thrips *Frankliniella occidentalis* settle first followed by leafminer *Liriomyza sp* and then the tomato leafminer with a time lag of about two (2) months. Finally, the infestation is greater on the basal part of the plant. The results of the order of arrival of the major pests of tomato show that it is thrips which moved first, followed by the leafminer, then the tomato leafminer with a lag time of about 2 months.

Key words: bioecology, tomato, *Tuta absoluta*, ecological niche, *Liriomyza sp*

HISTOLOGICAL STUDY ABOUT THE LARVAE AND ADULTS OF *CULEX PIFIENS* MOSQUITO TREATED BY THE ENTOMOPATHOGENIC FUNGUS *VERTICILLIUM LECANII* ISOLATED FROM THE SOIL OF BOUMERDES REGION.

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Abstract

The Culicidae are biting insects, the most harmful to people, they are almost all bloodsuckers, and they are responsible of the spread of many important diseases such as malaria, yellow fever, and elephantiasis. Entomopathogenic microorganisms occupy an important place among the alternative methods of fighting against pests insect. The fungus *Verticillium lecanii* is an entomopathogenic agent naturally present in the ecosystems. It offers a very interesting potential for controlling populations of mosquitoes. This study aimed to show the histological changes that occurred in *Culex pipiens* larvae and adults infected with *Verticillium lecanii* in 10^{-7} spore/ml dilution. The histological section was studied showing that the fungi infected all the body parts specially cuticle, epiderms, fat bodies and midgut. After then the insect have a white appearance and covered with a thick coat of hyphea. Thus study shows biological control of *Verticillium lecanii* on mosquitoes. The obtained results show that the application of *Verticillium lecanii* on cuticle of the fourth stage larvae and adults of *Culex pipiens* was dependent of an apparent disturbance on the structure of the cuticle or there has been the degeneration of its different parts, infection of the fungus does not stop at the body walls. So it affects even the adipose tissue, epidermal cells and intestine.

Key words: *Culex pipiens*, *Verticillium lecanii*, histological changes, cuticle, intestine and adipose tissue.

THE PESTICIDE USING HABITS OF REDPEPPER BREEDERS IN ISLAHIYE AND NURDAĞI DISTRICTS OF GAZİANTEP PROVINCE AND ATTITUDES AMONG THE ENVIRONMENT

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Abstract

In the world, especially in the developed countries, in all countries until the beginning of the 1980s, agricultural production primarily aimed to boost yield per unit area and diminish the production costs by this way. But direct and indirect negative impacts of using mass inputs on both human health and natural resources, started to become an important issue of development and environment initially in the developed countries by the early 1980s. The conscious usage of pesticides provides the destruction of harmful insects and weeds whereas unconscious utilization of them eliminates useful insects and micro-organisms and effect negatively the human health, plants and water resources. The aim of this study is to detect the pesticide usage habits of farmers in Nurdağı and İslahiye, where the most of the mass planting areas of redpepper are included in Gaziantep, and identify their attitudes about environment. To do so, surveys are conducted via questionnaire forms by face to face interviews and the data is analyzed via the usage of suitable statistical packages and the results are interpreted.

Key Words: Pesticide using, redpepper, environment

THE POPULATION FLUCTUATION OF *THRIPS TABACI* LİNDEMAN AND *FRANKLINIELLA OCCIDENTALIS* (PERGANDE) (*THYSANOPTERA : THIRIPIDAE*) ON YELLOW AND BLUE TRAPS, IN FRESH ONION FIELDS OF IZMIR PROVINCE

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Abstract

Sticky traps of different colors have been used for sampling and monitoring or controlling thrips on vegetables. In this study, yellow and blue sticky traps were placed to observe the population fluctuation and color orientation of main pest: *Thrips tabaci* Lindeman and *Frankliniella occidentalis* (Pergande) (Thysanoptera:Thripidae) in fresh onion fields of İzmir province. The study was conducted in one field each in Menemen and Tire Districts, in 2007-2008 and 2008-2009 vegetation periods. Two yellow and blue sticky traps were placed in each fields. The traps were changed with new traps weekly, brought to laboratory and counted *T. tabaci* and *F.occidentalis* on traps by binocular. It was determined *T. tabaci* and *F.occidentalis* 28/0 and 29/1; 133/2 and 83/18 individual on yellow and blue traps in Menemen, 2007-2008 and 2008-2009 years, respectively. Statistical analysis were conducted according to color of trap, species of thrips, location and years mainly counting thrips. As a result of statistical analysis, it was found 8,19 ±3,17 std. on yellow traps, 8,07 ±3,15 std. on blue traps, evaluations of color of traps, no significant difference has been found between color of traps. *T. tabaci* 11,78 ±3,16; *F. occidentalis* 4,62 ±3,10 adult caught and has not been found between species and trap catches. On the other hand, *T. tabaci* was the most abundant species captured in yellow sticky traps in both districts and years according to interaction of color of trap species and years ($P<0.05$).

Key words: *Thrips tabaci*, *Frankliniella occidentalis*, Fresh onion, Blue-yellow sticky trap

**FUMIGANT TOXICITY OF MONOTERPENOID COMPOUND LINALYL ACETATE AGAINST TO
CABBAGE APHID, *BREVICORYNE BRASSICAE* L. (HOMOPTERA:APHIDIDAE)**

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Abstract

In recent years, synthetic pesticides are used in our country and the world people, environment, animals, adverse effects observed and to search for alternative methods of combating agricultural pests, has begun to be preferred. In studies of several plant extracts and essential oil compounds with insecticidal activity was reported to be mostly monoterpenoids. In this study, fumigant effect of monoterpenoid compound, Linalyl acetate was tested against to apterous female adults of *Brevicoryne brassicae* L. (*Homoptera:Aphididae*) . All the tests were applied on 10 aphids, placed on a leaf disc in a plastic petri dish which was 55 mm diameter and as three replicated. Linalyl acetate was applied as seven different doses (5, 20, 75, 100, 150, 125, 200 µl/l), during 24, 48 and 72 hours exposure and then examined of mortality. Toxicity level of Linalyl acetate was increase with exposure time at 24 h. However, Linalyl acetate was showed 97 % mortality at maximum exposure dose (200 µl/l) and maximum exposure time (72 h). According to these data, 50 % of *B. brassica* populations the time required to kill at 200 µl/l dose was calculated 18,30 hours (LT₅₀) and LT₉₀ value was calculated as 47,79 hours. As a result, Linalyl acetate will be used for control cabbage aphid on long term exposure time.

Key words: *Brevicoryne brassicae* L., Monoterpenoid, Linalyl acetate, Lethal time

**THE HOST AND NATURAL ENEMIES OF *TUTA ABSOLUTA* (MEYRICK) (LEP.: GELECHIIDAE)
IN AEGEAN REGION**

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Abstract

Turkey is one of the most important tomato (*Lycopersicon esculentum* Mill.) producer all over the world, its annual fresh tomato production is 11 million tones, approximately ¼ of fresh fruit and vegetables production represented by tomato alone. Tomato leaf miner, *Tuta absoluta* (Meyrick 1917) (Lepidoptera: Gelechiidae), originally from South America, has been reported from European countries for the last 4-5 years. *T. absoluta* was first detected in 2009, spread rapidly and has become the main pest of tomato in Turkey. In this research, naturel enemies and hosts of *T. absoluta* was determined in Aegean Region, between in 2010-2012 years. The surveys are conducted in tomato greenhouses and open fields in Aydın, Çanakkale, Denizli, Manisa and Muğla provinces. Predators were collected by observations all part of 30 plant per da in survey area. In order to determine the parasitoids, plant parts which infested with *T. absoluta* biological stages were brought to laboratory and cultured separetely, observed regularly. As a result of surveys *Nesidicoris tenuis* Reut, *Macrolophus melanotoma* Costa (= *Macrolophus caliginosus* Wagner) determined in Izmir and Muğla provinces, *Macrolophus costalis* Fieber (Hemiptera: Miridae) in Muğla as predators. In addition, the egg parasitoid *Trichogramma euproctidis* G., (Hymenoptera: Trichogrammatidae) was found in tomato fields, Çanakkale Province. This is the first reported occurrence of *T. euproctidis* parasitizing *T. absoluta* in Turkey. *T. absoluta* was determined on eggplant (*Solanum melongena* L.) in Muğla-Kumluova and Aydın-Göhlisar, bean (*Phaseolus vulgaris* L.) besides tomato. *Solanum nigrum* L. was recorded as a wild host plant of *T. absoluta* in Izmir-Menemen.

Key words: *Tuta absoluta*, Natural enemies, Egg parasitoid, *Trichogramma euproctidis*, Turkey

PLANT OILS FOR CONTROL OF COTTON APHID (*APHIS GOSSYPHII* GLOV.) IN GREENHOUSE CUCUMBERS

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Abstract

Botanical pesticides are an alternative of synthetic chemical pesticides for pest control in modern ecological technologies. These products are not a threat for the environment and human health. Plant products have a number of advantages that make them preferable in modern organic agriculture. The range of these products is constantly expanding, which requires the mechanism of their action to be well known. During the period 2013-2014 a number of studies were conducted for establishment of the effectiveness of plant oils from mustard (*Sinapis alba* L.), hemp (*Cannabis sativa* L.) and yarrow (*Achillea millefolium* L.) in concentration 0.5% and 1% against the cotton aphid (*Aphis gossypii* Glov.) in cucumber variety Kiara F1, grown in greenhouses. Chemicals product Mospilan 20 SP 0.0125% (a. i. acetamiprid) was included as a standard. The 1% plant oils from hemp and yarrow demonstrate a good effectiveness (over 90%) to cotton aphid. The highest values of biological activity of the plant oils, included in the study were observed at 5th-7th day after treatment. The good effectiveness shown by the plant oils, gives us another alternative to control this pest in greenhouse cucumbers.

Key Words: *Aphis gossypii*, cucumber, plant oils, effectiveness

RELATIONSHIP BETWEEN BARLEY VARIETAL SENSITIVITY TO HERBICIDES AND THE ATTACK OF APHIDS

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Abstract:

The study was conducted at the Institute of Agriculture - Karnobat, Bulgaria during the period 2011-2014, after betting experience testing varietal susceptibility of barley to some herbicides have been identified clear differences in the population dynamics of aphids in different variants. Are reported preference of aphids to barley varieties treated with certain herbicides and doses. There are no aphids in barley varieties, not treated with herbicides. Account the dependence between the values of chlorophyll a + b and chlorophyll a / chlorophyll b and the attack of aphids. At higher values of these parameters attack by aphids is greater.

Key words: aphids, herbicides, barley

SCREENING OF SOYBEAN VARIETIES FOR RESISTANT TO *BEMISIA TABACI*(GENN) (HEMIPTERA: ALEYRODIDAE)

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Abstract

Soybean plants are vulnerable to several insect pests. Whitefly is one of the most serious pests to be reckoned with in soybean agriculture. An astute pest management is necessary to maximise both seed yield and quality. The objective of this study was to investigate the potential resistance of 50 soybean varieties to white fly, *Bemisia tabaci* (Genn) (Hemiptera: Aleyrodidae), was evaluated in second crop soybean field experiments in 2013. No artificial infestation was made since whitefly very abundant. The whitefly observation was made in August which is the time of the heaviest infestation. Five plants from each plot and three leaves from each plant (lower, medium and upper parts) were taken for investigation of whitefly population. Eggs, larvae and pupae numbers were determined on the leaves per 2.85 cm² . According to the number of whitefly 1-5 scale. According to results, 14 varieties were found to be highly resistant, 5 varieties resistant, 8 varieties moderately resistant, 8 varieties moderately susceptible, 15 varieties susceptible. Understanding of genetic control of resistance to whitefly can enhance development of resistant cultivars that could be grown in whitefly infested areas. The idea of developing common soybean cultivars that produce high yields and show resistance to biotic (diseases, insects, weeds) stresses over is attractive to soybean breeders. Thus, it is important to establish appropriate criteria for quick and efficient selection of resistant germplasm.

Key Words: *Bemisia tabaci*, whitefly infestation, Soybean, resistance, screening

BEHAVIORAL STUDY OF MEDITERRANEAN FRUIT FLY, *CERATITIS CAPITATA*, IN A CITRUS ORCHARD IN ALGERIA

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Abstract

The Mediterranean fruit fly, *Ceratitidis capitata*, is a destructive pest of citrus in Mediterranean areas. For better control of the medfly, the adoption of an IPM program is unavailable whose the use of mass trapping. The objective of this work is to study the behavior of the Mediterranean fruit fly in a stressed plot and another unstressed by a massive trapping; thus, from this point, we will evaluate the effectiveness of two traps used: delta trap and pheromone trap (gob fly). Our results showed that at the two plots, the medfly is less captured by the delta trap. Catches estimated from pheromone traps against fruit flies show the effect of the trap density in the stressed plot which results in a large number of individuals captured; however, catches show three main periods of flights in the two plots, the most important is the season during which the three main peaks were recorded. Periods of flights have a rather marked shift in time between plots with early adult flight in the plot unstressed during the first two periods unlike the third period. It should be noted that the raw number of individuals caught in the stressed plot for the two types of traps is significantly higher than the unstressed plot. This is probably because of the density of trap used in the stressed plot.

THE IMPORTANCE AND CURRENT STATUS OF POTATO CYST NEMATODES (*Globodera* spp.) IN TURKEY

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Potatoes are a major world crop and potato cyst nematodes *Globodera rostochiensis* (Woll.) and *G. pallida* Stone are associated and specialized parasites of this crop of worldwide significance. Potato plants can respond in a number of ways to attack by Potato cyst nematodes; but ultimately, the greater levels of invasion could adversely affect the plant development and tuber yield at progressively. Potato cyst nematodes reduce the size of root systems so that the volume of soil which plants are able to exploit and therefore the available reservoirs of water and nutrients are decreased. The original introductions of PCN into Europe were probably from only a few populations in South America. Potato cyst nematodes have been reported in 65 countries with *G. rostochiensis* in all countries and *G. pallida* within 41 of these. No country appears to have received introductions of only *G. pallida*. *G. rostochiensis* was found first in Bolu (Dörtdivan) in Turkey. It was found later in Izmir (Ödemiş- Bozdağ) in Turkey. Potato cyst nematodes are increasingly growing in importance, so far related to this nematode studies although less.

Key words: Potato cyst nematodes, potato, Turkey, status

**AN EVALUATION ON THE INVESTIGATIONS PERFORMED LAST 20 YEARS RELATED THE CONTROLS
OF THE ROOT KNOT NEMATODES (*Meloidogyne* spp.) IN THE GREENHOUSE VEGETABLES
PRODUCTION IN AEGEAN REGION, TURKEY**

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Root knot nematodes (*Meloidogyne* spp.) are the main problem on the production of the greenhouse vegetables in Aegean region. Average crop losses caused by the nematodes vary between 15-50%. The related studies in this region have been continued within "The Project of Integrated Pest Management in Greenhouses" since 1994. However initially researches focused on the studies on the possibilities of chemical control to the nematodes, in subsequent years the investigations of the alternative control methods against the Root-knot nematodes came into prominence. These methods are known as more economical and environmental friendly than chemical control. In this context, the studies related with the use of the soil solarization alone and together with the other methods (such as grafted seedling, microbial preparations, endomycorrhizal fungi, plant extracts, biofumigant plants, etc.) were done. Promising results obtained from the studies are used under the greenhouses conditions nowadays. At the end of the investigations, it is thought that providing minimum crop losses, the national economy will gain added value if the appropriate control methods are used against the Root-knot nematodes.

Key words: Root knot nematodes, *Meloidogyne*, greenhouse, vegetables, control measures

**THE EFFECT OF ENTOMOPATHOGENIC NEMATODES ISOLATES FROM TURKEY AGAINST
SPODOPTERA LITTORALIS BOISDUVAL (LEPIDOPTERA: NOCTUIDAE)**

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Entomopathogenic nematodes (EPNs) play an important role among other nematode groups in biological control of insects. EPNs possess impressive attributes for the biological control of many soil-inhabiting insects in addition to their high lethality, particularly ease of culture and application and high safety. The northernly distribution limit of *Spodoptera littoralis* Boisduval (Lepidoptera: Noctuidae) in Europe corresponds to the climatic zone in which winter frosts are infrequent. It occurs throughout Africa and extends eastwards into Turkey and north into eastern Spain, southern France and northern Italy. EPPPO has listed *S. littoralis* as an A2 quarantine pest. CPPC, NAPPO and OIRSA also consider it to be of quarantine significance. *S. littoralis* is a pest which has an economic importance in Turkey. To control *S. littoralis*, all commercial growers in Turkey have used chemical pesticides for many years. Recently, researchers have focused on alternative environmentally friendly alternative methods. EPNs are promising candidates to be used in IPM. In this study, efficacy of three Turkish isolates of EPNs [*Steinernema feltiae* (isolate 09-31), *S. carpocapsae* (Blacksea isolate) and *Heterorhabditis bacteriophora* (isolate 09-43)] for the control of last stage larvae of *S. littoralis* were tested under laboratory condition (*in vivo*). The studies were conducted in 2014, at the Entomology Division, Plant Protection Central Research Institute in Ankara (PPCRE). *S. littoralis* larvae were obtained from the laboratory colony maintained at the PPCRE. Plastic cups were used for the experiments. A hundred cm³ (approximately 145 g) autoclaved and air-dried sandy soil was placed into each cup. The soil moisture level was adjusted to 10% (w/w) by adding distilled water. Suspensions of EPNs were applied in 1.000 IJs 2ml⁻¹ (200 IJs insect⁻¹) at 25°C. Both trials lasted 5 days. The experiments contained four replicates for each treatment. Mortalities or passes to pupal stage of *S. littoralis* were evaluated according to the control groups. For the insects of control groups, no mortality was seen and nearly all last stage larvae have passes to pupal stage. Those who died in suspicious insects, in both experiments, were incubated individually at 25 °C by "White traps" technique. After 5 days of treatment, *S. carpocapsae* and *H. bacteriophora* achieved 100% larval mortality. These results suggested that EPNs might be used for controlling of *S. littoralis* but it should be tested under field conditions. It is hoped that the study is helpful for controlling strategies of this pests in Turkey.

Key words: Entomopathogenic nematodes, *Spodoptera littoralis*, effect,

VIRULENCE OF ENTOMOPATHOGENIC BACTERIA *XENORHABDUS BOVIENII* AND *PHOTORHABDUS LUM. THRACENSIS* AGAINST *PRATYLENCHUS THORNEI*

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Root lesion nematodes of genus *Pratylenchus* feed and reproduce in the root cortex of many plant species. They migrate through root tissue cause extensive root damage, and result severe reductions in growth and yield in crops. Root-lesion nematode *Pratylenchus thornei*, a polyphagous, migratory endoparasitic nematode, is an important pathogen of wheat in Europe, Africa, North America, Asia, the Middle East, and Australia. Previous studies suggested that the mutualistic bacteria of entomopathogenic nematodes (EPNs) had an adverse effect on root lesion nematode populations. *Xenorhabdus bovienii* and *Photorhabdus lum. thracensis*, symbiotic bacteria, used in the experiments were isolated from two entomopathogenic nematode species viz. *Steinernema feltiae* and *Heterorhabditis bacteriophora*. Our objective was to determine the virulence of entomopathogenic bacteria against RLN (major wheat root-lesion nematode, *Pratylenchus thornei*) in greenhouse wheat. RLN is produced on carrot culture using pure culture from Biological Control Research Station in Adana (Turkey). Bacterial supernatant were applied at the same time with RLN in wheat root [susceptible wheat variety (Seri) 400]. Approximately 10 ml of bacterial supernatant (*X. bovienii* or *P. lum. thracensis*) in TSB medium was given by a syringe into the soil. The positive control pots received only water containing RLNs and negative control posts received just water. For each plants (with 7 replicates), variables that were assessed included, total number of nematodes in both plant root and soil, fresh and dry root weight; fresh and dry weight of the upper parts of plant and plant height. The experiment were harvested in 9 weeks in controlled growth greenhouse conditions from March to May 2013. The results showed that the mutualistic bacteri of EPNs suppressed the effects of RLN. The effects of *X. bovienii* supernatant were consistently greater than the effects of RLN caused by *P. lum. thracensis*.

