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International Agricultural Science Congress

AGRICULTURAL BIOTECHNOLOGY



I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

Regeneration of *Cichorium intybus* L. in Tissue Culture and Secondary Metabolite Analysis

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Abstract: The aim of this study was to examine different in vitro regeneration strategies of Cichorium intybus L. to increase the amount of its secondary metabolites. For this purpose, Cichorium leaves collected from field was cultured in MS and B5 media supplemented with different concentrations of plant growth regulators. After shoot and root regeneration from leaf explants, plantlets were taken from culture media and transferred to soil. Plants regenerated in B5 medium with IBA and NAA was selected for secondary metabolite analysis Leaf samples was also used for in vitro callus production. MS with IAA (Indole acetic acid) and BAP (Benzyl amino pürine) was the best medium for callus production. Stem, root, flower and leaf samples from field were dried and used for analysis of secondary metabolites. High Performance Liquid Chromatography (HPLC) and spectrophotometry were used to analyze of secondary metabolites obtained from in vivo and in vitro samples. Extraction of phenolic compounds (caftaric acid, esculin, chlorogenic acid, cichoric acid) was made by using ethanol/water (80:20 v/v) and quantified in HPLC. Quantification of inulin was performed by spectrophotometry. The highest caftaric acid and chlorogenic acid concentration were found in in vivo flower samples. On the other hand, concentrations of esculin and chicoric acid were more in in vitro leaf samples. Inulin concentration is the highest in roots collected from field.

Keywords: Cichorium, Tissue culture, Phenolic compounds, HPLC

Determination of Autootoxicity Effects on Regeneration from Mature Zygotic Embryo Explants of Wheat (*Triticum aestivum* L) Plant in vitro Conditions

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Abstract: Autotoxicity is a biological phenomenon in which a plant is prevented from growing or multiplying by members of the same species through the production of chemicals secreted in the environment. Autotoxicity refers to self-toxicity and always provide inhibition to plants in the environment, whereas, allelopathy refers to the effects of chemical compounds of a species on other plants after they are released into the environment. and can be made inhibitory or stimulatory to the growth and development of other plant species. As in field cultivation, autotoxicity in plant tissue culture studies negatively affects the neighbouring explants in the same culture cab taken from the same source or plant and makes it difficult or impossible to regenerated. In this study, autotoxicity effects of mature zygotic embryo explants were evaluated using 6 different geometric patterns. The results, the regeneration ability of the explants changed differently due to autotaxy which was released when callus was formed in a culture cab. Hyperhydricity on the regenerated explants, swelling in the roots, curling, and other abnormalities were noted in developing roots during regeneration from these explants. However, one or two explant per cultures in cab resulted in sound regeneration on each explant with no similar adverse effects or abnormalities. This clearly indicates care to be taken during regeneration from the explants to avoid autotoxic effects of the explants.

Keywords: Plant tissue culture, Micropropagation, in vitro, Autootoxicity, Zygotic embryos, Wheat, *Triticum aestivum* L

Effects of Sucrose Treatment on in Vitro Rooting of SG3 Polygerm Line of Sugarbeet Shoots

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Abstract: Sugar beet farming in Turkey is held in every four corners of Anatolia. Prevention of all factors causing sugar beet abiotic stresses at every stage of tissue culture is very important for development of protocols for plant regeneration in sugar beet. This could speed up the micropropagation and transformation studies in sugar beet and will avoid economic losses in the developing plants to obtain quality products. Benzylaminopurine (BAP) is slow moving hormone that has a negative and inhibitory effect on plant growth and root formation; if the explants persists in the culture for more than 3 weeks. This study reports rooting of in vitro micropropagated shoots on 1 × MS medium containing 1.00, 1.5, 2.00, 2.50 3.00 mg / l BAP + 0.1 mg/l NAA from the cotyledon node of the SG3 polygerm sugar beet line. The developing shoots were cultured on 1 × MS medium containing 15 mg/l sucrose for 10 days. Theirafter, the subjected shoots were rooted on MS medium containing 0.5 and 1 mg/l NAA. The results confirmed significant effects of NAA on on root formation percentage (60-100% and 60-80%,), root length, number of roots per explant (8.33 -11.50), and root length (4.25-12.00 cm) when compared between the tow hormones. However, similar results were not obtained from explants without sugar pretreatment. The plantas obtained in the last phase were transferred to the pots for acclimatisation to the external conditions.

Keywords: Plant tissue culture, Micropropagation, in vitro, Sugar beet, Rooting, Sucrose

The Importance of Using DAPI Staining for Androgenesis Studies in the Example of *Anemone coronaria* L.

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Abstract: In vitro androgenesis techniques including anther and microspore cultures are powerfull biotechnological tools for breeding studies. The success of the techniques belongs severel factors. One of them, may be the most important one, is determination of the proper microspore developmental stages for the culture. Along with the numerous other staining methods to be used for this purpose, 4'-6-diamidino-2-phenylindole (DAPI) staining is the most reliable one. DAPI is a DNA specific fluorochrome that emits blue fuorescence at maximum 488 nm wave lenght. The importance and necessity of using DAPI staining for androgenesis studies was presented in the example of Anemone coronaria L. in this study. In addition to DAPI, different staining methods consisting of acetocarmine, feulgen, ethidium bromide, lacto-propionic-orcein and sectioning with hematoxylin dye were compared in terms of their ability to clearly display the place of microspore nuclei. Among them, DAPI showed up the clearest nuclei views and determined to be the most practical dye with high efficiency. As the result, DAPI staining proved to be reliable for the detection of all microspore developmental stages of A. coronaria which are normally difficult to visualize.

Keywords: Androgenesis, Anther, DAPI, Doubled haploidy, Microspore

Plant Growth Regulators Used in Caper Micropropagation and Development of Biologically Active Substances in vitro

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Abstract: Caper (Capparis spp.) is an important medicinal plant and belongs to Capparaceae family, commonly known as "gebere, gebre, gevel" in the different regions of Turkey. Two main caper species, namely C. spinosa and C. ovata were commonly grown in Turkey. Based on the global and national importance of the species and because of high endemic species rate, Turkey gave C. spinose higher priority more conservation. Many universities and institutions focused on a great attention to caper plant, by listing at least one of the Capparis spp. on their research program. Traditional method of propagation through seed is not preferred for propagation of caper plant due to low germination rate with high seed dormancy and the cross pollination behavior of the plant that result in high degree of heterozygosity of seeds. Therefore, the tissue culture of caper became more important subject for production and improvement of a procedure for micropropagation of caper species will be an important contribution for obtaining of biologically active materials of this plant on in vitro. In this review study, plant growth regulators used in the micropropagation of caper and development of essential substances will be discussed. 2200 caper plantlet were planted at the Aralık, Iğdır erosion control area in 2017. Obtained results from literature sources will open new avenues for improvement of the efficiency and lowering the cost of caper micropropagation.

Keywords: Capparis, Tissue culture, Explant, BAP, IBA

Genome-Wide Association Mapping for Fiber Length in a Global Germplasm Collection of Upland Cotton

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Abstract: Cotton supplies a great majority of natural fiber for the global textile industry. Exploring the elite alleles and germplasm accessions related to fiber quality traits will accelerate the breeding of cotton for fiber quality improvement. Genotyping-by-sequencing (GBS) is a method that can rapidly identify and genotype a large number of single nucleotide polymorphisms (SNP). Genotyping a germplasm using GBS technologies will enable us to identify marker-trait associations with high resolution. Field trials were conducted in Kahramanmaras and Diyarbakir during the 2016-2017 cropping season under standard conditions. Results revealed significant differences ($P < 0.05$) for genotypes in both environments for fiber length. Association mapping using the mixed linear model (MLM) and General linear models (GLM) was performed for both locations of the study for fiber length. Marker-trait associations were observed in association panel and it was shown that 95 SNPs found to be highly valuable also verified in GLM. This is due to the incorporation kinship matrix which allows to overcome false genetic variants. Totally 57 SNPs were observed using mixed linear model for fiber length and distributed on chromosomes 1, 4, 5, 8, 9, 11, 12, 13, 14, 15, 16, 18, 19, 21, 22, 23, 25, 26 in upland cotton while eight markers were novel. SNPA8449, SNPA9388 had very low probability i.e 0.000003, 0.000001 with r2 0.2196 and 0.17875 respectively. Therefore, there is great potential for mining elite alleles from germplasm accessions for use in fiber length improvement in modern cotton breeding.