Key words: Root lesion nematodes, mutualistic bacteria, wheat,

MANAGEMENT OF ROOT KNOT NEMATODES (*MELOIDOGYNE* SPP.) IN GREENHOUSE CUCUMBERS USING MICROBIAL PRODUCTS

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Abstract

The environmental pollution is one of the major problems in the world. The decrease of agrochemicals like chemical pesticides and fertilizers is important to protect human health and the environment. The use of biocontrol agents against some root knot nematodes *Meloidogyne* spp. is an alternative option to reduce environmental pollution. *Paecilomyces lilacinus* and *Trichoderma viride* are biocontrol fungi with a potential range of activity to control plant parasitic nematodes. Greenhouse experiments were conducted in 2013-2014 at the Maritsa Vegetable Crops Research Institute, Plovdiv to establish the biological activity of BioAct WG (*Paecilomyces lilacinus* strain 251) and *Trichoderma viride* strain T6 applied alone and in combination against root-knot nematodes (*Meloidogyne* spp.) in cucumber variety Defense F1. Two treatments with bioagents were carried out in a natural nematode population density: the first is at transplanting and the second - six weeks after it. All tested variants suppressed nematode reproduction and root galling and result in plant growth improvement compared to the control. The lowest rate of infestation and the highest average yield of a plant were established in the combination BioAct WG and *Trichoderma viride* strain T6. The micro-bioagents could be an effective mean to control root-knot nematodes, which results in vegetable production free of pesticides.

Key Words: *Meloidogyne* spp., *Paecilomyces lilacinus*, *Trichoderma viride*, cucumber, biocontrol

THE DETERMINING OF TOLERANCE OF SOME CONFECTIONERY PUMKIN GENOTYPES AGAINST ZUCCHINI YELLOW MOSAIC VIRUS (ZYMV) IN TRAKYA REGION

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ABSTRACT

Zucchini Yellow Mosaic Virus (ZYMV) is a viral disease that causes significant economic losses in cucurbits. In many cases, planting a disease-resistant cultivar is the best solution for controlling virus diseases in vegetable crops. The study was conducted in the pumpkin breeding program to develop ZYMV disease-resistant varieties at Trakya Agricultural Research Institute (TARI). Inoculum sources of ZYMV have been obtained from Mediterranean zucchini plants by Mersin Alata Horticultural Research Station and after multiplication, they were kept in the refrigerator at -20 ° C. The confectionery pumpkin genotypes were crossed with that resistant source plants in 2013 summer and then F1 seeds were harvested at September 2013. F1 plants were planted in 2014 and they were tested at the 1-2 leaf stage, along with the cotyledon leaves which were mechanically inoculated under greenhouse condition. Infected leaves (1g of plant material to be 4-5 ml of buffer solution) 0.01 M phosphate buffer solution (pH: 7.0) of the plant extract has crushed in porcelain mortar liquid was ensured. Then plant parts are filtered in order to separate components from the liquid portion and they were mechanically rubbed with a sponge soaked in the virus inoculum. First symptoms were observed on plants in 10- 12 days after inoculation. 3-4 leaved plants in this period was subjected to the process of re-inoculating. Based on that procedure, first resistant confectionery pumpkin genotypes were determined first time in Turkey and selection procedure will continue with other desired characters in addition to ZYMV tolerance in the future in confectionery pumpkin breeding program conducted by TARI.

Key Words: ZYMV, confectionery pumpkin, mechanical inoculation, breeding, resistant varieties

IDENTIFICATION OF *ALFALFA MOSAIC VIRUS* INFECTING BEAN IN LAKE DISTRICT OF TURKEY

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Abstract

This study was conducted to detect viral diseases in bean growing areas in Lake District of Turkey. In surveys, a total of 348 bean leaf samples were collected from plants showing disease symptoms. These samples were tested by double antibody sandwich enzyme linked immunosorbent assay (DAS-ELISA) for *Alfalfa mosaic virus* (AMV). It was found that AMV was detected in 59 samples (16.95%). Leaf samples that had tested positive in DAS-ELISA were used reverse-transcription-polymerase chain reaction (RT-PCR). RT-PCR was carried out by using specific primer which amplified a 351 bp fragment of coat protein of AMV in samples. The presence of AMV in the leaf samples was further confirmed RT-PCR using specific primers.

Key words: Bean, *Alfalfa mosaic virus*, DAS-ELISA, RT-PCR

VIRUS DISEASES and PHYTOSANITARY STATUS of VINEYARDS in PROVINCE of TEKIRDAG, TURKEY

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Abstract

Grape virus diseases are most important factors that cause yield losses in vineyards. The survey studies accomplished in April, May, June, July, 2014 the determination of disease incidences of 4 grapevine viruses in Şarköy, Malkara and Süleymanpaşa, main grape growing areas of Tekirdag Province. 122 commercial vineyards were selected on a random basis and vines were at least 7 years old. Leaf samples were collected from varieties such as Semillion, Merlot, Trakya İlkeren, Öküzgözü, İtalia, Alphonse L. and Cabernet Sauvignon, showing the symptoms of red or yellow foliage, short internodes, mottling and rolling of the leaves. Total 142 samples were collected by walking in a (X) pattern across the vineyards. Nearly 3 leaves were obtained from different canes on both arms of each vine. As a result of DAS-ELISA tests, *Grapevine fan leaf virus* (GFLV) was the most widely distributed virus of all the viruses currently detected in the province followed by *Grapevine fleck virus* (GFkV), *Grapevine leaf roll associated virus-1* (GLRaV-1) and *Grapevine leaf roll associated virus-3* (GLRaV-3). GLRaV-1 and GLRaV-3 were detected in low level of incidence. The rate of positive samples were found 3,86 % for GLRaV-1, 3,86 % for GLRaV-3, 61.0 % for GFLV and 39,4 % for GFkV. Those viruses were found as individually or mixed infections of different combinations of tested viruses in each grapevines. The overall viral infection rate in the surveyed grapevines was 73.2 %. These results revealed that the vineyards in Süleymanpaşa were highly infected with viruses with the incidence rate of 80 %.

Key words: Grapevine, Virus, ELISA

İNVESTIGATION OF NATURAL INFECTION ON SOME CULTURED PLANTS CAUSING *CUCUMBER MOSAIC VIRUS* (CMV) IN THE MARMARA REGION

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Abstract

In this study, total of 235 plant leaf samples were collected in the Marmara Region in June and July of 2013, among which; 48 tomatoes from Çanakkale (Ezine location), 15 tomatoes-25 peppers-35 gladiolus from Bursa (İzmit, Yenişehir, Orhangazi locations), 12 cucumber-8 zucchini-16 peppers from Yalova (Center), 25 peppers from Istanbul (Pendik location), 14 tomatoes-15 peppers from Bilecik (Osmaneli location) and 22 pepper from Sakarya (Pamukova location). Samples were analysed by DAS-ELISA. 68.9% of 103 pepper leaf samples, 87% of 77 tomato leaf samples, 75% of 8 the zucchini leaf samples, 58.3% of 12 cucumber leaf samples and 68.5% of 35 gladiolus leaf samples has been found to be infected with *Cucumber mosaic virus* (CMV). As a result of PCR analysis, the plants infected yielded the expected 540bp DNA fragment. PCR results confirmed ELISA test results. Tomato producers, especially the owners of the infected fields use their own seeds instead of hybrid seeds. Compared to previous years growers made a more conscious decision about virus diseases has been observed, although in some areas growers use fertilizers as a virus drug. It was advised that to growers adopt and implement preventive measures rather than curative measures in order to protect plants against viruses, also after identified the virus required information about potential vector insects and correct plant protection methods explained to growers.

Key Words: *Cucumber mosaic virus* (CMV), vegetable, gladiolus, DAS-ELISA, PCR.

DETECTION OF VIRUSES INFECTING SWEET CHERRY CULTIVARS AND ELITES AT THE INSTITUTE OF AGRICULTURE-KYUSTENDIL, BULGARIA

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Abstract

To assess the virus infections of new and commercial sweet cherry cultivars and elites, surveys were carried out in two collection orchards at the Institute of Agriculture – Kyustendil located in the Southwest Bulgaria. In the spring of 2012 and 2013 a total of 165 samples were individually collected and tested by DAS-ELISA for *Prunus necrotic ringspot virus* (PNRSV), *Prune dwarf virus* (PDV), *Plum pox virus* (PPV), *Apple chlorotic leafspot virus* (ACLSV), *Cherry leaf roll virus* (CLRV) and *Raspberry ringspot virus* (RpRSV). A total of 21,2 % of ELISA-tested samples was infected at least by single virus. PDV (10, 9 %) was the most prevalent followed by ACLSV (5.4 %) and PNRSV (4.8 %). The other viruses were no presented. The infection was found in both cultivars and elites. These results demonstrated that measures should be taken to avoid using infected parents for crossing.

Key words: Bulgaria, Kyustendil, sweet cherry, cultivars, elites, viruses, ELISA

**DETERMINATION OF THE APPROPRIATE PHENOLOGICAL PERIODS OF POTATO FOR DETECTION OF
POTATO Y POTYVIRUS AND POTATO S CARLAVIRUS BY DAS-ELISA**

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Abstract

Potatoviruses, which are the most important disease groups of potato farming are carried by potato seed tubers, mostly. These viruses are generally latent in potato tubers. In case of using infected tubers, viruses are carried easily from year to year and from region to region. Therefore, *Potato Y potyvirus* (PVY) and *Potato S carlavirus* (PVS) which are included in potato certification schema and quarantine list and caused serious economic losses of potato, are very important to be tested in appropriate phenological periods by suitable methods. The aim of this study was to investigate PVY and PVS in different phenological periods of potato by DAS-ELISA (Double-antibody sandwich enzyme-linked immunosorbent assay). This research was realized by potato tubers which were taken from Kütahya (Central, Çavdarhisar) and Uşak (Central, Banaz) provinces between 2007-2008. Primarily, 50 potato tubers infected by PVY and 31 infected by PVS were tested separately by DAS-ELISA, in dormant period of tubers. The same tubers were waited in moist and dark air conditioning room (22-25°C) for 5 weeks. Samples of tubers which dormancy had been broken, were tested for presence of PVY and PVS by DAS-ELISA. The same tubers were sowing in pots and tested by DAS-ELISA before flowering and in during flowering periods of plants for presence of PVY and PVS. As a result of the investigation; the exile period of potato tubers and the period before flowering of potato plants are the most suitable periods for PVY and the exile period of potato tubers and flowering period of plants are the most for PVS for testing by DAS-ELISA.

Key words: Potato, PVY, PVS, DAS-ELISA

DETERMINATION OF VIRUS DISEASES IN POTATO (*SOLANUM TUBEROSUM* L.) PRODUCTION AREAS IN BOLU, SIVAS and YOZGAT PROVINCES

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Abstract

The Solanaceae are a large family of angiosperms including 98 genera and approximately 2.700 species. About half of the species in Solanaceae are belong to the genus *Solanum*, which is the economically most important genus containing several major crops, including potato, tomato, eggplant, and numerous wild relatives of these crops. Potato (*Solanum tuberosum* L.) is one of the most important crops in Turkey, with annual production of nearly 5 millions tones from 172.000 ha of arable land. Besides that, potato is one of the most regulated crops moving in international trade because of the ease with which pests, particularly latent pests such as viruses, can spread from one region to another. Potato vegetative material may be infected by at least 40 different viruses and 1 viroid and true potato seed by at least 5 viruses and 1 viroid. Over so that the production amount of especially *Potato Y potyvirus* and its strains (PVY^C, PVY^N, PVY^{O+C}), which causes infection and serious yield losses, plays an important role. PVY and its strains are listed in Turkey's Plant Quarantine Regulation Annex-2/B (Harmful Organisms That Have Limited Existence in Turkey, That is Subject To Quarantine). In this study, it is aimed to determine the presence of PVY and its strains. For this purpose, during 2013, 5 different cultivars (Agria, Provento, Jelly, Melody and Florice), a total of 27 randomly selected potato (*Solanum tuberosum* L.) leaf samples were tested for the presence of *Potato Y potyvirus* and its strains by using serological (ELISA) method in Bolu, Sivas and Yozgat provinces. As an outcome of this study, PVY^N (2 samples) and PVY^{O+C} (15 samples) were detected in potato samples.

Key words: Potato, virus, ELISA, testing, Turkey

SEROLOGICAL AND MOLECULAR IDENTIFICATION OF *POTATO Y POTYVIRUS* AND INVESTIGATION OF PRESENCE OF APHID VECTOR IN GREENHOUSE TOMATOES IN AEGEAN REGION OF TURKEY

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Abstract

Potato Y potyvirus (PVY) is an important viral agents causing economic damage in some crop plants of Solanaceae family. In different conducted research PVY was found to be carried by more than 50 aphid species. The aim of this study were to investigate the presence of PVY, serological and molecular identification of PVY and Investigation of presence of aphid vector in greenhouse tomatoes' in Aegean Region of Turkey. For this purpose, surveys were carried out in Muğla (Fethiye, Dalaman and Ortaca districts) and Denizli (Central district) Provinces between 2011-2013. As a result of surveys 167 leaf samples showing viral symptoms (leaf mottling, mosaic, dark brown necrotics pots, deformation, vein necrosis, and stunding) were collected from tomato plants. The leaf samples brought in laboratory were tested by DAS-ELISA using specific diagnostickits to detect PVY. As a result of DAS-ELISA 167 leaf samples were found infected by PVY. To confirm the results of DAS-ELISA positive leaf samples were tested by RT-PCR method and band was obtained in lenght of 480 bp. As a conclusion of the studies ELISA test results and RT-PCR test results were confirmed each other. In the surveys, in order to determine virus vector aphid species, minimum 50 plants per da were observed and taken leaf samples were inspected at laboratory. In this study, it was not found any aphids pecies. As a result of these studies, aphid vectors were not effective in the naturale spread of PVY in greenhouse tomatoes in Aegean region of Turkey

Key words: Tomato, PVY, DAS-ELISA, RT-PCR, Aphid, Vector, Turkey

IDENTIFICATION OF *CITRUS PSOROSIS OPHIOVIRUS (CPSV)* BY DAS-ELISA IN ALGERIA

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ABSTRACT:

Psorosis virus (*CPsV*) is a viral disease described on Citrus , and constitutes a serious threat to Citrus regions in several countries. In Algeria detection *CPsV* was declared in 2009. The objectives targeted in our work were twofold first the identification of the *CPsV* by DTBIA test at five stations in Citrus Blida namely: Experimental station of agriculture department, station Meftah, Bouinan station, guerouaou station, Larbaa station and station in the province of Tipaza. Second is the identification of the *CPsV* by DAS-ELISA on biologically indexed by Madam vinous plants during 2011-2012. The results of DAS-ELISA revealed the presence of *CPsV* for different varieties of plant indexed. The latter also externalized symptoms characterized for Psorosis more or less strong.

Key words: Citrus, Psorosis, *CPsV*, DTBIA, DAS-ELISA, index

VIRUSES INFECTING PEPPER GROWING AREAS IN DENİZLİ PROVINCE, TURKEY

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This study was carried out during 2013 in pepper production areas in Denizli province, Turkey. A total of 115 leaf samples were collected from plants showing virus disease symptoms. These samples were tested for *Cucumber mosaic virus* (CMV), *Tomato spotted wilt virus* (TSWV) and *Tomato mosaic virus* (ToMV) by using Double antibody sandwich enzyme linked immunosorbent assay (DAS-ELISA). Single and mixed infections by viruses were found according to DAS-ELISA results. Of the total 115 pepper leaf samples, 19 were found to be infected with at least one of the three viruses. Infection percentages of viruses were 6.9%, 4.3% and 2.6% for TSWV, CMV and ToMV, respectively. Mixed infections were found to be 0.86% for ToMV + TSWV, CMV + TSWV and ToMV + CMV respectively.

Key words: Pepper, viruses, DAS-ELISA

ALLELOPATHIC POTENTIAL OF SOME ALGERIAN PLANTS

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Abstract:

Allelopathic activity study of 15 plant's aqueous extracts was evaluated on the germination and growth of two experimental models, *Lactuca sativa* and *Rhaphanus sativus*, with increasing concentration: 0,25 ; 0,5 ; 0,75 and 1 %. The seeds tested were germinated in petri dishes. Seasonal variation of allelopathic activity of *Tetraclinis articulata* was studied. In parallel of this biological activity test, phytochemical screening of the main phytoconstituents was established by TLC with quantification of polyphenolics and flavonoids contents. Inhibitory effects with variable intensities were observed on the germination and growth of *L. sativa*. Aqueous extract of *T. articulata* exhibits the more inhibitory effect on *L. sativa* germination and aqueous extract of *Peganum harmala* showed the more growth inhibitory effect with all concentrations tested, for the two experimental models. Investigation of seasonal variation revealed that June and November samples of *T. articulata* presented the most important inhibitory effect on *L. sativa* germination. Phytochemical screening by TLC identified that these active extracts contain phenolic acids, flavonoids, cardiotonic glycosids, sesquiterpens lactons and saponins. Phenolics and flavonoids contents quantified by spectrophotometry are very important in some active extracts like *Globularia alypum*, *Pistacia lentiscus*, *Acacia raddiana* and *Haloxylon scoparium*.

Key words: Allelopathic Activity; Germination; Growth; Seasonal Variation, Phytochemistry.

INFLUENCE OF SOME MIXTURES BETWEEN STIMULATORS AND ANTIBROADLEAVED HERBICIDES ON THE GRAIN YIELD AND GRAIN QUALITY OF DURUM WHEAT

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Abstract

The research was conducted during 2010 - 2012 on pellic vertisol soil type. Factor A included no treated check and 2 stimulators – Napsil (derived chlorofenoxyacetic acid, naftilacetic acid, phtalamine acid, chlorochlorine chloride, folic acid, trace elements) – 500ml/ha, Cemofol (derived methylphtalamine acid, chlorochlorine chloride, folic acid, salicylic acid, trace elements, surface active substance) – 700ml/ha. Factor B included weeded no treated check and 4 antibroadleaved herbicides – Derby super WG (florasulam + aminopirialid) – 33 g/ha, Secator OD (amidosulfuron + iodosulfuron) – 100 ml/ha, Sunsac (metosulam + 2.4-D) – 100 ml/ha, Lintur70 WG (dicamba + triasulfuron) – 150 g/ha. All of stimulators, antibroadleaved herbicides and their tank mixtures were treated in tillering stage of the durum wheat. Under investigation was Bulgarian durum wheat cultivar Victoria, which belongs to *Triticum durum* var. *valenciae*. The grain yield was the highest by combined use of stimulators Napsil and Cemofol with herbicides Derby super and Secator. Stimulator Cemofol cannot be mixed with herbicide Lintur. There is antagonism at mixtures of stimulator Napsil with herbicides Lintur and Sansak. The lowest durum wheat grain yields are obtained by these tank mixtures. The grain yield decrease by these tank mixtures is due to the decrease in the grain number per spike and the grain weight spike. The 1000 grain weight, test weight and vitreousness are increased by influence of the investigated stimulators, antibroadleaved herbicides and their tank mixtures. Stimulators Napsil and Cemofol and antibroadleaved herbicides Derby super, Secator, Sunsac and Lintur increase the protein quantity, wet and dry gluten quantities. Protein quantity, wet and dry gluten quantities are the highest by the tank mixtures Napsil + Derby super and Napsil + Secator.

Key words: durum wheat, stimulators, herbicides, grain yield, structural elements of the yield, grain quality

EFFECT OF PGPR_s ON THE HYOSCYAMINE CONENT OF HAIRY ROOT OF THREE SPECIES OF *DATURA*.

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Abstract

The *Daturas* are tropane alkaloid producing plants from the Solanaceae family. These alkaloids are known to have very important pharmaceutical properties; Moreover, their concentrations reported in the total mass of the plant are low. It is possible to increase alkaloid levels artificially by different techniques. The culture of hairy root is very promising for the biosynthesis of these alkaloids. The objective of this work is to optimize the production of hyoscyamine in vitro Hairy root by studying the effect of PGPR_s on hairy root cultures for three *Datura* species (*D. stramonium*, *D. tatula* and *D. innoxia*). The study of the effect of PGPR_s, used as elicitors for the biosynthesis of hyoscyamine with different contact time (hairy root - elicitors) showed statistically significant results. Both of two bactérien strains C7R12 and C8 stimulate the growth of hairy root during 5 days of contact. On the other hand, they greatly inhibit the growth of hairy root during more length contact time (10 days) with 75% of biomass loss. Concerning biosynthesis of hyoscyamine, it is the line from L_{DT} elicited with C7R12 strain wich is the most productive of hyoscyamine with 12,931 mg/g MS (in other words an enhancement about 85% compared to the control).

Key words: hairy root, *Datura sp*, elicitation, hyoscyamine, optimization, PGPR, *Pseudomonas fluorescens*.

HERBICIDAL ACTIVITY OF METABOLITES FROM *INULAVISCOSA* (ASTERACEAE) TOWARDS *OROBANCHE CRENATA* FORSK

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Abstract

Four new bi- and tricyclic sesquiterpenes phytotoxic appointed Inuloxins A, B, C and D, were isolated with the acid α -costic already known from the aerial parts of *Inulaviscosa* (family Asteraceae), a plant very replied in the Mediterranean region and known for its active ingredients. The phytotoxic activity Inuloxins AD, and monoacetyl derivatives of diazoInuloxins A and C, respectively, and that of the α -costique acid and certain of its derivatives was evaluated in vitro with respect to one bad parasitic weed: *Orobanchecrenata* Forsk. The Inuloxins A, C and D were the most active and causing to 100% inhibition of germination of seeds of parasite. Inuloxin B was completely inactive against broomrape. The major metabolite, α -costique acid showed an inhibitory effect on the germination of this parasitic weed. Preliminary results also suggest a structure-activity relationship between metabolites and their chemical derivatives

TECHNOLOGICAL INDEXES OF ORIENTAL TOBACCO TREATED WITH GLYPHOSATE FOR THE CONTROL OF BROOMRAPE

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Abstract

The technological quality of oriental tobacco variety Plovdiv 7 treated with glyphosate (Glyphogan 480 SL) for the control of broomrape was studied. The product was applied acropetally, basipetally, one-time and twice in two doses. The nicotine content of first class oriental tobacco has optimal values in industrial controls and in the variants with single treatment with Glyphogan 480 SL acropetally, dosed at 30 ml/dka, and single treatment with Glyphogan 480 SL basipetally, dosed at 50 ml/dka. The amount of sugars and total nitrogen in tobacco batches of the first and second class for all variants were within the reference values. The ashes in all variants, except for the control and the second class variant with a single application of Glyphogan 480 SL dosed at 50 ml/dka basipetally, were within the reference values. For first-class oriental tobacco of the Plovdiv 7 variety treated with glyphosate (Glyphogan 480 SL), in the control and all variants with treatment basipetally, the tobacco smoke when smoking had a well expressed fullness, harmony and smoothness to the taste.

Key words: tobacco, glyphosate, nicotine, sugars, total nitrogen, ashes, technological quality

TROPANE ALKALOIDS PRODUCTION THROUGH BIOTECHNOLOGY: EFFECT OF SALT STRESS ON HYOSCYAMINE CONTENT OF HAIRY ROOTS OF THREE SPECIES OF *DATURA SP*

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Abstract:

The genus *Datura* includes several species, five of which are identified in a wild state in Algeria (*Daturaferox* L, *Datura innoxia* Mill, *Datura quercifolia* Humboldt, *Datura stramonium* L, *DaturaTatula* L).The datura produces alkaloids (atropine, scopolamine and hyoscyamine), these substances have several interests through their pharmacological properties and their applications in medicine. Alkaloid production by field cultivation which depends on climatic factors and the complexity of their chemical synthesis voice often too expensive, because their production by biotechnology is an interesting alternative.Indeed, in-vitro culture offers the advantage of monitoring environmental conditions and therefore, a regular production. The production of alkaloids requires specialized like hairy root induced by *Agrobacterium rhizogenes* characterized by a rapid growth, a genetic and biosynthetic stability. Furthermore, the elicitation is an effective strategy to improve the productivity of secondary metabolites. Most often, it is the use of biotic substances and / or abiotic elicitors known to stimulate the biosynthesis of specific secondary metabolites. The objective of this work is to optimize the production of hyoscyamine in vitro by studying the effects of salt stress (KCl and CaCl₂) on hairy root cultures for three *Datura* species (*D. stramonium*, *D. tatula* and *D. innoxia*). Thus, the hairy root induced by inoculation of *Datura sp* explants with the A4 strain of *Agrobacterium rhizogenes*. The results show that *Datura stramonium* present the best response to ward the induction of transgenic roots. However, it is with the selected line of *D. Tatula* (L_{DT}) that the highest rates of growth and hyoscyamine content are obtained. The study of the effect of KCl and CaCl₂, used as elicitors for the biosynthesis of hyoscyamine with different contact time (hairy root - elicitors) showed statistically significant results. Both of KCl and CaCl₂ inhibit the growth of hairy root with 35% of biomass loss. On the other hand, they greatly stimulate the production of hyoscyamine, the optimal concentration of KCl is 2 g/l combined with a while of contact of 10 hours for the line DT and 24 hours for lines DS and DI. As for the CaCl₂ they are the concentrations of 1 g / l for D.I during 24 hours and 2 g/l and D.Tand D.S for respectively 10 hours and 24 hours, which give the best results. Otherwise, it is the line come from *D. tatula* elicited with CaCl₂wich is the most productive of hyoscyamine with 16,978 mg/g MS (in other words an enhancement about 107% compared to the control).

Key words: *Agrobacterium rhizogens*, CaCl₂, hairy root, *Datura sp*, elicitation, hyoscyamine, Kcl, optimization, salt stress.

PHENOLOGY AND PHYSIOLOGY OF ARTEMISIA CAMPESTRIS IN THREE REGIONS OF ALGERIA

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Abstract:

In Algeria, the countryside is vast and spans multiple floors temperate climate, hot and cold, which explains the wide variety of natural conditions and the large number of plant species. Climate change become increasingly restrictive for the growth and development of plants especially in semi-arid and arid areas. Algeria is one of the Mediterranean countries where drought has long been observed clearly led the process of salinization sols. Two natural constraints, drought and salinity have changed the stability of ecosystems and are largely the causes of land desertification. Climate variability is a constant stress on ecosystems. Climate variations and the composition of the medium have an influence on phenology, physiological and biochemical parameters of plants. In this context, we studied the phenological and physiological characteristics of *Artemisia campestris* L. on three different bio-climatic stages regions Biskra, M'sila and Djelfa. The phenology of the plant shows that phenophases dependent abiotic environmental factors. A marked precocity was observed in the ecotype Biskra. Physiology also varies under abiotic conditions under floors bioclimatiques. We deduce that from the semi-arid region of Djelfa the pre-Saharan region of Biskra, a decrease in chlorophyll and carotenoids was observed. The plant accumulates sugars, proline and proteins to overcome the effects of stress (water/saline). Indeed, it slowed the growth of some of its organs (reduced leaf surfaces).

Key words: Artemisia, phenophases, physiology, drought, salinity.

COMPARATIVE ANALYSIS OF SOME HERBICIDES FROM AMIDE AND DINITROANILINE FAMILIES ON THE SOIL MICROORGANISMS

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ABSTRACT

The changes under the influence of some herbicides from dinitroaniline family (Wing P – a.s. *dimethenamid-P + pendimethalin* and Benefin – a.s. *benfluralin*) and amide family (Butizan S – a.s. *metazachlore* and Dual Gold 960 EC – a.s. *S-metolachlor*) in the basic trophic groups of soil microorganisms, on population level, were traced. Herbicides were applied when cultivation of oriental tobacco on humus-calcareous (rendzina) soil. Microbiological analyzes were carried out in dynamics, during the period - before treatment, to the 15th-day, 35th-day, 50th-day and 90th-day after their submission in the soil. The numerical development of assimilating mineral nitrogen microorganisms were suppressed from the four herbicides was found. An action of amides herbicide was highly. The negative impact on ammonifying microorganisms was relatively weak. Treatment with Wing P reported even some stimulation. The effect of herbicides from the amide family of density of actinomycetes was excitatory and inhibitory of dinitroaniline family. The negative effect was durable and very strong at Benefin. Indicative of deteriorating living conditions in the soil were generally increased population density of the spore microorganisms and proportion of spores. The power of influence (ηx^2) of the factor herbicides was about 40% and was statistically significant. The comparative analysis of microbial communities in the presence of various herbicides shows disorders percentage distribution of the different groups of microorganisms. Stronger when they are dinitroaniline herbicides. The likely period of adaptation of microbial communities after treatment was about 15 days for Butizan S (a.s. *metazachlore*), 35 days for Dual Gold 960 EC (a.s. *S-metolachlor*) and 50 days for dinitroaniline herbicides. Dynamics over time suggests the possibility for participants in the early stages of biodegradation of amide herbicides were actinomycetes, and of dinitroaniline - assimilating mineral nitrogen microorganisms .

Key words: amide, dinitroaniline, herbicides, soil microorganisms

**INFLUENCE OF TREATMENT WITH POST-EMERGENCE HERBICIDES ON PRODUCTIVITY OF
BARLEY EMON, LARDEYA AND ORFEY**

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Abstract:

A field experiment was conducted from 2011 to 2013 at the Institute of Agricultural - Karnobat, Bulgaria to determine the tolerance of winter two-row barley varieties – Emon, Lardeya and Orfey - of post-emergence herbicides used during tillage stage in optimal and double doses. It did determine the reaction of the Emon, Lardeya and Orfey varieties to several broadleaf herbicides alone or in combination with wild oat herbicides.

Key words: barley, productivity, herbicides

A COMPARATIVE MORPHOLOGICAL CHARACTERISTICS OF *CHENOPODIUM ALBUM* L., *C. MISSOURIENSE* AELLEN AND *C. PROBSTII* AELLEN

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Abstract:

Globalization and growth of trade relationships worldwide in recent decades have resulted in the advent of many new plant species in European countries. The representatives of *Chenopodium* are some of the most aggressive and quickly seize new territories. The object of this study is one of the most widespread weeds in Bulgarian flora – *Chenopodium album* L. и the two North American species *Chenopodium probstii* Aellen and *Chenopodium missouriense* Aellen, whose probable finding among weeds in cultural communities is an issue of the near future. A comparative morphological characteristics of *C. probstii* and *C. missouriense* and the representative of Bulgarian flora closest to them – *C. album* L. has been made. A total of 18 quantitative and 10 qualitative features are included in the morphological analysis. For more detailed study of generative organs the Scanning electron microscope (SEM) has been used. Information about the chorology and ecological preferences of *C. probstii* and *C. missouriense*, possible ways of their penetration into Bulgarian flora, as well as the reasons for their later discovery have been given.

Key words: *Chenopodium album*, *C. probstii*, *C. missouriense*, morphology, chorology

THE INFLUENCE OF SOME HERBICIDES ON THE GROWTH AND DEVELOPMENT OF WINTER OILSEED RAPE

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Abstract

Within the period 2011-2014 in the experimental field of the Agricultural University, Plovdiv, were conducted field experiments using the herbicides Teridox (500 g/1 dimetochlor), Butizan S (500 g/1 metazachlor), which were applied to the soil after planting the crops and before their germination, and also Modaon 4F (48 g/1 bifenox) and Butizan S, which was applied to the leaves during the vegetation period of the rape. The experiments were made using the block method over an area of 25 m² in three repetitions. It has been established that the herbicides demonstrate excellent selectivity for this crop, and have excellent control: *Amaranthus retroflexus L.*, *Portulaca oleraceae L.*, *Chenopodium album L.*, *Solanum nigrum L.*, *Setaria spp.*, *Stellaria media L.* and self seeded wheat plants. Herbicides dimethachlor, bifenox and metazachlor not have a negative impact on growth and phenological development of rapeseed hybrid Xenon. In the three years experienced plant height in the treated variants statistically proven to exceed zero control. Depending on weather conditions the vegetation period of plants occurs for 263 days (in 2012/2013) to 279 days (2011/2012).

Key words: winter oilseed rape, herbicides, growth, development

THE INFLUENCE OF SOME HERBICIDES ON THE STRUCTURAL ELEMENTS OF THE YIELD OF WINTER OILSEED RAPE

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Abstract

In the period 2011-2013 in the experimental field of the Agricultural University, Plovdiv, were conducted field experiments using some herbicides *Teridox* (500 g/1 *dimetocho*), *Butizan S* (500 g/1 *metazachlor*), *Modaon 4F* (48 g/1 *bifenox*) on winter oilseed rape. The experiments were based on the block method over an area of 25 m² in 4 repetitions. It has been established that they demonstrate excellent selectivity for this crop and by eliminating the competition of the weeds, they increase the components of the yield and have a positive effect on the growth and the development of rape. The obtained data has been statistically processed based on the *Student* method.

Key words: rape, herbicides, yield, development

EFFECTIVENESS AND SELECTIVITY OF THE HERBICIDE *DIFLUFENIKAN* IN COMMON BEAN

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Abstract

During the period from 2006 to 2008 we conducted a number of experiments at the experimental base of the Agricultural University – Plovdiv in order to establish the effectiveness and selectivity of the new herbicide *diflufenikan* (trade name – Pelikan 50 CK). The prevailing types of weeds in the experimental fields were annual late-spring weeds. The herbicide preparation was selective for common bean Bulgarian cultivar Plovdiv 15 (grade 1 on the scale of EWRS) in doses of 200, 250 and 300 ml/ha. The effect of the herbicide on the annual dicotyledonous weeds was the greatest for the variant Pelikan 50 CK – 300 ml/ha and during the three years of the experiment it reached 90-94% compared to the control K1 and when doses of 200 and 250 ml/ha were applied, the effectiveness reached 82%-84% respectively. In 2007 the effect of the herbicide was the lowest due to the severe drought in April and the high density of the annual gramineous weeds was not affected by application of the herbicide.

Key words: *diflufenikan*, effectiveness, herbicide, *Phaseolus vulgaris* L., selectivity

STABILITY AND TECHNOLOGICAL VALUE OF COMMON WHEAT VARIETIES ENOLA, ILIKO AND INZHENIO TREATED WITH HERBICIDE MIXTURES

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Abstract

The research was conducted during 2010 - 2012 in the experimental field of the Department of Plant Production in Agriculture Faculty at Trakia University. Stara Zagora. The field experiment was performed with three varieties of common wheat: Enola, Iliko and Inzhenio. The objective is to determine the influence of the imported herbicide formulations on the performance of common wheat and determination of the most valuable technological options regarding the stability of the yield. Variants of the experiment are as follows: 1. Control - no treatment with herbicides; 2. Axial one - 1000 ml.ha⁻¹; 3. Lintur + Traksos 150 g.ha⁻¹ + 1200 ml.ha⁻¹ - tank mixture; 4. Logran + Traksos 37.5 g.ha⁻¹ + 1200 ml.ha⁻¹ - tank mixture; 5. Axial + Lintur 150 g.ha⁻¹ + 900 ml.ha⁻¹ - tank mixture; 6. Axial + Logran 37.5 g.ha⁻¹ + 900 ml.ha⁻¹ - tank mixture; 7. Lintur + Traksos 150 g.ha⁻¹ + 1200 ml.ha⁻¹ - separate treatment; 8. Logran + Traksos 37.5 g.ha⁻¹ + 1200 ml.ha⁻¹ - separate treatment; 9. Axial + Lintur 150 g.ha⁻¹ + 600 ml.ha⁻¹ - separate treatment; 10. Logran + Axial 37.5 g.ha⁻¹ + 600 ml.ha⁻¹ - separate treatment. Synthesis criterion for stability YSi by Kang taking into account both the stability and value of production, shows tha-1t in terms of technology growing, technologically the most valuable is the variant of decoupling Lintur + Axial (10+). Axial one herbicide was highly complex assessment (11+) for technological stability of yields. In varieties Iliko and Inzhenio most technologically valuable options appear involving herbicide Axial one (12+) and separately imported Lintur + Axial (5+).

Key words: common wheat, herbicides, grain yield, stability.

DENİZLİ-GÖZLER AREAS WITH THYME WEED SPECIES

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Abstract

In this study the intensity and frequency of occurrence of weed species in oregano production areas of Gozler village of Denizli province was investigated. In 2013, surveys were conducted at randomly selected fields in two different growing stage of oregano namely theme plant phenological phase and plant cutting stage. During the surveys 150 da in the 20 field have been investigated. Weeds were determined by species and counted by randomly throwing 1m² frames. Different numbers of samples were taken according to the size of the investigated fields, 4 for areas of 5 da, 6 for 5-10 da, 8 for 10-20 da and 12 sampling for areas up to 20 da. In final broad leaved weeds were measured as whole plants while grass weeds were measured as total of stems for a weed. From the obtained data weed frequency and weed density per square meter was determined. Weed species frequency of occurrence was calculated by using the formula $FQ = 100 \times \frac{(n)}{\text{total number of measurements}}$. From all species except (*Alyssum fluvescens* var. *stellatocarpum*) being endemic, three are parasitic (*Cuscuta campestris* L., *Orobanche gracilis* sm. and *Orobanche ramosa*) species. Seven species belong to grass while 21 species are broadleaved weeds. The average weed density was found to be 10.66 per square meter. Within broad leaved weeds *Convolvulus arvensis* L. with (53,5 plant/m²) was found to be the most dense weed species followed by *Melilotus officinalis* L. (1,45 adet/m²), *Dacus carota* L. (10,5 plant/m²), and *Alyssum fluvescens* var. *stellata* (8,5plant/m²). Within grass weeds *Cynodon dactylon* L. with (14.46 plant/m²) was the most dense species followed by *Sorghum halepense* L. (5.00 plant/m²), *Poa trivalis* L. (3.69 plant/m²) accordingly. *Convolvulus arvensis* L. with 87,5% frequency of occurrence was the most frequent weed species followed by *Dacus carota* L. 87,5%, *Poa trivalis* L 50%, *Aegilops geniculata* 50%, *Filago pyramidata* 40.0% 20% accordingly.

Key words: *Thymus*, weeds, weed density, frequency of occurrence.

PLANTS DERIVED COMPOUNDS AND THEIR POTENTIAL AS BIOHERBICIDE

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Abstract

Phytotoxic effects of crops and weeds was investigated under laboratory, pot, soil and field experiments during 2011-12 and were repeated in 2012-13 by using aqueous extracts of allelopathic plants viz., *Oryza sativa* L., *Parthenium hysterophorus* L., *Phragmites australis* Cav. and *Datura alba* L. with reduced rates of fenoxaprop-p-ethyl and bromoxinil+MCPA for controlling weeds in wheat. In lab and pot studies, *P. hysterophorus* and *D. alba* reduced the seed germination, shoot length, fresh and dry biomass of the tested species when compared to other treatments. Water soluble allelochemicals of these plants retarded or inhibited the germination, growth and biomass of tested species with positive effect on *Triticum aestivum*. The study of soil samples of experimental field showed higher amount of mineralizable carbon in *Datura alba* + ½ fenoxaprop-p-ethyl treated plots while the least amount of mineralizable carbon was present in control. *P. australis* and *P. hysterophorus* along with lower rates of fenoxaprop-p-ethyl and bromoxinil+MCPA showed a promising results for controlling weeds and improving wheat yield and yield related traits like productive tillers, spikelets and grains spike⁻¹ and subsequently biological and grain yield. In addition, these treatments were economical by giving higher values of cost benefit ratios. Overall data showed that 50% reduced herbicide rates in combination with *P. australis* or *P. hysterophorus* water extracts can suppress the weeds and resultantly increase the grain yield of wheat. The results obtained from these studies could be helpful in formulating new plants derived biochemicals that can be used in agriculture for weeds and pest control. These results warrant that presence of these allelopathic plants in field crops and subsequently mixing in soil due to ploughing may create problems in crop production as allelochemicals will be accumulated in the soil. Similarly, the adverse effects of allelochemicals and herbicides also increase the mortality of soil biota that is a threat to sustainable crop production. Hence more extensive and meaningful studies are suggested to fully explore all the possible interactions among allelochemicals and herbicides. It seems from the above findings that plant derived compounds provide more opportunities as appreciated. Therefore commercialization of these allelochemicals on small scale for organic food production should be initiated to popularize the concept of allelopathy in agro-ecosystem. This approach of using plant derived compounds in agriculture will decrease the use of synthetic herbicides which will ultimately protect the environment.