Keywords: GBS, Association mapping, Fiber lenght, QTLs

Branched Wheat Grown in Marmaris Produces More Spikelets and Grains

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Abstract: Wheat is one of the most important crop plants in the world. World population will be more than 10 billion in 2050. Increasing wheat yield is one of the most important aims in crop studies. It has been reported that Miracle wheat (Triticum turgidum compositum, 2N=4X=28) has branched phenotype. Mutation in TtBH-A1 (Branched Head-A1) gene causes more spikelets and grains than unbranched wheat. Additionally, it has been reported that homologs of this gene in crops have the similar functions. Spike length, spikelet number, grain number, yield/spike and thousand grain weight are the main yield related parameters. Our aim was to evaluate yiled analysis of branched wheat grown in Marmaris. Marm-1 (branched), Marm-2 (unbranched) and Marm-3 (unbranched) have different phenotypes. Spike length, spikelet number in a spike, grain number, yield/spike and thousand grain weight parameters were measured and calculated. Marm-1 significantly produced more spikelet and grains than unbranched ones. Additionally, yield/spike of Marm-1 was importantly higher than unbranched wheats. However, thousand grain weight was significantly lower in branched wheat. As a conclusion, this branched wheat had a higher yield potential.

Keywords: Yield, Branched wheat, Marmaris, More spikelet, Grain number

Acknowledgements: We are grateful for the financial support provided for this research by Van YuzuncuYil University Scientific Search Project Department (FHD-2017-5752).

Determination of Genetic Relations among Tomato Genotypes with ISSRs Molecular Markers in Sulaymaniyah Region

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Abstract: The aim of this study was to investigate the genetic relation among 32 tomato genotypes (*Solanum lycopersicon* L.) grown in Sulaymaniyah using ISSR molecular markers technique. The results of ISSR markers, revealed 65 amplified fragments, 50 of them were polymorphic from using 15 primers. Fifteen ISSR markers used to detect DNA polymorphism gave polymorphism percentage for each primer range between 50–100% with an average polymorphism percentage reaching 75.61%. In general ISSR markers could detect high polymorphism, primer ISSR6 and Sola 11 gave the highest polymorphism percentage were 100%, while primer 3F, Sola 5 and Sola 12 did not give any amplification. The mean of PIC (Polymorphic Information Content) value was 0.50 for ISSR markers. The similarity matrix was computed by using Jaccard similarity coefficients, based on polymorphic bands and dendogram established through UPGMA cluster analysis. The dendogram revealed 3 main groups. Genetic similarity (GS) ranged from 0.261 to 0.941 within studied genotypes. The highest similarity was 0.941 for the genotype pairs G7 and G16. However, the lowest similarity index was 0.261 between G15-G24 and G15-G26. The ISSR technology proved useful in describing genetic diversity among tomato genotypes was collected from different geographical around Sulaymaniyah province.

Keywords: Genotype, ISSR, *Solanaceae*, Sulaymaniyah, Tomato

Acknowledgements: We are grateful for the financial support provided for this research by Van YuzuncuYil University Scientific Search Project Department (2015- FBE-YL360).

Transcriptomics of Synthetic Elicitor-Mediated Defense Activation: What We Have Learned so far?

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Abstract: Synthetic elicitors are drug-like compounds that are structurally distinct from natural defense elicitors. By activating plant immune responses, they can protect plants from diseases. Also synthetic elicitors can serve as tools for the dissection of the plant immune system as well as leads for the development of environmentally-safe pesticide alternatives. By high-throughput screening, we previously identified and characterized several synthetic elicitors (e.g. DPMP and BHTC) that effectively induced plant immune pathway and reduce pathogen infection. By mRNA-seq analysis, we have revealed global transcriptional patterns associated with these synthetic elicitors. We analyzed the pattern of synthetic elicitors and compared these results with global transcriptional results of pathogens or known elicitors. All of the above results gave us valuable information about profile of these synthetic elicitors. İn Arabidopsis thaliana, while the set of synthetic elicitor-up regulated genes largely overlap with genes induced by the known SA mimics DCA, INA and BTH, they also induces expression of couple of hundred of genes that are uniquely targeted by these compounds. Deep understanding the characteristics of these unique genes in arabidopsis and different plant species (wheat, corn, tomato) may give us better insight about how to interpret profile of these compounds.