Key words: Allelopathy, wheat, weeds, grain yield

STUDY OF THE PROTECTIVE EFFECT OF THE AQUEOUS EXTRACT OF *ARTEMESIA CAMPESTRIS* ON OXIDATIVE STRESS INDUCED IN RATS BY CARBON TETRACHLORIDE (CCl₄)

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Abstract

Artemisia campestris is a medicinal plant belonging to the *Asteraceae* family, also known by the name of « Dgouft ». This species is wide-spread in the Algerian south. The aqueous and ethanolic extracts were obtained using hot maceration and soxhlet extraction respectively, leading to a yield of 12.08% for the aqueous extract and 14.90% for the ethanolic extract. The phenol content determined with Folin-Ciocalteu reagent represents 81.25 and 205.35 mg AG/g of extract in aqueous and ethanolic extracts respectively. The flavonoid content was obtained following the “aluminium trichloride method” which leads for the aqueous and ethanolic extracts to 13.64 and 28.56 mg eq quercetin /g of extract. Two different methods were performed in vitro for the antioxidant activity: the free radical DPPH and the reduction power. For the first test, the CI50 were estimated to 191.68 mg/l for the aqueous extract, 27.8 mg/l for the BHT and 9.97 mg/l for the ethanolic extract. However, the second test had shown a weak extracts reduction power compared to the BHT. The “*in vivo*” study used rats divided in 4 batches of 6 rats each, for a period of 30 days. The model batch and the batch 01 have received a daily dose of paraffin and *A.campestris* aqueous extract respectively, whereas the batches 02 and 03 received in addition, an oral dose of CCl₄, 24 hours before every sacrifice. The biochemical markers analyses of hepatic check up (ASAT, ALAT, PAL and bilirubin) registered high contents for these markers for batch 02 when aqueous extract pretreated rats and CCl₄ intoxicated showed a reduction on the biochemical markers.

Key Words: *Artemisia campestris*, polyphenols, Toxicity, CCl₄, Hepatic check-up.

THE ROLE OF THE LITTLE OWL *ATHENE NOCTUA* (SCOPOLI, 1769)(AVES, STRIGIDAE) IN THE CONTROL OF PESTS' SPREAD IN THE CENTER OF THE PROVINCE ON HUNTING OF ZÉRALDA IN ALGERIA

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Abstract

The study of the little owl's diet (*Athene noctua*) in the center of the province on hunting of Zéralda (Algiers) by analyzing of 31 pellets collected during three seasons has identified 89 prey species, belonging to 10 classes and 20 orders. The preference of insects is indicated by the dominance of them (A.R. %=77.68%). Within Insecta, the order of Coleoptera most consumed (42.28%). That represented by the most eaten species, *Acinopus* sp. with A.R. %=7, 37 %. The value of the Shannon-Weaver's index ranged between 2,02 and 4,69 bits, whereas the equal distribution of prey-species of the little owl, the majority of values are above 0,72, this is indicating equilibrium between the numbers of different species ingested. We found some species-pests like *Calliptamus* sp. and *Platycleis* sp., following the diet of this raptor it has been shown that the species is useful and has an important role in natural and environment balance.

Key words: Diet, Little Owl *Athene noctua*, the center of the province on hunting of Zéralda, Insecta, *Calliptamus* sp.

ROLE OF LANNER FALCON *FALCO BIARMICUS* (TEMMINCK, 1825) AND THE OWL *ATHENE NOCTUA* (SCOPOLI, 1769) IN REDUCING PESTS IN THE REGION OF AIN EL HADJEL

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Abstract:

The study of diet in the Algerian steppe taken from the region of Ain el Hadjal in 2013 is made with respect to the content of the pellets rejection of two predatory species Lanner falcon and the owl of Athena. In parallel the availability of Arthropods and Rodents prey are taken into account, particularly in Dayet el Ghrouba. Total wealth in this resort is 140 species, including 30 species are pests. For rodents 200 active burrows per hectare are identified. This study shows that trophic menus Lanner falcon and the owl of Athena play a very important role in the regulation of many numbers of rodents and insects harmful to crops.

Key words: diet, arthropod availability, crop pests, Owl of Athena, Lanner Falcon.

SOIL SCIENCE

USE OF STATISTICAL METHODS AND GIS TO EVALUATE THE GROUNDWATER QUALITY OF AN AGRICULTURE CITY: İPSALA DISTRICT (EDİRNE, TURKEY)

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Abstract

İpsala District can be described as an agriculture city, because of containing very large and productive agricultural lands. İpsala Plane, which is located in the Meriç Valley and irrigated mainly by Meriç River, includes most of soil of İpsala District. It is the largest plain and one of the most productive agricultural areas of the Thrace Region and 35% of total rice production of Turkey is being supplied from İpsala Plain. As it is known that agricultural applications are one of the main anthropogenic organic pollution sources in especially rural areas. The aim of this study was to evaluate the groundwater quality of İpsala District by a statistical approach and present the investigated parameters visually by using GIS maps. Groundwater samples were collected from 23 stations including all the residential areas of İpsala District in winter season of 2013. Some physical, chemical and microbiological water quality parameters including temperature, dissolved oxygen, pH, conductivity, turbidity, nitrite, nitrate, ammonium, sulfate, phosphate, chloride, fluoride and Biological Oxygen Demand were investigated and some multistatistical methods were applied to detected data. GIS (Geographic Information System) was also used in order to make a visual explanation by presenting distribution maps of investigated parameters. Groundwater samples were assessed according to national and international quality criteria. According to detected data, although the investigated parameter levels in groundwater of İpsala District were not exceeded the limit values for drinking, the region has II. – III. Class (Turkish Regulations) groundwater quality in terms of nitrite and nitrate parameters in general.

Key words: İpsala District, Groundwater Quality, Pearson Correlation Index, Factor Analysis, Cluster Analysis, ArcGIS

PERFORMANCE AUDITING ON ENVIRONMENTAL SAFETY AND HEALTH - ALBANIA

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Abstract

The overall objective of environmental auditing is to help safeguard the environment and minimize risks to human health. The Typical Audit Process is usually conducted by a team of people who will analyse the facts and compare them with the criteria for the audit, draw conclusions and report their findings. Benefits of Environmental Auditing are of a broad range starting from identification of current or potential future problems that need to be addressed to potential cost savings, such as from waste minimization and reduction of health problems. Those factors developed auditing in the early 1970s. Since then environmental auditing has spread rapidly. Auditing of Environment is fairly new in Albania. On last 20 years being on the transition, our economy has been focused to more vital short term problems than environment. But last 5 years a civil reaction and consciousness has been increase toward environment and legislation has been issued and approved to prevent the actual situation trying to improve it. A considerable help in that issue has been given from donators on specific issues of environment. Although the results has not been likely good due to absence of the efficiency of the projects on environment.

Key words: Environment, audit, human health.

**INFLUENCE OF NITROGEN APPLICATIONS ON LEAF MINERAL COMPOSITION OF DEVECI PEAR
VARIETY GRAFTED ON BA 29 ROOTSTOCK**

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The experiment was carried out during 2009 - 2011 period under the Yalova location in Turkey. The aim of this experiment to determine using fertigation and postharvest foliar fertilization method with different nitrogen doses (0, 30, 60, 90 g/tree) and application times (Application1: It starts in early spring before the buds burst and finish 40-45 days ago from harvest, Application2: It starts in early spring before the buds burst and finish 40-45 days ago from harvest and postharvest foliar nitrogen application, Application3: It starts after blooming and finish 40-45 days ago from harvest, Application4: It starts after blooming and finish 40-45 days ago from harvest and postharvest foliar nitrogen application) effects on leaf mineral composition on Deveci pear cultivar grafted on BA 29 quince rootstock. The experiment was designed according to randomized block design with three replication. Increasing doses of nitrogen had increased the nitrogen content and decreased the zinc content of leaves while different results had been obtained for other plant nutrients.

Key Words: Pear, nitrogen, fertilization, mineral composition

**CONTRIBUTION TO THE STUDY OF SOME BIOLOGICAL CHARACTERISTICS OF SOIL AND
RHIZOSPHERE FABIA BEAN (*VICIA FABIA* L. VAR *EQUINA* AND *MINOR*)**

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Abstract

Studies on microorganisms have in recent years to develop the concept of "organic fertilizers" based primarily on properties known as "beneficial" in some organizations. Apart from these nitrogen-fixing bacteria widely used for making organic fertilizers are capable of some dissolved minerals in rhizosphere. These bacteria find a land application in agriculture in structuring the soil rhizosphere species *Vicia faba* beans or kidney beans (*v. v. equina* and the *minor*), presents an excellent host rotation enriches the soil with nitrogen by root excretion of nitrogenous products by detachments nodule or remaining roots. Before culturing the eleven floors of this rough textures, and heavy, after chemical and physical fronts *v. f. crop Vicia faba equina* and *minor* crops were put in the two species separately and has made the same physico-chemical, it was noted that the rate of carbon and nitrogen falling on almost all soils after cultivation. The resulting C / N ratios vary, but the rate of phosphorus are significant and increase in both types of cultures nodulation tests were positive with a slight difference noted in favor of the *minor* variety, it rots due to be rhizoidal diversity of flora which is at the origin of nodulation and that would be specific to this variety has rather to the overall charge of this flora latter finding at least partly explain the difference in nitrogen levels between the two types cultures, which could be related to deficiencies flora associated symbiotic. The decrease was less pronounced in the variety *minor* compared to the variety *equina* by against the latter seems more perfermente viewpoint nitrogen fixation.

Key words: rhizobia, symbiosis, nodule, fixing, *v. equina*, *v. minor*.

STUDY OF THE DYNAMICS OF CYCLES OF C, N AND P IN A SYSTEM LEGUME (BEAN) - CEREAL (MAIZE) IN THE REGION OF SÉTIF

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Abstract:

Cereals are an important part of the diet in Algeria but they remain dependent on soil and climatic factors on the one hand and on the other hand technical factors including rotation and fertilization resulting in irregular production and the need to introduce pulses in the rotation is necessary. The study of the dynamics was performed on three phenological stages (before flowering, flowering and post- flowering) , and for three terms (pure corn, beans and corn Association pure bean) . Analyses focused on the rhizosphere soil. It was found that the bean (*Phaseolus vulgaris*) is a source of nitrogen for maize (*Zea mays*), when grown together and allows a slightly positive in regard to the storage of organic carbon in soils . While phosphorus deficiency causes a decrease in air dry biomass, root dry biomass for both species and the decrease of nodular biomass beans.

DECOMPOSITION'S EFFECT OF CROP RESIDUES AND FARMYARD MANURE ON THE CHEMICALS EVOLUTION CHARACTERISTICS OF TWO TUNISIAN SOILS UNDER ARID CLIMATE

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ABSTRACT

To investigate the potential of crop residues (Sulla (*Hedysarum coronarium* L.), rapeseed (*Brassica napus* L.), faba bean (*Vicia faba* L. var *minuta* (eg Desf. Alef) Mansf), wheat (*Triticum durum* Desf)) and bovine manure on soil fertility, the effect of their decomposition on the chemicals evolution characteristics of clay and sandy Tunisian soils under arid climate was evaluated by tracking incubation jars under natural conditions. The incubation was carried out under aerobic conditions and at a constant temperature of 28°C during 90 days with moisture adjusted to 2/3 of field capacity. Carbon mineralization through the CO₂ released and the evolution of chemical soil parameters were observed at regular dates. The study showed that the residues, bovine manure and soil texture influenced significantly ($P < 0.05$) carbon mineralization and chemical soil parameters (cation exchange capacity CEC, the sum of exchangeable bases, the saturation levels bases TSB), with higher values for clay. At the end of incubation, Manure in the clay soil were characterized by the highest values (CEC = 32.45 meq / 100 g, the sum of exchangeable bases = 23.78 meq / 100 g; TSB = 73%) compared to sandy soil. Residues of Fabaceae (sulla) in clay soil were characterized by higher values compared to controls and other residues (CEC = 5.28 meq / 100 g, the sum of exchangeable bases = 17.90 meq / 100 g; TSB = 64%) it represent a source of organic matter that could be used in the fertilization of Tunisian degraded soils. As a result, the comparative study of two types of organic matter (farmyard manure and crop residues) allows us to say that our organic matter affect soil properties with a greater relative importance for farmyard manure and Fabaceae residues. Thus, the properties of sandy soil appear relatively fixed. However, the improvement is limited in time. Bovine manure and crop residues, particularly the Fabaceae, are a source of organic matter that could be used in fertilizing degraded Tunisian soils.

Key words: Crop Residues, Bovine Manure, Incubations, Soil Fertilization, Tunisian Soils.

EFFECTS OF OIL MILL WASTEWATER (OMW) ON THE CHEMICAL PROPERTIES OF SANDY SOIL UNDER TUNISIAN ARID CLIMATE

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Abstract

Soils of arid regions are relatively poor in organic matter. This depletion is accelerated by crop intensification, the light texture of the soil and the non return of crop residues in the soil. Thus, the depletion of organic matter in these soils increases the degradation and depletion of soil fertility and promotes erosion and desertification processes. To preserve and maintain soil productivity, the contribution of organic amendments is essential. However, these improvements alterations are not always available and their quality is often poor and we use other sources of organic amendments. Among these amendments is oil mill wastewater (OMW) which may constitute a possible amendment to the poor soils of arid regions. As part of the agricultural use of OMW as fertilizer, we conducted a test application of OMW on the sandy soil of Medenine (southern Tunisia), not grown in pots in order to enhance the beneficial or negative effects of this effluent on chemical soil characteristics. The experiment was conducted in pots over 3 months. Three increasing doses of OMW (T50 = 50 m³ ha⁻¹; T100 = 100 m³ ha⁻¹ and T200 = 200 m³ ha⁻¹) were applied and compared to an unfertilized control, with or without the application of fresh or salt water as irrigation. The rate of organic matter increased progressively with the increasing doses of oil mill wastewater (0.81% ; 1.53% et 3.2% for the treated samples T50; T100 et T200) compared to the control (0.3 %). Decreases in these rates were recorded over time. In addition, these two types of irrigation modify only slightly the contents of organic matter in soils. Concentrations of exchangeable potassium increased with the dose of applied OMW (50; 240 et 330 mg/kg for the treated samples 50 ; 100 et 200 m³ ha⁻¹) compared to the control (39 mg/kg). However, the application of irrigation did not affect the levels of this parameter, the pH of the treated samples remained unchanged, and the electrical conductivity of the soil did not increase at an alarming rate.

Key words: oil mill wastewater (OMW), chemical propriety of soil, organique amendment, fertilization.

EFFECT OF ANTHROPIZATION ON THE DIVERSITY OF MICROBIAL POPULATIONS OF DEGRADED SOILS TERGA

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Abstract

Our study is about the effect of anthropization on the microbial populations on a spatial and temporal scale in soil used in the region of Ain Témouchent, Terga, located in the west of Oran (Algeria). This site has been newly replanted by the introduction of two tree species (*Pistacia atlantica* and *Tetraclinis articulata*) associated or not with two leguminous (*Retama monosperma* and *Lotus creticus*). The rhizosphere soil of each test is taken in triplicate to investigate about the diversity of microbial communities at time = 0 (early planting) after 6 months, 12 months and 18 months. Similarly, a sample of rhizosphere soils of two pulses is performed in a replanted site in 2008 and in the native forest of Terga in order to compare the microbial communities at the spatial level. Sampling of these two sites was done on time = 0 and time = 12 months, bare soils of the three sites are considered as a witness. To investigate about this diversity we used metagenomics of extracting DNA from the ground. The soil DNA was extracted using the UltraClean soil DNA and UltraClean Mega soil DNA kit. After purification of DNA samples, PCR-amplification of the IGS for the intergenic region (IGS) located between the two sub units 16S and 23S is formed. A RISA (Ribosomal intergenic Spacer Analysis) profile of purified PCR products was performed. Statistical analysis of the results (R software) shows that at time = 0 planting some plants has a rhizospheric effect, in other words it shows that the microbial community is different from that bare soil's one. After 6 months, we note that the evolution of rhizosphere communities continues but there would also be an evolution of bare soil which would be very useful for the rapid restoration of these sites. Actually, we are about to perform statistical analysis of the samples taken at T= 12 months and T = 18 months

Key words: Metagenomics, PCR, RISA, PCA

POST-FIRE RECOVERY OF ALGERIAN SOIL PHYSICO-CHEMICAL AND MICROBIOLOGICAL PROPERTIES (FOREST OF FÉNOUANE, WILAYA OF SAÏDA)

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Abstract

The study area was located in the forest of Fénoouane (Sidi M'barek, wilaya of Saïda, Algeria). This forest of the southern foothills of the Tell Atlas Mountain can be compared to others semi-arid fresh bioclimatic stages of Algeria with recurrent fires and difficulties to reforestation. The study area is characterized by a Mediterranean climate. The mean annual temperature is 16,5 °C and annual precipitation is 350 mm. At the early stage of succession (*i.e.* following forest fires), plant communities are dominated by herbaceous and fast growing species such as *Pistacia lentiscus*, *Stipa tenacissima* and *Cistus villosus*. At the later successional stage (*i.e.* with no fire for at least 20 years), close forest is dominated by a tree stratum of *Pinus halepensis* and *Tetraclinis articulata*. In this forest, 25 sampling plots (400 m²) were selected taking into account the year of the last fire. To assure five replicates of each "time since fire", 25 sampling plots (400 m²) were selected along a chronosequence of 2, 4, 8, 13 and 20 years since fire. Soils were sampled at the top 5 cm and their physico-chemical properties (water holding capacity and moisture content at sampling time, contents in organic carbon, total nitrogen, ammonium, nitrate, inorganic phosphorus and CaCO₃, pH) and microbial properties (basal respiration, microbial biomass, enzymatic activities) were analysed. Our results showed lowest soil moisture content (2%) in the soils unburned since 2 years. The destruction of arboreous vegetation and its substitution two years after the fire by an herbaceous stratum are hypothesized to increase evapotranspiration and thus soil drought. Similar organic carbon contents in the recently burned soils and unburned soil since 20 years suggested inputs of charred material from carbonized vegetation. In comparison with soils unburned since 20 years, FDA hydrolase and phosphomonoesterases activities remained weaker two years after the last fire in spite of the recovery of microbial biomass. However, concomitant increase in total nitrogen content to black carbon also suggested inputs of inorganic nitrogen of fresh organic matter. These inputs of available resources, probably originated from grazing sheep, have stimulated the recovery 8 years after fire of microbial biomass and some enzyme activities (FDA hydrolase and phenol-oxidase). Indeed, fire is frequently used by breeders to promote the development of grasslands and thus allow the grazing of sheep. The stimulation of microbial growth and activities may have generated a priming effect of the black carbon and soil organic matter leading, by adding-on to a strong erosion of surface soil, to extremely low organic carbon contents 8 years after the last fire. This study showed that the post-fire reconstitution of both soil physico-chemical characteristics and microbial properties depend on climatic conditions, especially drought, of the intensity of erosion processes and on the grazing use of the burned ecosystems. Our results suggested that the soils burned since 10 years ago may be particularly vulnerable to new fires. However addition of exogenous organic matter (compost, manure...) 8 years after a fire could be envisaged to reduce soil erosion, compensate the losses in carbon content and create a litter layer that would limit the evaporation.

Key words: resilience, soils, fires, microbial activities, Algeria.

ASSESSMENT OF SOIL QUALITY USING MICROARTHROPOD COMMUNITIES UNDER DIFFERENT LAND SYSTEM

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Abstract

The study was conducted in a region of Central Bulgaria with different land use systems. The aim of the survey was to evaluate soil quality using microarthropod density, diversity and soil biological index (QBS-ar). The paper also described the relationship among microarthropods and physiochemical parameters of the soil. Our evaluation indicated that a total microarthropod density differed significantly with land use. Higher microarthropod population densities were observed in arable lands compared to permanent grasslands. Contrariwise the microarthropod communities in arable lands showed a reduction both in taxa numbers and soil biological quality (QBS-ar index). Population densities of microarthropod and QBS-ar index were positively significantly correlated with soil moisture, but negatively correlated with pH and temperature of the soil. The use of microarthropods for soil quality assessment could be an effective and easy to apply tool in the concept of sustainable management of agro ecosystems.

Key words: microarthropods, soil monitoring, diversity, QBS-ar, soil quality

ASSESSMENT OF NEMATODES AS BIOINDICATORS OF SOIL HEALTH IN AGROECOSYSTEMS

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Abstract

Soil is a multicomponent and multifunctional system, with definable operating limits and a characteristic spatial configuration. Soil health, term using by farmers, or soil quality – a term generally used by scientists, is defined as the continued capacity of soil to function as a vital living ecosystem that supports and sustains directly crop growth and indirectly animals, and humans. To evaluate soil quality reliable indicators that allow comparison across ecosystems are needed. Nematodes can be used as effective soil health bioindicators because they occur in any environment, that provides a source of organic carbon, in every soil type, easy to sample, and well classified into functional (feeding) groups, and nematode taxa are well classified. Nematodes have diverse life strategies, ranging from colonizers (short life but high reproduction rate) to persisters (long life, but low reproduction rate) which can provide an indication of the real condition or health of the soil in agricultural environment. Because Bulgaria is an agricultural country with developed vegetable crop production maintaining soil health is especially important for the economy and livelihood of the populations. The ability to monitor and assess the quality of agroecosystem soils would be of significant importance for stakeholders, who could change their farming strategies accordingly. Therefore the data collected from literature, recent and future research will be base to create “soil health maps” using GIS that will appropriate for local conditions.

Key words: soil health, nematodes, agroecosystems, vegetable crops.

DETERMINATION OF ZINC CONTENT FOR THREE GREAT SOIL GROUPS IN BURSA REGION

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Abstract

In this work we determined Zinc status in three great soil groups of Bursa, Turkey. For this aim, soil samples were taken 50 locations (Alluvium 30 samples, Colluvium 10 samples and Vertisol 10 samples) from 7 different districts. According to results, zinc level was established 36.67 % as low level while 60 % as adequate ratio of Alluvium soils. Similarly zinc status was determined 50 % as adequate level and 40 % as low level in Colluvium soils. However 20 % as adequate level, 70 % as low level and also 10 % as very low level zinc was determined in Vertisol soils. Therefore, we should suggest the zinc fertilization is essential especially Vertisol soils for the crop yields in these regions

Key words: Zinc, Great soil groups, Bursa

THE VALUE OF *ACACIA NILOTICA* IN THE RESTORATION OF ARID AND SEMI ARID AREA

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Abstract:

Arid and semi-arid land represent one third of the earth's surface. In these areas, the salinity of soil and irrigation water is one of limiting factors of the plant productivity and crop yield. Algeria is one of the affected countries, almost 3.2 million hectares of saline surfaces. In the South of Algeria the rehabilitation and conservation programs remain a priority. The environmental and social impact of deforestation may be partly offset by the planting of native woody species. Among these species, leguminous trees of the *Acacia* species which play multiple and essential role: protecting and enriching the soil through the root symbiosis with *Rhizobium*, production of timber and air fodder, participation in human nutrition and pharmacopoeia. Moreover, in an arid zone, where the germination characteristics are strongly involved in the selection for plant adaptation to environmental conditions, we can assume that the first critical phase of rehabilitation is relating to the germination of reintroducing species. But their seeds and germination are unknown. For this reasons we considered important to present in our communication different species of acacia trees in desert regions of Algeria, ecology and preliminary results concerning the effect of abiotic stress on the germination of *Acacia nilotica* seeds.

Key words: Arid area, Algerian acacias, *Acacia nilotica* subsp. *adstringens*, Seeds Germination

PAST AND DIFFERENT CROPPING OF PHYSICAL SOIL GROWN CEREALS IN PROPERTIES IN THE REGION OF TIMGAD - COMPARISON OF TWO TOOLS tillage (Hard TEETH) EFFECTS

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Abstract:

This study follows in the framework of the practice of various types of the fallow (stubbles cereals, fallows worked and fallows naked) and the type of tool use for the ploughing (farmer or disk plough) and the effect of the interaction of these two factors between them on the evolution of certain properties physics soil, as well as the incidence of these two factors (farming precedent tools for ploughing) on the behavior of a cereal (durum wheat variety MBB) under a semi-arid climate in the area of Timgad (W Batna). The effect of the interaction (previous farming/tool) is measured more particularly starting from the evolution of the structure of the ground (Da), space poral and the hydrodynamic operation of water in the plowed horizon. That showed differences enter the treatments obtained. The improvement of the structure of the ground involves consequences favorable to the installation of the network results is noted for all the treatments. Modifications of the density of the solid particles of the surface horizon (Da) are characterized the treatments (stubbles cereals/disk plough). Best the value of the total porosity of the plowed horizon is recorded on the level as of treatments (worked fallow disk plough). These same observations are noted in the study of the hydrous properties of this horizon the follow-up of the growth and of output of the culture of wheat explains the role of the combination (worked fallow/disk plough) in the installation, the growth and the output in grains of this culture. The obtained results can constitute a base of advices to the farmers concerning the practice of the fallow and the type of the tool which it is necessary to use for the work of the ground in the areas semi-arid.

Key words: Farming precedents, tools for ploughing, apparent Density, porosity, holding capacity, not of fading, durum wheat, output.

EFFECTS OF SALT STRESS (NaCl) ON GERMINATION OF OKRA (*Abelmoschus esculentus* L.)

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In the Mediterranean region arid or semi-arid climate, water is the main factor limiting the expansion and intensification of crops. Water resources are becoming increasingly scarce, and relatively saline waters are increasingly used in agriculture. Salinity is one of the most severe environmental factors limiting the productivity of agricultural crops and threatening food security. Most crops are sensitive to salinity caused by high concentrations of salts in the soil. Salinity affects plant growth at all developmental stages; however, sensitivity varies from one growth stage to another. In order to study the salinity tolerance of Okra (*Abelmoschus esculentus* L.): The seeds are germinated in Petri dishes containing increasing concentrations of salt (NaCl) from 0, 25, 50, 100, 150 meq at 25°C. The study showed that the salt has a depressive effect. So seed germination decreased significantly with the increase in NaCl concentration. Results indicated that salinity caused significant reduction in germination percentage, speed of germination (coefficient of velocity), root and shoot lengths, fresh and dry weight. This reduction in germination indicates this plant's extreme insensitivity to salinity, so it isn't advisable to cultivate it in saline soil.

Key words: okra, germination, seedling, salinity stress, NaCl.

ANATOMICAL CHARACTERISTICS OF TWO SPECIES OF FODDER *Atriplex halimus* and *Atriplex canescens* TREATED TO SALINITY

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Halophytes are plants able to accomplish their life cycle in moderately to highly saline habitats. Mechanisms that confer the ability to grow in conditions that are considered as adverse for crops are complex and operate at different levels, among others, cellular and tissue levels. In arid and semi-arid regions, the genus *Atriplex* has agronomic and ecological interest some. Indeed, in addition to their good forage quality, they ensure fixation and soil enrichment. These species are very striking a specific variability. In order to elucidate the anatomical variability level, two species of *Atriplex* were used: *halimus* and *canescens*. The results show anatomical differences that can be linked to their degrees of adaptation to external conditions.

Key words: halophytes, anatomy, *Atriplex*, salinity.

MICROBIOLOGICAL PROPERTIES IN RHIZOSPHERE SOILS OF HALOPHYTIC PLANT SPECIES

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Abstract

One of the most important aims of The South-eastern Anatolian Project (GAP) is to irrigate at agricultural area. Over irrigation by the farmers have created drainage and salinity problems in area. Soil salinity as a limiting parameter which directly impact the plants growth, soil microorganisms, environmental safety and food production. Salinity causes certain changes in physical, chemical, biological properties of soils, plant growth and plant type. Halophytic forage plants like *Salsola crassa*, *Salsola dendroides*, *Cressa cretica*, *Salsola soda*, *Alopecurus myosuroides*, *Prosopi farota*, *Alhagi pseudalhagi*, *Tamarix smyrnensis*, *Chenopodium album*, *Amaranthus blitoides*, *Amaranthus albus* were widely determined in Harran Plain- Akçakale. Rhizosphere soil samples of these plants were collected the rhizosphere of each plant. The rhizosphere soils were analyzed by measuring microbiological (soil respiration, microorganism population, microbial biomass) and biochemical (catalase, dehydrogenase activities) properties. Soil basal respiration was highest in the rhizosphere of *Salsola soda*. Enzyme activities were affected by the rhizosphere soils, their values depending on the plant species. Catalase activity and dehydrogenase activity were highest in the rhizosphere of *Alopecurus myosuroides*, 12.3 ml O₂ 5g soil⁻¹ and 345.7 µg g soil⁻¹, respectively.

Key words: Microbial respirasyon, soil, catalase, dehydrogenase, halophyte forage plants

PHOSPHORUS UPTAKE IN COMMON WINTER WHEAT CULTIVARS (*TRITICUM AESTIVUM* L) UNDER INCREASING LEVELS OF EXCHANGEABLE ALUMINUM IN STAGNIC PODZOLUVICSOLS

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Abstract

The genetically acid soils, as well as the soils with secondary acidification in Bulgaria require greater knowledge on the tolerance of wheat to increasing levels of exchangeable aluminum in soil. The peculiarities of the phosphorus uptake of 20 winter cereal genotypes (18 *T.aestivum* L. genotypes, 1 *T.durum* Desf. genotype and the rye-wheat hybrid *Triticale*) were investigated under conditions of a vegetation experiment. The triticale hybrid was used as a standard. The experiment was carried out against two backgrounds of soil fertilization: 1. One check variant with regard to the levels of exchangeable Al^{3+} and 2. Mineral fertilization with N:P:K=1:1:1 at norms of 200 mg N, P_2O_5 and $K_2O/1000$ g soil. The experiment was carried out on light grey forest soil (Stagnic Podzoluvicsols-FAO, 2002) with content of exchangeable Al^{3+} 0,5 meq/100 g soil (Ao). The independently applied increasing levels of exchangeable aluminum caused decrease of the amount of phosphorus uptake in the plant organs of the above-ground biomass and the roots of the tested cereals. Lowest amounts of assimilated phosphorus were found in the variants with additional introduction of 5.0 meq $Al^{3+}/100$ g. At the end of the vegetation the phosphorus uptake in the total biomass after additional application of 2.5 meq $Al^{3+}/100$ g (A_1) was 73.0 % from the uptake in the check variant. The balanced introduction of nitrogen, phosphorus and potassium in soil had positive effect on P uptake of the tested cereal crops. Phosphorus uptake in the above-ground biomass increased by the end of the vegetation with 82.8 % at fertilization of the check variant, and with 40.4 % at fertilization of the variants with application of 2.5 meq $Al^{3+}/100$ g. The positive role of the balanced mineral fertilization on phosphorus uptake in grain was very well expressed. The increase in the check variant was with 68.1 %, and in the variants with introduction of 2.5 meq $Al^{3+}/100$ g – with 31.3%. Similar tendency was observed in the uptake of P to the roots. The variation of the phosphorus uptake at genotype level was strongly expressed at all levels of content of exchangeable aluminum in soil applied independently and in combination with balanced mineral fertilization. Triticale cultivar Vihren and wheat cultivar Karat took up more phosphorus to grain than the rest of the cultivars. The addition of high concentration of exchangeable aluminum in soil (50 meq $Al^{3+}/100$ g) not only strongly disturbed phosphorus uptake of the tested cereal crops; it caused the perishing of common wheat cultivars Pryaspa, Trakia, Sadovo 1 and Kristal.

AGRONOMIC EFFECT AND ECONOMIC EFFICIENCY OF LONG-TERM MINERAL FERTILIZATION WITH OPTIMAL NORM OF NITROGEN FERTILIZATION WITH DIFFERENT PK NORMS AND RATIOS ON WHEAT PRODUCTIVITY

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Abstract

A stationary field trial (Haplic Chernozems) initiated in 1967 with a two-field crop rotation of wheat and maize investigated the economic efficiency of continuous nitrogen, phosphorus and potassium fertilization with different norms and ratios on wheat production. Variety Dragana was tested in this trial; it was grown with combining 4 nitrogen and phosphorus norms – 0, 60, 120 and 180 kg/ha and three potassium norms – 0, 60 and 120 kg/da. The investigation included the period 2010– 2013. The meteorological conditions during the years of wheat growing had a strong effect on the economic efficiency of mineral fertilization with macro elements, regardless of the norms and ratios between them. During years unfavorable for wheat production there was a market positive role of continuous NPK fertilization at ratios 1:1:0; 1:1:1 and 1:1,5:1. Total income was directly dependent on the obtained agronomic effect and the realization price of the ready produce. According to the type of the fertilization variant during the years of investigation, it varied from 1441.4 lv/ da (2011) to 3620.8 lv/ha (2013). As a result from the long application of mineral fertilizers at different norms and ratios between the macro elements based on the production potential of variety Dragana for the period 2010 – 2013 it was established that under the conditions of slightly leached chernozem fertilization with $N_{120}P_6K_6$ was economically most advisable. It ensured higher mean profit even in comparison to independent application of nitrogen (120 kg/ha). During all years of investigation a return of 1 lv of direct expenses for buying of fertilizers was established. Averaged for the period these expenses were highest for the combinations between the macro elements from the nitrogen norm 120 kg/ha and reached a mean value of 3.43 lv income per 1 lv investment for fertilizers in systematic fertilization with $N_{120}P_{60}K_{60}$. Averaged for the period the economic analysis was in favor of the independent nitrogen fertilization regardless of the size of the fertilization norm and the noticed tendencies. In this case, however, we are considering the economic evaluation of an open and highly dynamic system which includes two biological components: soil and plant, which are strongly affected by the meteorological conditions and market price of the produce, without accounting for grain quality. When considering the negative effect of independent nitrogen fertilization on soil fertility, the economically more profitable application of independent nitrogen fertilization should give way to the most suitable norms and ratios between the main macro elements. Averaged for the period, regardless of the market character of buying prices even at the high fertilization norms high rentability was registered - from 9.13 % ($N_{120}P_{180}K_{120}$) to 68.01 % ($N_{12}P_{60}K_{60}$).

Key words: Wheat, Fertilization with different NPK norms and ratios, Economic Analysis

EFFECT OF MAGNESIUM AND POTASSIUM NUTRITION ON YIELD OF WHEAT UNDER DIFFERENT IRRIGATION REGIMES

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Abstract

Plants faced with many stress factors throughout their lives but these factors alone have an effect on the plant rarely. Especially recent ***climate changes, soil nutritional problems and combination of abiotic stresses such as drought, salinity, high temperatures and acidity causes a significant loss of yield and quality of plants. This event shows itself in drought stress more dramatically.*** In the ***last few years or recently studies indicate that, research*** indicates that the negative impact of drought stress on the plant is more important on the mineral nutrition deficiency. This study was conducted to understand the role of magnesium (Mg) and potassium (K) supply in reducing the drought stress and to determine the effect of combine stress on dry matter and grain yield. For the purpose, plants obtained with low or adequate Mg and K supplements under greenhouse condition were grown under 70% of field capacity (adequate irrigation), 35% of field capacity (moderate drought) and 20% of field capacity (severe drought) by the end of the ripening period. The results show that the dry matter and grain yield has decreased dramatically under the ***combined*** effects of Mg and K ***deficiency*** and ***water stress***. Both moderate and severe water stress resulted in significant decreasing effect on grain yield capacity of plants especially under Mg and K deficiency conditions. The results gained from this reasearch indicate that Mg and K nutrition of plants under water stress is important and the lack of Mg and K nutrition, drought more limits plant growth and productivity.

Key words: Drought stress, wheat, yield, magnesium, potassium.

**RESPONSE OF SOYBEAN AND WHEAT TO PHOSPHORUS FERTILIZATION ON CALCAREOUS SOIL
OF SAVA VALLEY AREA IN BOSNIA AND HERZEGOVINA**

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Abstract

The stationary field experiment of increasing rates of phosphorus (P) fertilization started in spring 2011 on calcareous alluvial soil of Posavian Canton in Federation of Bosnia and Herzegovina (B&H). By previous soil test was found low levels of plant available P (7.06 pH in 1n KCl; 4.17% organic matter; 3.79% CaCO₃; 5.4 mg P₂O₅ in 100 g of soil determined by ammonium-lactate-method). Five rates of P fertilizer (monoammonium phosphate: 13% N + 53 % P₂O₅) was applied as follows (kg P₂O₅ ha⁻¹): a = 75 (basic fertilization), b = 225; c = 375; d = 525; e = 975). The experiment was conducted in four replicates (basic plot 60 m²). In the next years only basic fertilization was applied. Crop rotation was as follows: soybean (2011) - winter wheat (2012 + 2013). As affected by P fertilization from 75 to 375 kg P₂O₅ ha⁻¹, soybean yield was increased for 20% (2.11 and 2.53 t ha⁻¹, respectively), whereas further increase of P rates resulted with lower yield to the control level. In both years significant differences of wheat yields were found only between basic and each rate of the increased P fertilization. Wheat yields of the control were 6.21 and 6.44 t ha⁻¹, for the harvest of 2012 and 2013, respectively. As affected by P fertilization yields of wheat were increased up to 13% in 2012 and 15% in 2013. Means of wheat yields of four P treatments (b+c+d+e) were 6.92 and 7.21 t ha⁻¹, for 2012 and 2013, respectively).

Key words: phosphorus fertilization, calcareous soil, grain yield, soybean, winter wheat

DETERMINATION OF PLANT NUTRIENTS TAKEN BY FLAX AND BLACK CUMIN FROM SOIL

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Abstract

Flax and black cumin are among of the most important spice plants of Turkey. This study was carried out at experimental fields of Selçuk University, Çumra Vocational College; in 2007-2008. The aim of this study was to determine the plant nutrients taken by these plants from soil. For this reason, the soil samples were taken according to the rules both before sowing and after harvest on the production area. The soil samples were analyzed in the laboratoires of Konya Trade Chamber. According to the analyses results; flax plants were taken from soil mainly Mg, Na and Fe elements while black cumin plants were taken mainly K, Mg, Na and Fe elements. Meanwhile, it was determined that some plant nutrients were increased in the soil after production of flax and black cumin. After production, the seed yield of black cumin was 1150 kg/ha and the seed yield of flax was 840 kg/ha.

Key words: flax, black cumin, soil analysis, plant nutrients

STUDY OF THE SYMBIOSIS RHIZOBIA IN FABA BEAN AND ALFAALFA CULTIVATED UNDER WATER STRESS AND SALINE

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Drought and salinity are major constraints limiting plant productivity dramatically, particularly in arid and semi arid regions. Plant tolerance to these constraints is a complex phenomenon. Research tolerant couples capable of operating in these conditions is a goal. The culture of faba bean and alfalfa remains uncertain due to drought and salinity of water and soil. The aim of this work is to study the effect of water stress and salinity on the rhizobia symbiosis with faba bean and alfalfa. This study identified several responses to water and salt stress. The results showed that drought and salt disrupt the physiological processes of growth and development, especially that of the symbiotic fixation of atmospheric nitrogen in the faba bean and alfalfa. Different symbiotic combinations studied react differently to water stress and salinity, this diversity can be exploited to determine the most efficient mechanisms deployed by the faba bean and alfalfa to adapt to drought and salinity.

Key words: water stress, salinity, symbiosis, rhizobia, faba bean, alfalfa.

RELATIONSHIP BETWEEN SALINITY STRESS AND ION UPTAKE OF HYACINTH (*HYACINTHUS ORIENTALIS*)

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Abstract

Salinity is one of the most severe environmental factors limiting the productivity of agricultural. Salt stress is also of rising importance in landscaping. Salinity is a reality in coastal area and in countries where de-icing salts are applied to roadways. Plants are affected in a different way by amount and kind of salt depending on their growth and development stage. Major saline ions can affect nutrient uptake which may cause reductions in plant growth. Hyacinth is grown worldwide as a commercially important bulbous ornamental plant. In this study the effect of salt stress on ion uptake of hyacinth (*Hyacinthus orientalis* L.) plants were investigated. The plants were irrigated with different NaCl concentration by the addition of 0, 25, 50, 75, 100, 200, 400 and 600 mM for 15 days with two days intervals in peat medium under controlled conditions. Salt treatments were imposed to plants at the beginning of flowering stage. The results obtained from this study show that ion uptake of hyacinth plants were affected under salinity stress. According to the results Na and Cl uptake were significantly increased by salt stress.

Key Words: Salinity, hyacinth, ion concentrations, bulbous plant

EVALUATION OF *BACILLUS SUBTILIS* CH-13 EFFECT ON YIELD AND QUALITY OF WHEAT

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Abstract

Objective of this study is to determine the effect of microbiological fertilizer (*Bacillus subtilis* Ch-13) on yield and quality of wheat. The experiment carried out in Uludag University Research field. Wheat (*Triticum Aestivum* L.) specie 'Pehlivan' used in experiment. During the experiment, any other irrigation and agricultural compounds did not apply. Five doses of chemical fertilizer (CF₀, CF₂₅, CF₅₀, CF₁₀₀) and two doses of microbiological fertilizer (BS₀, BS₁) was threated in this experiment. As basic fertilizer, 20-20-0 compose fertilizer was applied by seeding. Ammonium nitrate is used as nitrogen source and applied at two times. CF₁₀₀ (20 kg of N da⁻¹, 3 kg P da⁻¹) was the highest dose of chemical fertilizer. After the application of first dose of chemical fertilizer, microbiological fertilizer treated and untreated seeds were seeded by seeder in to the experiment parcels according to the experiment subjects. Microbiological fertilizer sprayed on to seeds 1-2 hours before sowing as 1L/tone seed, its mixed by hand and dried in shade. Two foliar applications has been made; the beginning of tillering (when 2-3 leaves) 200 ml da⁻¹ and in the spring just before of stem elongation. It is determined that microbiological fertilizer has positive effect on wheat yield grown without irrigation in Bursa. The highest yield in experiment was obtained with K50M1 (half dose of chemical fertilizers + microbiological fertilizer). Microbiological fertilizer application increased the wheat yield in all chemical fertilizer doses. However, with increasing doses of chemical fertilizer, the positive effect of microbiological fertilizer on yield is decreased.

Key words: Wheat, microbial fertilizer, chemical fertilizer

**CONTRIBUTION TO THE STUDY OF SOME BIOLOGICAL CHARACTERISTICS OF SOIL AND
RHIZOSPHERE FABIA BEAN (*VICIA FABIA* L. VR EQUINA AND MINOR)**

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Abstract

Studies on microorganisms have in recent years to develop the concept of "organic fertilizers" based primarily on properties known as "beneficial" in some organizations. Apart from these nitrogen-fixing bacteria widely used for making organic fertilizers are capable of some dissolved minerals in rhizosphere. These bacteria find a land application in agriculture in structuring the soil rhizosphere species *Vicia faba* beans or kidney beans (v v equina and the minor), presents an excellent host rotation enriches the soil with nitrogen by root excretion of nitrogenous products by detachments nodule or remaining roots. Before culturing the eleven floors of this rough textures, and heavy, after chemical and physical fronts v f crop *Vicia faba* equina and minor crops were put in the two species separately and has made the same physico-chemical, it was noted that the rate of carbon and nitrogen falling on almost all soils after cultivation. The resulting C / N ratios vary, but the rate of phosphorus are significant and increase in both types of cultures nodulation tests were positive with a slight difference noted in favor of the minor variety, it rots due to be rhizoidal diversity of flora which is at the origin of nodulation and that would be specific to this variety has rather to the overall charge of this flora latter finding at least partly explain the difference in nitrogen levels between the two types cultures, which could be related to deficiencies flora associated symbiotic. the decrease was less pronounced in the variety minor compared to the variety equina by against the latter seems more perfermente viewpoint nitrogen fixation.

Key words: rhizobia, symbiosis, nodule, fixing, v equina, v minor.

USAGE OF BENTONITE IN AGRICULTURE

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Bentonite is an absorbent aluminum phyllosilicate, essentially impure clay consisting mostly of montmorillonite mineral. There are different types of bentonite, each named after the respective dominant element, such as potassium (K), sodium (Na), calcium (Ca), and aluminum (Al). Sodium bentonite are swelling bentonite containing high ratio of sodium exchangeable base. Calcium bentonite non swelling bentonite containing high ratio of calcium exchangeable base. It is believed to be formed by the alteration of volcanic ash deposits, mostly of upper cretaceous era. The main uses of bentonite are for drilling mud, binder (e.g. foundry-sand bond, iron ore pelletizer), purifier, absorbent (e.g. pet litter), and as a groundwater barrier. Bentonite can be used in organic farming for sustainable agriculture to protect and maintain multifunctions of soil. Bentonite and zeolites are soil preserving natural materials which can be mined regularly and found suitable in our country. Benefits of bentonite use in agriculture can be summerized as follows; improves water and nutrient management of plant, increases water fixing and water holding capacity by 10 times, effective in making soil and carrier nutrients available, enhances number of nitrifying bacteria, total beneficial bacterial count, saccarase enzyme activity, microbial biomass nitrogen content, increases plant biomass by 20%, medium dosage of bentonite stimulates soil microbial parameters, increases phosphorous and potassium contents by 4% and 30%, respectively.

Key words: Bentonite, Agriculture, Mineral

DECOMPOSITION'S EFFECT OF CROP RESIDUES AND FARMYARD MANURE ON THE CHEMICALS EVOLUTION CHARACTERISTICS OF TWO TUNISIAN SOILS UNDER ARID CLIMATE

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ABSTRACT

To investigate the potential of crop residues (Sulla (*Hedysarum coronarium* L.), rapeseed (*Brassica napus* L.), faba bean (*Vicia faba* L. var *minuta* (eg Desf. Alef) Mansf....)), wheat (*Triticum durum* Desf) and bovine manure on soil fertility, the effect of their decomposition on the chemicals evolution characteristics of clay and sandy Tunisian soils under arid climate was evaluated by tracking incubation jars under natural conditions. The incubation was carried out under aerobic conditions and at a constant temperature of 28°C during 90 days with moisture adjusted to 2/3 of field capacity. Carbon mineralization through the CO₂ released and the evolution of chemical soil parameters were observed at regular dates. The study showed that the residues, bovine manure and soil texture influenced significantly ($P < 0.05$) carbon mineralization and chemical soil parameters (cation exchange capacity CEC, the sum of exchangeable bases, the saturation levels bases TSB), with higher values for clay. At the end of incubation, Manure in the clay soil were characterized by the highest values (CEC = 32.45 meq / 100 g, the sum of exchangeable bases = 23.78 meq / 100 g; TSB = 73%) compared to sandy soil. Residues of Fabaceae (sulla) in clay soil were characterized by higher values compared to controls and other residues (CEC = 5.28 meq / 100 g, the sum of exchangeable bases = 17.90 meq / 100 g; TSB = 64%) it represent a source of organic matter that could be used in the fertilization of Tunisian degraded soils. As a result, the comparative study of two types of organic matter (farmyard manure and crop residues) allows us to say that our organic matter affect soil properties with a greater relative importance for farmyard manure and Fabaceae residues. Thus, the properties of sandy soil appear relatively fixed. However, the improvement is limited in time. Bovine manure and crop residues, particularly the Fabaceae, are a source of organic matter that could be used in fertilizing degraded Tunisian soils.

Key words: Crop Residues, Bovine Manure, Incubations, Soil Fertilization, Tunisian Soils.

BIO-REVEGETATION IMPACT ON THE PHYSICOCHEMICAL CHARACTERISTICS OF A SANDY QUARRY SOIL IN TERGA BEACH REGION IN ALGERIA

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Abstract

In order to define the impact of a bio-revegetation effect on soil physicochemical properties, we used *Acacia saligna* in variants with bio-fertilizers such as rhizobia and mycorrhizae that play a key role in the productivity and sustainability of soil as well as the environmental protection. The area of study is a degraded sandy quarry in Terga, a coastal semi-arid area located in the northwestern part of Algerian. Our sampling and analysis of soil were made after each trimester of experiments in the fields, using four blocks, each one containing ten plots. Sampling is a composite of soil that was made in each plot diagonally on a depth of 10 cm and a diameter of 30 cm from the plant, at different times: first trimester (3 months), second (6 months), and third (9 months). Preliminary results showed a real and favorable modification of substrates by obtaining materials with less alkaline pH, there is a significant phosphorus increase in the second and third trimester compared to the first trimester, however the soil calcareous nature prevents the expression of some parameters resulting in a small improvement in total nitrogen and a deficiency in both exchangeable magnesium and organic matter.

Key words: sandy quarry, revegetation, *Acacia Saligna*, rhizobia and mycorrhizal inocula, total nitrogen, available phosphorus

EFFICIENCY OF POTASSIUM IN BARLEY GENOTYPES

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The variation in potassium uptake and utilization by Bulgarian malting barley genotypes was studied. Four varieties such as Obzor (state standard), Emon, Kaskadior and Krami and ten perspective breeding lines, selected by the Department of Genetics and Breeding at the Agricultural University-Plovdiv, were studied. It was established that the potassium concentration of straw was two times higher than the grain potassium concentration. Variety Krami and lines 17, 18, 31, 44 were distinguished with higher content of potassium in grain and variety Krami and lines 24 and 44 had higher straw potassium content. Accumulated potassium in straw represented eighty percents of the total potassium uptake in maturity. Kaskadior was characterized with the highest potassium harvest index and the lowest expense for 100 kg grain - 26.8% and 2,5 kg K₂O, respectively. Cultivar Emon and line 29 used most efficiently potassium to biomass and grain formation, and variety Krami and line 44 demonstrated the lowest values of KUE_b and KUE_g. The rest of the studied genotypes showed lower potassium use efficiency related to standard variety Obzor. A strong positive correlation was established between KUE_b and KUE_g with KHI, and between KUE_g and KUE_b. The efficiency of potassium use for biomass and grain was negatively related to the straw yield, the concentration and content of potassium in straw, the total potassium uptake and the expense of potassium for 100 kg grain.

Key words: potassium use efficiency, barley, genotypes

ACCUMULATION AND DYNAMIC OF DRY MASS IN DURUM WHEAT CULTIVARS IN DEPENDENCE OF NITROGEN FERTILIZATION

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Dry mass accumulation and dynamic until anthesis and during a grain filling period of seven Bulgarian durum wheat cultivars (Progress, Vazhod, Victoria, Predel, Deana, Zvezdica and Elbrus) were studied in 2010-2011. A field experiment with four rates of nitrogen fertilization – 0, 60, 120 and 180 kg N.ha⁻¹ was conducted. The climatic conditions (temperature and precipitations) during the vegetation of durum wheat were close to the mean long-term values for the region of South Bulgaria. It was found that dry mass at anthesis and maturity (without grain) and grain yield significantly increased with increasing of the nitrogen fertilizing up to rate N₁₂₀. The high nitrogen rate of 180 kg N.ha⁻¹ decreased the post anthesis net dry mass accumulation of studied cultivars with the exception of variety Predel. The model of dry mass dynamic depended of the cultivar and nitrogen fertilizing. The nitrogen fertilization increased average values of dry mass translocation and dry mass translocation efficiency, the contribution of pre-anthesis assimilates to the grain, and enhanced the average ratio of pre- to post anthesis accumulated dry mass of wheat cultivars. Bulgarian standard cultivar Vazhod was characterized with positive dry mass translocation and dry mass translocation efficiency, independently of nitrogen levels. At fertilization rates N₆₀ and N₁₈₀ new cultivar Elbrus demonstrated the highest dry mass translocation - 2590 and 2750 kg DM.ha⁻¹, respectively, and high dry mass translocation efficiency (25 %) and contribution of pre-anthesis assimilates to the grain (50 %). At moderate nitrogen rate 120 kg N.ha⁻¹ the reutilization efficiency of biomass and contribution of pre anthesis assimilates to the grain were the highest in cultivar Predel – 25.2 and 49.1 %, respectively.

Key words: dry mass reutilization, translocation efficiency; durum wheat

EFFECT OF SOIL TYPE ON THE PREDICTION OF SOME SOIL PARAMETERS VIA NEAR INFRARED SPECTROSCOPY

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The objective of this study was to examine the effect of soil type on the prediction of organic carbon, available phosphorus and potassium content and pH (H₂O) values via near infrared spectroscopy. A total of 126 soil samples of Vertisols (n=21), Chernozems (n=32), Fluvisols (n=47) and Luvisols (n=26), were taken from 0-20 and 40-60 cm layer. The soil samples were analyzed for organic carbon content, available phosphorus and potassium content and pH (H₂O) values by standard chemical methods. The spectral data of all air dried soil samples was measured using a Perkin Elmer Spectrum One NTS, FT-NIR Spectrometer, within the range from 700 to 2500 nm. It was formed four calibration groups, according soil type. PLS regression were used for calibration models development for the studied soil parameters. The accuracy of calibration models was evaluated using the coefficient of determination in cross validation (R^2_{cv}), root mean square error of cross-validation (RMSE_{cv}) compare obtained calibration equations. Results showed that values of RMSE_{cv} were different using calibration sets from different soil type. The highest values of RMSE_{cv} were obtained using calibration set with Vertisols samples and the lowest values of RMSE_{cv} were obtained with Chernozems and Luvisols samples.

DETERMINATION OF THE NUTRITIONAL STATUS OF WHEAT PLANT BY PLANT AND SOIL ANALYSIS IN THRACE REGION

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ABSTRACT

The aim of this study is to determine nutritional status of wheat plant in Thrace region with plant analysis. Soil and plant samples were collected from different 41 points representative to different soil groups in Thrace region. Both, basic soil analysis and micro nutritional elements (Fe, Cu, Zn, Mn, and B) were examined in these soil samples. Amounts of macro nutritional elements (nitrogen, phosphorus and potassium) and micro nutritional elements (Fe, Cu, Zn, Mn, and B) were also obtained in the plant samples. Amount of nutritional elements in soil and plant samples were compared with the threshold values to make further assessments. Study results indicated that wheat plant was fed enough in terms of macro elements. At some points, competency level was exceeded in terms of nitrogen and potassium. In terms of nutritional status for micro elements; iron, copper, manganese contents were determined at competence level, boron and zinc contents were determined below the competence level at several sample points.

Key words: Wheat, nutrition, plant analysis

INFLUENCE OF N FERTILIZATION AND PREDECESSORS ON TRITICALE YIELD STRUCTURE CHARACTERISTICS

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Abstract

The soil and climatic conditions of Stara Zagora are favorable for triticale cultivation. Its productivity is similar to that of wheat. Advantage of triticale compared to wheat, is that it can be grown with success and in mountainous areas, wherever wheat, rye, barley and oats productivity is lower. Nitrogen fertilization and predecessor are factors affecting triticale yield structure parameters determining in a big degree productivity of triticale. The aim of present study was to establish the effect of nitrogen fertilization on the yield structure characteristics of triticale cultivated after different predecessors. The survey was conducted on Gleic Chromic Luvisols, neutral and well reserved with K₂O, moderate with P₂O₅ and low with Nitrogen. The study was carried out with Triticale variety Rogen. Cultivation was performed according to the conventional technology of cropping. Triticale was grown after 5 predecessors and 4 levels of N fertilization were applied according to the predecessors as follows: Winter pea (*Pisum arvense* L.) and Spring pea (*Pisum sativum* L.) – N 0; 40; 80; 120 kg/ha; Sunflower (*Helianthus annuus* L.); Wheat (*Triticum aestivum* L.); Triticale (*xTriticosecale* Wittm.) – N 0; 60; 120; 180 kg/ha. Morphological characteristics (structure element of the yield) were measured: Specific weight of the stem, g; Height of the stem, cm; Length of the spike, cm; Weight of the spike, g; Number of the spikelets in 1 spike; Number of the grains in 1 spike; Weight of the grain in 1 spike, g; Hectoliter mass of the grain, kg; Specific weight of 1000 grains), g. The effect of Nitrogen fertilization on the triticale yield structure characteristics is different depending on the separate parameters. The highest positive effect of N fertilization – about 22 % increasing compared to non fertilization is obtained for weight of the stem, weight of spike and weight of grains in spike. Fertilization has a lower effect on the height of stem, length of spike, number of spikelets and number of grains. Fertilization does not change hectoliter mass and the weight of 1000 grains. Weight of stem correlates with height of stem. Weight of spike correlates with length of spike, number of grains in spike, weight of grain in spike and number of spikelets. Weight of grain correlates with number of grains in the spike, weight of spike and weight of stem. Specific weight of 1000 grains and hectoliter mass of grain do not correlate positively with other parameters. Climate circumstances and combination of rains and temperature during the years are factors influencing of a higher degree on the parameters – weight and height of stem, length of spike, hectoliter mass and specific weight of 1000 grains with power impact 50 – 88 %. Nitrogen fertilization as a factor has a bigger effect on the weight of spike, number of spikelets, number of grains and weight of grain in 1 spike. Weight of spike is the most important parameter with highest contribution to yield structure and is positive in F1 and F2. Weight of stem and length of spike are the next parameters positive in F1 and negative in F2. Number of grains, hectoliter mass, and weight of 1000 grain are negative for F1 and positive for F2. Number of spikelets, weight of grain, stem height are negative for the two F1 and F2.

EFFECT OF DIFFERENT PRE-PROCESSING METHODS ON THE PREDICTION OF SOME SOIL PARAMETERS VIA NEAR INFRARED SPECTROSCOPY

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Abstract

The objective of this study was to examine the effect of different pre-processing methods on the prediction of organic carbon, available phosphorus and potassium content and pH (H₂O) values via near infrared spectroscopy. A total of 126 soil samples of Vertisols, Chernozems, Fluvisols and Luvisols, were taken from 0-20 and 40-60 cm layer. The soil samples were analyzed for organic carbon content, available phosphorus and potassium content and pH (H₂O) values by standard chemical methods. The spectral data of all air dried soil samples was measured using a Perkin Elmer Spectrum One NTS, FT-NIR Spectrometer, within the range from 700 to 2500 nm. Amongst the pre-processing methods, smoothing with moving average, multiplicative scatter correction (MSC), standard normal variation (SNV) and 1st Derivative were mainly investigated. Partial least squares regression (PLSR) was applied for evaluation of the efficiency of different pre-processing methods on soil spectra as development of calibration model. The results showed that the combinations of SNV and 1st Derivative or MSC and 1st Derivative are better for use than raw soil spectra for calibration model development for the studied soil parameters.

PROPERTIES OF HARDPAN IN BOR-NIGDE SOILS AND ITS EFFECT ON CULTIVATION

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Abstract

In this study, soil properties of hardpan forming in Bor-Niğde soils and its effect on cultivation were investigated. Three different profiles were examined in the study area and soil samples were taken from various depths. As a result of the physical and chemical analyses, it was determined that soil structure of the study area, pH and EC values, Ca+Mg, ESP, organic matter, total N amounts were available media for the formation of hardpan. However, upon examination of available P, K, Cu and Zn values, it was concluded that their amounts in the study area were not effective in the hardpan formation in that area. As for bulk density, it was found out not to be sufficiently higher in comparison to the areas including hardpan. Climate, soil structure, physical and chemical properties of the project area are some of the important factors playing role in hardpan formation. The presence of the hardpan is rather limiting agricultural activity. In this context, plant and root growths are adversely affected. It was observed that efficient and productive agricultural activity could be done in the area, after the hardpan was broken and the amount of the organic matter that was very little and little especially for this area was increased and irrigation could be supplied.

Key words: Hardpan, physical and chemical properties, Niğde-Bor,

STUDIES ON NEW ENVIRONMENTALLY FRIENDLY FERTILIZERS IN COMMERCIAL VINEYARDS

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Abstract

During the last decades of the 20th century, perceptions of the relationships between agriculture and the environment changed markedly and the demand for more environmentally friendly vegetable production is steadily increasing. In this frame significant efforts are undertaken worldwide attempting the transformation of traditional (conventional) vegetable production systems towards the sustainable ones by developing, improving and adopting agronomic techniques based on their previous environmental performance evaluation. The main aim of this study was the evaluation of the environmentally friendly fertilizers BIO.L.A - 1650 kg/hr (6-5-6 + 1,5 MgO + CaO + 60% organic matter + 1% microorganisms + micronutrients + vegetable proteins + amino acids + zeolite), AXION RED – 1000 kg/hr (10-10-10 + 10% organic matter + 2% MgO + 2% Fe + 0.2% Zn + 0.2% B), QUATTRO – 800 kg/hr (13-13-13 + 13% organic matter) produced from the Greek Company AGROLA ABEE (Old Road Thessaloniki - Kilkis (12 Km., Ionia, 57008) on the nutrition status of a commercial vineyard (wine cultivar Xinomavro Naoussa), located in Strantzia Naoussa. The latitude of the vineyard was 40°39'41.55''N and 22°05'41.32''E. All the fertilizers were applied in January 2012. Plants without fertilization were used as control. Samples of leaves were collected in June of 2012. The results showed that there was no significant difference among the fertilizers tested in the leaf nutrient content. In contrast, the leaf P and K was less about 40% and 14% respectively in the leaves of control plants. Samples of soil, leaves and grapes were also collected in September of 2012. The results showed that the leaf N, P, K and Mg contents were less in comparison of those of June. In contrast the leaf Ca, Cu, Fe, Mn, Zn and B were similar with those in June. The fruit nutrient contents were similar in all 4 treatments with only exception the fruit N content which was much lower (about 45%) in control plants. The percentage of fruit rots (*Botrytis cinerea*) was significant less in the control plants in comparison to fertilized treatments. No significant difference was found in the percentage of fruit rot among fertilizers. Soil analysis showed higher content in organic matter, P, K, and Fe in all fertilized treatments, especially in the treatments with BIO.L.A. Generally, the above fertilizers and especially the fertilizer BIO.L.A. improve the nutrition status of vine plants and also improve the soil properties.

Key words: Fertilizers, vineyard, nutrient

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PREPARATION OF PEAT FOR SUBSTRATES BY NEUTRALIZATION WITH BLACK SEA ORGANIC-MINERAL SEDIMENTS - SAPROPELS

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Abstract

Peat is a ground component in various substrates for seedling production. Because of content of organic acids in the peat it has to be neutralized before using. In the period April-June 2014 was carried out neutralization of peat with Black sea organic-mineral sediments – sapropels. The results obtained were compared to control – peat without sapropels and etalon – neutralized with calcium carbonate peat. Incorporated in the peat the marine sapropels increase pH values as follows: At an amount 10 g/kg from pH 3.76 (control) to 5.24 after four days incubation, 5.41 after 11 days and 5.46 after 25 days. At an amount 30 g/kg at the same incubation periods to pH 4.86, 5.49, 5.79 and 5.93. At an amount 50 g/kg respectively to pH 6.37, 6.42, 6.49 and 6.58. At an amount 70 g/kg respectively to pH 6.90, 7.01, 7.18 and 7.22. At an amount 100 g/kg respectively to pH 7.08, 7.15, 7.19 and 7.28. At an amount 200 g/kg respectively to pH 7.30, 7.40, 7.42 and 7.43. By using calcium carbonate as etalon pH changes as follows: At an amount 10 g/kg from pH 3.76 (control) to 4.86 after four days incubation, 5.33 after 11 days and 5.41 after 25 days. At an amount 50 g/kg respectively to pH 7.36, 7.23 and 7.27. At an amount 100 g/kg respectively to pH 7.41, 7.43 and 7.56, compared to control.

Key words: marine sapropels, calcium carbonate, neutralization, peat

RESPONSE OF FIELD CROPS TO AMELIORATIVE PHOSPHORUS FERTILIZATION (A REVIEW)

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Abstract

Different types of nutritional unbalances, including also low levels of plant available phosphorus (P), are often limiting factor of soil fertility in Croatia and in countries of the region, particularly in Bosnia and Herzegovina (B&H). Aim of this study was survey our recent investigations (eight stationary field experiments) of maize, soybean, wheat and barley responses to ameliorative P fertilization up to different levels (depending on the trial up to 825-1580 kg P₂O₅/ha). Either MAP (monammonium phosphate: 12% N + 52% P₂O₅) or triplephosphate (45% P₂O₅) were used as source of P. Selection of soil was made based on the previous soil test. In spite of low levels of available P (ammonium lactate method: below 10 mg P₂O₅ /100 g of soil), response of the field crops to applied fertilization in four experiments in Croatia was mainly moderate or without significant differences. However, in B&H by using the rate of 1580 kg P₂O₅/ha maize yields were increased depending on year in municipality Kozarska Dubica from 16 to 40%, Gradiska from 8 to 38%, and in Laktasi from 6 to 18%. Also, by using 975 kg P₂O₅/ha soybean yield in Odzak municipality was increased for 20%. In general, year effect (weather characteristics) was the most influencing factor of yields in our investigations. We presume that ammonium-lactate method is not suitable as criterion of P supplies in all tested soils. From other side, majority of tested soils have additional soil fertility limitations as low pH or unfavorable physical properties.

Key words: phosphorus fertilization, grain yield, maize, wheat, soybean, barley

RHIZOSPHERE SYMBIONTS VALORISATION: EXPLOITATION OF COMMON BEAN-RHIZOBIA SYMBIOSIS ADAPTED TO P DEFICIENCY CONSTRAINT

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ABSTRACT

Leguminous have a high environmental, dietary and socio-economic importance especially for the African countries. Despite of their interest, their culture is decreasing during last years because of such biotic and abiotic constraints as temperature variations, impairment of Mediterranean soils in minerals especially phosphorus. The ability of a symbiotic association with rhizobia allows the biological nitrogen fixation resulting can be exploited to improve plant growth and fertility soil. The inoculation by rhizobia plays an important role in improving and increasing the potential of fixing the atmospheric nitrogen through increasing number and weight of nodules. In this context that is our study whose objective is to select an efficient rhizobia and bean genotypes to improve growth and production of this very important beans and adapt it to address constraints in particular soil phosphorus deficiency with reasoned inoculation with natives rhizobia from selected agroecosystem to preserve of biodiversity and agroecosystem functions. Six recombinant inbred lines, namely RILs: (CIAT) and one common bean variety widely cultivated in Algeria. Lines 115, 104 and 75 have been characterized as P-efficient whereas 147, 83 and 29 have been categorized as P-inefficient based on plant growth and seed yield in relation to the availability of P. This RILs was sowing both *in vitro* trapping and *in natura* multilocus test for 20 plots from Ain Temouchent agroecosystem chose in northwest of Algeria. After 45 days after transplanting the nodules are collected, according to macroscopically aspect 40 strains was selected to PCR-RFLP analysis amplified 16S rDNA genes. Total DNA was extracted as Laguerre (1992) described. Aliquots of PCR products were digested with restriction endonucleases. The following enzymes were used: *Msp* I and *Nde* II. Small collection of isolates revealed an interesting diversity. For 40 strains studied five were identified as *Rhizobium elti*, 3 *R. leguminosarum*, 11 *R.gallicum*, 1 *R.lotii*, 1 *R. ciceri* and 6 *Agrobacterium* and 10 strains remaining will be sequenced to be identified. For this strain studied, 29 can establish a nodule and 17 and 2 strains were more efficiency that was identified as *R. etli*. All strains were tested in glass house at hydroponic cultural condition. Plants were subjected to two P deficiency levels: moderate and severe. After 5 weeks of growth under greenhouse conditions, oxygen consumption measures related to nitrogen fixation were performed on the whole plant as Vadez (1996). O₂ consumption of root nodules of inoculated beans was measured at flowering stage 45 days after sowing (DAS). Results show's That P deficiency decrease nodulated-root respiration and affects growth parameters especially nodulation by lowering the number and size of nodules and nodule growth is more sensitive to P deficiency than the plant growth.

Key words: Common beans, nodulation, phosphorus, rhizobia.

DETERMINATION THE EFFECTS OF MANURE ON MAIZE GROWN UNDER IRRIGATED CONDITIONS OF SOUTH MARMARA

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Abstract

This research was conducted to determine the effects of manure applications in corn yield and yield components. The experimental design was completely randomized plots with four replications, carried out at Gönen-Kazancı vineyard location in the main crop season of 2013. Plots included eight 10 m rows. In the experiment, six treatments were used along with the control (biogas digestate, digestate+conventional, manure, manure+conventional, conventional). The highest green herbage yield, grain yield, and dry matter yield values were obtained from biogas digestate and conventional applications. Humic acid-rich digestate of farmyard manure and waste applications improved the soil structure, resulting increases in yield and quality characteristics.

Key words: Maize, digestate, manure, conventional.

THE UTILIZATION POTENTIAL OF DIFFERENT FORMS OF MANURE COMPOST IN CEREAL CULTIVATION

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Abstract

Bread wheat is one of the staple cereals for Turkish community. Barley is another cereal, which most cultivated species after the wheat, have been used to animal feeding and malt industry. In both wheat and barley cultivation, fertilization is one of the most important outgoings. Preferring the less and environmentally sensitive products may provide a significant contribution in cultivation of these cereals. The compost obtained from different materials has a significant potential in that manner. This study was arranged in Güvemalan Village of Biga, Çanakkale. Field trial was carried out in a producer's field at the year of 2013. Renan, Sladoran and Angela cultivars were used as plant material for wheat, two-rowed barley and six-rowed barley, respectively. Two-rowed barley is grown in the Gönen-Sarıköy, whereas six-rowed barley grown in Gönen-Hasanbey. In this study, we applied the two forms of compost (directly obtained from manure and after taken biogas from manure) alone and thought the chemical fertilizer. In wheat trial, measured traits were plant height, spike length, spike weight, kernel weight per spike, grain yield, test weight, crude protein content, gluten content, gluten index value, sedimentation value and modified sedimentation value were measured. In barley trial, the measured traits were plant height spike length, spike weight, kernel weight per spike, grain yield, test weight, crude protein content, ADF, NFD and ADL values. Our results of study showed that alone application of compost provide the significant contribution for high yielding and plant development in wheat. The higher grain yield values were obtained from plots where applied biogas compost (646.9 kg/da) and manure compost (608.6 kg/da). Along with the conventional fertilizer and biogas compost provide a satisfactory results for both yield and quality traits. The significant differences among the treatments were found for two-rowed (Sladoran) and six-rowed (Angela) barley cultivars in point of plant traits. The highest yield (519.0 kg/da) in two rowed barley were obtained from collaborated system with conventional and manure compost. When considering the results for yield and quality traits, it was determined that biogas compost should applied as alone while manure compost should together with chemical fertilizer in six-rowed barley. Results of this study showed that six-rowed barley could produce up using the manure compost without chemical fertilization.

Key words: Yield, Wheat Quality, Fertilization, Compost

STUDY ON MAXGROW UNIVERSAL LIQUID FERTILIZER EFFECT ON ALFALFA (MEDICAGO SATIVA L.) FOR FORAGE AND SEED PRODUCTION

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ABSTRACT

Liquid complex fertilizers find wide application in agriculture. The share of the used liquid fertilizers in the world is over 40%. The use of liquid fertilizers in Bulgaria has a very great future, due to their low price and minimum costs of application. They are convenient to dose when preparing the working solution, contain the essential macro and micro nutrients in the best possible form for assimilation by the plants. They are particularly effective for outside root additional nutrition – the so-called foliar fertilizing, which results in better absorption of nutrients (1.2). The last studies showed that the liquid fertilizers had a positive influence on the processes of foliar and root additional nutrition of plants with the purpose of increasing the yield and quality of seeds. Other authors recommended the combined application of leaf fertilizers with growth regulators, which increased the effect. The researches in our country on these matters are still insufficient and incomplete. The objective of this study was to establish the influence of the all-purpose liquid fertilizer “MaxGrow” on lucerne for forage and seed. The doses of treatment of lucerne from 0, 03 to 0, 05 l/ha MG for seed production were of interest, since on average for the period the yield was the highest: 356,3; 321,9 and 315,6 kg/ha, respectively. The increase, as compared to the untreated control, varied from 35, 4 to 231, 3 kg/ha. The highest yield of forage green mass, on average for the period of study, was produced at the dose of 0.06 l/ha MG with an yield of 12540 kg/ha, followed by the doses of treatment of 0,05 and 0,04 l/ha MG with produced green mass from 12490 to 10330 kg/ha, respectively.

Key words: fertilizing, liquid fertilizers, lucerne, seed production.

EVALUATION OF NATURAL PLANT WASTES ALTERNATIVE TO INORGANIC K FERTILIZER: BML CAPSULES

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Abstract

The effect of beet leave, chard, tomato and eggplant plant stem, banana skin, sunflower stem, Turkish coffee sediment, and egg shell wastes on the growing of bean, chickpea and onion plants was analyzed and evaluated to find alternative inorganic fertilizers in the study. The wastes were first dried, and powdered with the help of blender and garlic press. 22 experiment groups were formed, and KNO₃ was used as (+) control, water was used (-) control. Three different doses (125 mg, 250mg, 500 mg) were taken from each experiment group and they were applied on the plants. The first fertilizer application was done when the plants were in 3 leafed phase. The other two applications were carried out 3 weeks. Daily maintenance of the plants, essential measurements and observations were done regularly. With the help of this data to evaluate the effects of the experiments groups and doses we use the analysis of variance and Duncan significance test. And also we had an analysis done to determine th effect of the wastes on the amount of mineral substances in the habitat. The experiment groups that encourage the development of the length of the plant and leaf blade of the three plants (banana, banana + chard, banana + tomato) were determined. We produced fertilizer capsules by filling of effective wastes in essential doses. We provided these water solvable capsules from a pharmaceutical company. It was determined that the amount of K, N, P, Mg, Ca increased the habitat of wastes.

Key words: Fertilizer capsules, Natural wastes, Agriculture

EFFECTS OF VERMICOMPOST ON YIELD AND QUALITY IN GREENHOUSE LETTUCE PRODUCTION

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Abstract

In this study, it is investigated that the effect of different amounts of vermicompost on yield and quality in greenhouse lettuce production. Research was made at greenhouses of Havsa Vocational Collage in 2012. *Lactuca sativa* L. var. *crispacv*. Arapsaı was used in the experiments. Seeds(Rainseeds) of lettuce were germinated in viols include peat. Before the planting, in addition to the control group, 10, 20, 40, 80 and 100 g vermicompost(Vermisol Natural Tarım) per plant was added into soil. One month old seedlings were planted to the greenhouse with 30 cm row spacing and 25 cm intra-row Spacing. Weed control was made mechanically and irrigation was made according to the moisture needs of the soil throughout the experiment. At the end of two months, some characteristics likemean head weight, mean marketable head weight, mean head diameter, mean head height, mean diameter and length of root system, mean total leaf number, mean discarded number of leaves and mean total leaf number of marketable were calculated. At the end of the investigation, mean values of some characteristics for control group were like that; head weight (78,3 g), marketable head weight (70,9 g), head height (14,9 cm), head diameter (19,7 cm), length of root system (6,4 cm), diameter of root system (8,4 cm), total leaf number (23,4). On the other hand, when 40 g vermicompost was used per plant mean head weight(128,7 g) was maximized. Additionally, it was determined that mean head height (17,6 cm), mean head diameter (28,2 cm), and mean total leaf number (29,1) were also rose to maximum values by the same amount of vermicompost. As well as, most of characteristics examined in this study were significantly effected in a positive way by the all amount of vermicompost, it was also evaluated that the usage of 40 g vermicompost is optimum.

Key words: *Lactuca sativa*, Irrigation, Germination, Grass Quality, Unit Cost

THE RELATION BETWEEN ORGANIC MATTER AND BIOLOGICAL ACTIVITY IN KONYA REGION

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Abstract

In the study was researched that relation between organic matter and biological activity in Konya-Çumra plain at Çumra, Alibey and Alemdar series in which wheat cultivated areas. As a result of this study, was obtained significant statistically between the values of soil respiration and organic matter in these series. However values of correlation between organic matter and biological activity were not significant statistically.

Key words: Soil respiration, organic matter, series, wheat.

PROFILE OF ANTIOXIDANT ENZYMES IN TWO BULGARIAN BARLEY CULTIVARS IN EARLY GROWTH STAGE, DIFFERING IN SALT STRESS RESPONSE

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Abstract

Soil salinization is among the major crop yield limiting factors in contemporary agriculture. Excessive irrigation and climate changes are among the causes for increased salinity in previously unaffected areas, including the Balkan Peninsula. Development and improving of salt tolerant cultivars of existing crops is essential for meeting the growing food production necessity and for utilization of salinized agricultural areas. Marker assisted selection is among the promising approaches for fast and efficient screening of newly developed cultivars for various stresses tolerance. Thus identification and establishment of genetic and protein markers for stress tolerance is essential in modern agriculture. Along with osmotic stress and ion toxicity, high NaCl concentrations negatively affect plant growth and development by promoting burst in reactive oxygen species formation. Antioxidative systems are essential for overcoming of this negative effect. In the present study two newly-developed Bulgarian barley cultivars – Bozhin and Iz Bori were studied. Seeds and 4 days old seedlings were evaluated for their ability to germinate and grow at 0.15 and 0.3 M NaCl and proteins were isolated from root tips, roots and leaves. Antioxidative enzymes: peroxidases, ascorbate peroxidases, catalases and glutathione reductases were studied. Enzymatic profiles were obtained by zymographic analyses after electrophoretic separation and several isoforms were identified as associated with salt stress response and salt stress tolerance. Further analyses and comparison of zymographic to genetic and metabolomic data will reveal differences in the two cultivars and establishment of molecular markers for salt tolerance.

Key words: antioxidative enzymes, reactive oxygen species, salt stress, zymographic analysis

APPLICATION OF THE WATER EROSION PREDICTION MODEL (WEPP) FOR A MEDITERRANEAN SEMI ARID CATCHMENT: DEKIKIRA AND EL GOUAZINE, CENTRAL TUNISIA

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Abstract

The aim of this study was the application of a physically based model which is WEPP (Water Erosion Prediction Model) to quantify the erosion level for a Mediterranean catchment. This model was elaborated by the USDA to represent different mechanisms controlling water erosion and soil loss. The calibration of the parameters and the validation of the algorithms were done after several experiments in many stations all over the United States from which came the difficulty of its application anywhere else. Two catchments were selected: Dekikira and El Gouazine, they are both semi arid Mediterranean catchments belonging to El Oueslatia area from the Kairouan governorate, and they are hardly affected by the water erosion. The application of the WEPP for Dekikira has shown similar results to those of other studies done in many regions around the world. On the other side, the application of this model for El Gouazine was not obvious because this catchment is too large to be evaluated by WEP. So we have tried to subdivide it into 5 hydrological units and then the results were integrated.

Key words: Water Erosion, modeling, Water Erosion Prediction Model, runoff, sediment yield, Watershed and Lake Hill.

DETERMINATION OF METEOROLOGICAL AND HYDROLOGICAL DROUGHT IN DAMLICA CREEK WATERSHED IN ÇATALCA-İSTANBUL

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Abstract

Agricultural and Industrial water consumption increase with Industrial development, rapid population and urbanization in Thrace region of Turkey. Effect of drought increases with increasing of mean global temperature year by year in our region and the world. Drought is one of the most important results of climate change. The purpose of this study is to determine drought periods for Damlica creek watershed in Çatalca. It was began in 1980 and finished in 2006. Its duration for precipitation observation is 27 and stream flow observation is 25 years. The seasonal precipitation distributions for autumn, winter, spring and summer are 28.0 %, 36.7 %, 23.1 % and 12.2 %, respectively. Drought analyses for meteorological and hydrological have been done using two methods (the Standardized Precipitation Index, the standardized Runoff Index). According to runoff values, 1990 year has been found to be extreme drought, for precipitation values, 1983, 85 and 1990 years have been found to be severe drought.

Key words: Damlica watershed, Drought, Standard Precipitation and Runoff Index

PLANT DEVELOPMENT IN SOILLESS MEDIA

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Abstract:

Agricultural activities, has emerged with the existence of mankind. Therefore, humanity-soil cooperation is as old as the course of human history. These disciplines evolving over time and rapidly growing world population has caused over-exploitation of this resource and even it has revealed clearly the fact that it is a scarce resource. Under these conditions, the scientists have studied on the various components to replace soil and on soilless production media. In order to cope with the nutritional needs of a growing population and to recycle several waste streams that can be used, soilless culture has a high chance today in which the importance of organic production and agricultural areas are rather high. Soilless agriculture, as an alternative, is conservationist as well as an important research field to provide reintegration of agricultural areas that are too bad for agricultural use. Increasing of soilless agriculture by development will also increase the country's economic and the export potential. This review mentions some organic and inorganic soil-less media and mentions the effects of media on the plant growth environment.

Key words: Soil, media, soil improvement, pumice, peat,

PERFORMANCE OF WASTEWATER TREATMENT IN PETROCHEMICAL REFINERY PLANT SAMIR

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Abstract

Demographic, economic and urban increments are at the origin of different sources of environmental pollution in developing countries. Many stations are now activated sludge type functional in Morocco. These treatment processes require the monitoring of their performance and optimizing their operations to meet the prefectures of releases. The company SAMIR refinery Mohammedia is considered as the first factory producing much oil to Morocco. This unit produces wastewater containing hydrocarbons undergoing activated sludge biological treatment types. This study focuses on the diagnostic evaluation of the treatment of wastewater from oil spills SAMIR Company station to identify the steps on which we can act to improve the removal efficiency advantage of pollution. The results obtained in this study showed that the physicochemical parameters analyzed along different processing steps fluctuate over time. Indeed, the COD removal by the STEP yield varies between 35 and 100%. This fluctuation may be due to the change in raw water quality (pH, flow, COD, TSS ...) to the back of the die and physicochemical treatment by coagulation flocculation requires optimization. Monitoring of the sludge index showed a fluctuation between 20 and 40%, which shows a good settling of the sludge in the clarifier. Furthermore, the removal of hydrocarbons, phenols and detergents by STEP fluctuates over time. This justifies optimizing the operation with STEP.

Key words: Wastewater, Coagulation, Flocculation, Performance, Hydrocarbons, Phenols, Detergents

EVALUATION OF ANTALYA PROVINCE WITH REGARDS TO SOIL AND WATER RESOURCES

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Abstract

Agricultural production is mainly based on two bases, such as soil and water. The increase of plant production depends on preservation, improvement and sustainability of soil and water resources. With this regard, the water and soil resources of Antalya province have been investigated in this study. Antalya, which is located to the South of Turkey, by the Mediterranean coastline, has significant agricultural contribution to the economy. Almost 31% of the province population has settled in the countryside and they are all engaged in farming. Agriculture in Antalya is very strong in this region with regards to quality, yield and agro biodiversity. On the other hand, climate and vegetation show significant difference in coastline and highland. The total floor area of Antalya is 20874 and it owns a 2.6% of the total country land. 77.8% of the province is mountainous, 10.2% of it is plain and 12% of the province is rough. It is possible to see 16 different soil structures in the province. 27% of the province area consists of Red Mediterranean earth. According to the values declared by State Hydraulic Works (DSİ) in 2009, the amount of water used in the province is 1081 million m³. When the surfaces of dams, ponds are considered as water resources, the total province surface area is 5207.9 ha. The rate of the land in the province which can be irrigated in 19 counties of Antalya is between 6% and 97%. The general rate of the land irrigated in the province is 55%. The amount of land where vegetable production was carried out in 2009 in Antalya is 478105 decare including 232043 decare outdoor agricultural production and 246062 decare greenhouse production. The total vegetable production including mushroom production is 3535850 ton.

Key words: Soil, water, agricultural production.

THE STATUS AND THE PROSPECTS OF THE AMELIORATIVE MEASURES DRAINAGE AND IRRIGATION IN CROATIA

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Abstract

In Croatia there is total of 2,955.728 ha agricultural areas. Agriculture in Croatia is burdened with many problems which are calling for rapid solutions. Serious problems include the insufficient built of drainage systems, insufficient use of irrigation and the fragmentation of agricultural land. From total agricultural areas the hydromorphic soils cover 1,087.095 ha in which surplus water is retained a shorter or longer time in the course of vegetation period, especially in humid years. Till now, for excess surface water regulation completely are built canals on 724,749 ha (66.6%), partially are built canals on 324,662 ha (29.8%) of ameliorated areas, and pipe drainage is installed on 134,897,5 ha (16,4% from total areas on which is needed to install pipe drainage). Apart from the excess water, water deficiency that occurs during the growing season endangers productions of various crops, especially in dry years. From total arable areas (2,005.394 ha) there are 244,150 ha of soils suitable for irrigation and 588,163 ha of soils moderately suitable for irrigation. With regards to suitable soils and enough amount of water required for irrigation, irrigation in Croatia is currently applied on only about 15,000 ha or 0.75% of arable areas. Because of greater demands and good potentials for irrigation, the Government of Croatia in year 2005 started the project of irrigation and agricultural land and water management. The project foreseen the irrigation of 65,000 ha till 2020 year. Croatia farms have an average about 1.9 ha arable area and average plot size is 0.45 ha and therefore land consolidation is necessary.

Key words: Agricultural areas, drainage, irrigation, Croatia

LOCAL MONITORING PROGRAM FOR INVASION OF ZEBRAMUSSEL (*DREISSEN APOLYMORPHA*) IN THE DAM LAKE ZHREBCHENO, BULGARIA

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ABSTRACT

Zebra mussels (*Dreissen apolymorpha*) are bivalve mollusks approximately 1 to 5 cm long that live in freshwater lake. They have invaded many Bulgarian freshwater ecosystems in recent decades. Because of their ability to settle on almost any substratum, zebra mussels cause severe damage to closed water systems, RAS and intensive fish farming systems. In order to assess the status of the mussel population in the lake in area of the fish farm "Forest group", the distribution, extent of colonization, abundance, biomass and size-frequency, structure of post-settlement stages were studied in 2012 and 2013. The purpose of this management plan is to identify spread of zebra mussel colonies in the Dam Lake Zhrebchevo. Zebra mussels in Dam lake Zhrebchevo are category 2+, and 3+ according to the existing classification of abundance, population belongs to the class VI and hydrochemical parameters have values close to the optimal development of invasive mussels.

Key words: dam, invasion, zebra mussel, monitoring program,

QUALITY OF WATER FOR IRRIGATION

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Abstract

In the future, quality of irrigation water is expected to decrease due to the development of industry, therefore agriculture will be faced with less water and worse quality. In 2013 the increase in the yield of corn was created by irrigation, drip irrigation that max yield was 17,5 t / ha, and the yield of silage reached 112 ha. For better quality of agricultural production despite type of irrigation affects of quality water from aliquot presence elements: nitrogen, phosphorus, potassium, and total salt content. According to the Regulation on classification of waters in our country there are 5 classes of clean water, where surface for corn, silage of the region Pelagonian is irrigation water used from tank Strezevo that is belongs to the second class, technical and raw, slightly mesotrophic contaminated water. The measured average monthly concentrations of outlet water from the reservoir Strezevo amounts: $T^{\circ}C = 10,77 \pm 4,75$; $(O_2 = 10,43 \pm 1,24$; $CO_2 = 5,71 \pm 3,23$; $NH_3 = 0,0622 \pm 0,047$; $PO_4 = 0,03 \pm 0,029$; $NO_3 = 0,39 \pm 0,130$; $Fe = 0,10 \pm 0,056$;) / mg/l); Fortress $^{\circ}dH = 1,69 \pm 0,135$; and pH = $7,51 \pm 0,125$. In this paper we try to contribute to the debate that it is possible to identify increasing crop productivity of maize silage in addition to the system of drip irrigation using the water quality, ensuring food security and securing livelihoods farmers.

Key words: Irrigation, drip irrigation, quality water, elements of water, corn,

THE EFFECT OF ULTRAVIOLET RADIATION PERIODS ON PHOTOSYNTHETIC PIGMENTS AMOUNT IN CYANOBACTERIUM *ANABAENA VAGINICOLA* F. E. FRITSCH & RICH

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Abstract:

In this research the effect of ultraviolet radiation at different periods on the amount synthesis of chlorophyll *a*, carotenoids and phycobiliproteins was studied on cyanobacterium *Anabaena vaginicola* F. E. Fritsch & Rich. For this purpose cyanobacterium was isolated from regions paddy-fields soils in Mazandaran provinces. After liquid cultivation using BG110 medium, this cyanobacterium was treated by different ultraviolet radiation periods (1, 2, 3 and 4h). The results showed that the amount of chlorophyll *a* decreased under different ultraviolet radiation treatment. This reduction in 1 hour ultraviolet radiation treatment, show significantly different in compare with control and so the amount of carotenoids decreased but this in comparison with chlorophyll *a* did not significant. The reason for that probably is the sensitivity of the chlorophyll *a* to the ultraviolet irradiation which should be highest in comparison with carotenoids. Other possibility is the increase in carotenoids synthesis, because the rate of this pigment on detoxification of different Active oxygene species is well known. About phycobiliproteins, the amount of phycocyanin showed increasing with high period ultraviolet radiation treatment while amount of allophycocyanin and phycoerythrine decreased. These observations showed that ultraviolet radiation did not change phycobilisomes structure fragmentation and phycobiliproteins concentration changes was done incorporate with ultraviolet radiation compatibility.

Key words: Carotenoids, chlorophyll *a*, phycobiliproteins, different treatments

THE METHODS OF SOIL MOISTURE IDENTIFICATION AND THE CALIBRATION OF TDR SYSTEM

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In this study, the methods of soil moisture identification and TDR system, which is widely used, were discussed. Furthermore, Trase TDR tool was used in the calibration study in a certain soil texture (SCL). The soil samples prepared in accordance with the calculated bulk density were placed into 7 plastic columns containing different soil water contents (2.97%, 5%, 10%, 15%, 20%, 30% and 40%). The value of dielectric (conductivity) constant (K_a) in the columns was measured by using the TDR tool in different times and a soil-specific calibration curve was formed based on the volumetric moisture content. Calibration values of the experiment soil and percent values of the soil volumetric moisture contents, which are obtained with equation of Topp (1980), were found to be of approximate value. Data can be produced for available water level depending on water content and soil water characteristic curve obtained from measures within this study. In this content, it is possible to calculate irrigation water time and amount with identification of water content in the media.

Key Words: Soil moisture, TDR (Time Domain Reflectometry), calibration, soil water content, available water,

INVESTIGATION OF SOIL AND WATER RESOURCES: A CASE STUDY OF DÜZCE AREA IN TURKEY

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Turkey is a fortunate country in terms of soil and water resources, which are natural wealth and main components of agriculture for food requirement of a country. However, these resources were not utilized in the expected level. There are not enough studies on the conservation and the development of soil and water resources in Turkey. The management of soil and water resources in Turkey can be reach to satisfactory utilization by the academic researches on this subject and the required investments. By considering this, in this work, the conservation and development of soil and water resource in Düzce Area were investigated. The problems encountered during this research were evaluated; and, we proposed the solutions for the problems in this study.

Key words: Irrigation; Soil; Water resource; Management; Düzce

THE DETERMINATION SUITABLE IRRIGATION PROGRAMME OF TRAKYA ILKEREN GRAPE CULTIVAR GROWN UNDER ŞARKÖY CONDITIONS

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This study was conducted to determine suitable irrigation scheduling for Trakya Ilkeren table grape cultivar irrigated by drip irrigation method in 2012. The experiment vineyard was set up farmer conditions in Sofu village in Şarköy. In accordance with this purpose, daily evaporation was measured from evaporation pan. Themes of study consisted of four pan evaporation coefficients (A: 1,0, B: 0,75, C: 0,50, D: 0,25) and control (non irrigation). With the aim of determining the effects of irrigation themes on cultivar, parameters of yield, quality and vegetative development were measured. Yield results showed that the minimum yield, 2,4 kg/stock, was obtained in control theme, the maximum yield, 4,1 kg/stock, was obtained in a theme. Quality parameters indicated that brix were found between 14,3 % (A:0,50) and 16,0% (control) values. Total acidity measured in must were found between 7,4g/l (control) and 8,0 g/l(A) values. As a result, it was determined that bigger berry size and more yields were attained in A theme than other irrigation themes.

Key Words: Table grape, Drip irrigation, Irrigation Program, Evapotranspiration, Yield

THE DEFINITION AND MONITORING OF SOIL WATER CONTENT

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Abstract

Agriculture is the biggest water consuming industry by 70%. Overuse of water means wasting water, which is a critically important natural resource. Similarly, using less water than necessary leads to decrease in vegetative production. Therefore, it is extremely important to determine the accurate amount of water to be used in irrigation. For this purpose, it is a necessity to monitor and determine the amount of water already existing in the soil. Many different methods have been developed to be used in the determination of soil water content. In this research, three different methods have been investigated, and these methods are the most commonly used ones. The first method is gravimetric, the second one is time domain reflectometry (TDR) and the third is neutronmetre. Gravimetric method is a method which can be used to directly determine the soil water content. TDR and neutronmetre are the methods which are used to indirectly measure the soil water content. Gravimetric method is used in calibrating the TDR and neutronmetre methods. The indirect measurement methods have been developed to make them more practical in implementation compared to the direct measurement methods. In spite of all these advantages, the indirect measurement methods may not come up with the results as accurate as those of direct measurement methods. Moreover, the cost of the tools used in the indirect measurement methods is much more than that of the tools used in direct measurement methods. However, it may not be appropriate to use a method dependent on one single criteria. With this regard, this study aims to discuss the superiority and shortcoming of different methods to be used in determination and monitoring of soil water content.

Key words: Soil water, neutron probe, gravimetric method

THE EFFECT OF DRIP IRRIGATION INTERVALS AND SOME ANTITRANSPIRANTS IN THE WATER STATUS, GROWTH AND YIELD OF POTATO (*SOLANUM TUBEROSUM* L.)

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Abstract

In order to reduce the quantity of water applied by irrigation , increase the water use efficiency and determine the appropriate period for irrigation potato crop a field experiment was implemented at vegetables field, Department of Plant Production/ Agriculture Technical College /Mosul (Iraq) during spring season of 2014. This study involved four irrigation intervals (3, 4, 5 and 6 days) under drip irrigation system ,and spraying with five antitranspirants substances (control, Kaolin 5 g.L⁻¹, Magnesium Carbonate 3 g. L⁻¹, Liquid paraffin 2% , Nu-Film 17 1%), which subjected in a factorial experiment with in split plot system in a Randomized Complete Block Design with three replications. The results showed that increasing irrigation intervals from 3 to 6 days decreased the total water content of the leaves from 83.59 % to 81.81 % , the relative transpiration from 0.147% to 0.162% , plant yield from 542.22 gr. to 425.80 gr., total yield of tubers from 25.808 ton.h⁻¹ to 20.253 ton.h⁻¹ , marketable yield of tubers from 24.471 ton.h⁻¹ to 18.822 ton.h⁻¹ , where caused an increase in the leaf water deficit from 19.19 % to 23.86%, water use efficiency from 8.63 Kg.m³ to 13.32 Kg.m³. Spraying potato plants with liquid paraffin 2% lead to highest total water content 83.37% , lowest relative transpiration 0.152%, lowest leaf water deficit 20.33%, highest plant yield 509.22 gr., total yield 24.236 ton.h⁻¹ and marketable yield 22.770 ton.h⁻¹. On the other hand, the interaction treatment between irrigation intervals and anti transpirants resulted in a significant effect on many studied parameters.

COMPARATIVE STUDY OF ALGERIAN COMMERCIAL WATERS AND DEMONSTRATION OF THEIR PHYSICOCHEMICAL AND TOXICOLOGICAL QUALITY

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Abstract

The study consists on a comparison between mineral and spring waters which are not treated (only physically), the principal difference is the stability in time. Also their quality regarding the unwanted and toxic elements was developed. On the other hand, a comparison was made with Algiers distribution waters, whose consumption is not always recommended. Thereafter, the beneficial effects of Algerian mineral waters on the human organism were illustrated on the base of the physicochemical composition of each one and the contribution of each mineral salt. In conclusion, all commercial waters in Algeria are in standards, and each water could provide benefits to the human body through each own virtue and quality.

Key words: _Subsoil water, mineral water, spring water, water distributed, quality, standards.

NEW PLANTS WITH COMMERCIAL POTENTIAL

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Abstract

It is expected that the worsening of global warming and climate change will increase the frequency of droughts across many regions of the globe, possibly causing arid/drought conditions to become permanent. For this reason, many scientists are preparing for future scenarios that might require changes in the pattern of crops and plants being cultivated in different regions. Both the possibility of the depletion of fuel sources in the near future and the increased occurrence of droughts have compelled many people to use new plants as food and energy sources, and/or to use previously known plants in novel and different ways. To satisfy the demand for food and raw materials of the increasing population and to ensure food security, the use of new plants in agriculture is being increasingly considered. Agricultural production not only satisfies a population's demand for food, but also constitutes a large portion of the income of certain developing countries. In such countries, agriculture also provides employment for a sizeable portion of the population. In this context, it is important to investigate the potential uses of plants from the Mediterranean region of Turkey – such as Quinoa, Amaranth, Crambe, Lesquerella and Echinacea – in various areas such as energy, food, cosmetics, plastics and medicine. It is thus necessary to determine methods for ensuring effective agricultural production and yield with these plants, to effectively implement such methods, to perform the necessary economic analyses relating to these plants, to expand the food production potential of countries, and to also create sources of additional revenue by utilizing these new plants.

Key words: alternative plants, new plants, climate change

THE EFFECTS OF GLOBAL CLIMATE CHANGE ON AGRICULTURE AND FOOD

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It is estimated that the chemicals rised as a result the increase of urbanization and industrialization in the world will lead to significant changes in climate in last century. Related to the climate change increase of temperature average causes decrease of snow and rainfall, underground water level, dry up of rivers and lakes and increase of evaporation rate. Ecosystems can be affected adversely by negative effects on biodiversity, habitat change, destruction of microorganisms in the soil, increase of plant diseases and epidemics. Furthermore these significant hazards have affected agriculture. In recent years, in some plant diseases, increases that can result economic loss have been determined and it is thought to be associated with global warming. How to plant pathogens in a fight with results to be made will be among the key issues of the future. It is clear that besides vegetal and animal production industry related to the agriculture (food, liquor, tobacco and its products, textile and leather industry) will be affected negatively because of critical dry in some parts of the world. Despite of technologic developments like sophisticated product diversity and sprinkler systems global warming will cause change in agricultural activities like sowing and planting dates, kinds of products and cultivation fields. Because of productivity loss in many products, excessive use of pesticides and fertilizer and probable health risks threaten the food security. As a result of floods in agricultural lands, erosion, salinization the production of agricultural lands has been one of national security concerns in many countries. Turkey is among the countries risk group in terms of the potential impact of global warming due to surrounded on three sides by sea, its situation in the temperate climatic zone, its geological and geomorphic structure, and topography.

Key words: Chance, Agriculture, Food Supply, Drought, Global Warming

CASUARINAS: IDENTITY AND POTENTIAL USE IN PROGRAMS AGAINST DESERTIFICATION IN ARID AND SEMI-ARID REGIONS OF ALGERIA

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In Algeria, many dry lands are threatened by the desertification, which is defined as land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climate variations and human activities. Combating desertification by rehabilitating degraded lands can be done successfully, using many tree species. Notably, trees in the Casuarinaceae family have a wide range of applications in agroforestry and land reclamation, prevention of desertification; coastal dunes stabilisation; and restoration of degraded soils. Casuarinaceae species are actinorhizal plants which originated from Australia. They are fast-growing multipurpose species which do not require chemical fertilizers due to their symbiotic association with the nitrogen-fixing actinomycete *Frankia* and with mycorrhizal fungi. *Casuarinaceae* can grow in difficult sites, colonize eroded lands and improve their fertility, allowing the subsequent growth of more demanding plant species. Therefore, these trees have been increasingly used for reforestation and reclamation of degraded lands in tropical and subtropical areas. Our contribution, proposes to identify and present Casuarinas species found in Algeria and particularly those existing in the arid and semi arid regions and to evaluate their importance in the programs of reforestation and crop protection of agricultural development.

Key words: Casuarinas, desertification, reforestation, arid and semi arid regions, Algeria.

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