Keywords: Transcriptomics, Synthetic elicitor, Plant immunity, *Arabidopsis thaliana*, Wheat

Genome-Wide Identification and Expression Analyses of bHLH38, bHLH39, bHLH100 and bHLH101 Genes in Higher Plants: Insights into Iron (Fe) Homeostasis

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Abstract: Iron, comprising abundantly earth crust, is an indispensable element for plant growth and development because of having important role in many vital biochemical processes such as respiration, photosynthesis, nitrogen gas fixation, redox reactions etc. A basic helix-loop-helix (bHLH) transcription factor family, playing in many regulatory and development processes in plants, was identified to be included in iron uptake mechanism of plants. In this respect, particularly bHLH38, bHLH39, bHLH100 and bHLH101 genes were determined as bHLH family members regulating iron homeostasis of plants. Therefore, the objective of this study was to determine the role of these genes, found four in Arabidopsis, four in tomato, one in rice, four in soybean and one maize species, in Fe homeostasis through bioinformatics tools. Our analyses showed that all bHLH proteins had the helix-loop-helix (HLH) DNA binding domain (PF00010). The exon numbers of four Ib subgroup bHLH proteins ranged from 2 to 13. Plants under investigation did not show any clear distinction of monocot and dicot division. The establishment of 61 cis-elements in promoter sequences revealed that they have been included in many metabolic processes from biotic to tissue specific gene expressions. 3D structures of bHLH38, bHLH39, bHLH100 and bHLH101 proteins comprised different cavity and channel numbers. Our co-expression network analysis revealed that bHLH39 and bHLH101 genes were more effective in Fe acquisition in Arabidopsis. Supporting this result, digital expression analysis also demonstrated that bHLH39 and bHLH101 genes highly expressed in seed parts and adult leaves in terms of anatomical parts.

Keywords: Iron homeostasis, Bioinformatics, Co-expression network, bHLH

Genetics of Triticeae Root System, Lessons from Rice (*Oryza sativa* L.) and Maize (*Zea mays* L.)

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Abstract: Poaceae family includes the most important crops for human and animal consumption. More than %50 of daily caloric intake comes from wheat (Triticum spp.), maize (Zea mays L.) and rice (Oryza sativa L.). Root system of these plants may change based on the genetic structure and environmental factors (root plasticity). So far only few genes cloned related to root system or drought tolerance. There are many reports evaluating root traits, and QTL reported on almost every chromosome on these crops. Unfortunately, none of them get to next step and cloned, except DRO1. This gene, identified in 2011, is the first gene cloned, and successfully used on many different rice cultivars for drought tolerance. This study aimed at discussing the current status of crop root research and difficulties on studying root system. Results highlighted here comes from the most recent achievements on root studies on above-mentioned crops. Current methods on studying root system architecture and genetics will be evaluated to promote root research in Turkey.

Keywords: Root genetics, Chromosome 2D, DRO1 gene, Bread wheat

The Effect of Esterone on the Genomic Instability Caused by Salinity Stress

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Abstract: Salt stress is an important factor limiting crop yield in some cereal crops such as wheat. In previous studies it is known that retrotransposons move under various abiotic stresses such as drought, salt etc. Recent studies have been focused on the expression and movement of retrotransposons. Retrotransposons are mobile genetic elements that transpose through reverse transcription of an RNA intermediate. Retrotransposons are ubiquitous in plants and play a major role in plant gene and genome evolution. Some mammalian sex hormones have been reported to have a positive effect on plant growth and development in plants. In this study, it was aimed to determine the esterone effect and change of retrotransposition movement induced under salt stress by using (Triticum aestivum L.) IRAP (Inter-Retrotransposon Amplified Polymorphism) techniques and GTS (Genomic Template Stability) assay. For this aim, we treated 200 mM NaCl and esterone solutions in the 3 different concentrations (10-7 M, 10-8 M and 10-9 M) to the wheat seeds. Then, we observed the germination rates of seeds and growth of the seedlings. As a result, the all of esterone concentrations increased the rates of germination and growth compared with control. Also, we determinated that salt stress increases genomic instability, but esterone mitigated the damages of salt stress by decreasing GTS. According to these results it was recorded that esterone eliminated the harmful effects of the salt stress.

Keywords: Retrotransposon movement, Wheat, DNA damage, Esterone

AHAS Genes in Tomato and Potato: Insights into Herbicide Resistance

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Abstract: Acetohydroxyacid synthase enzyme (AHAS) involves in synthesis of the complex and branched-chain amino acids whose regulations are of importance to balance intracellular amino acid supply and whose intermediates involve in many pathways within cells. Herbicide families, known as group B, such as sulfonylureas (SU) imidazolinones (IMI), etc., inhibit AHAS. The AHAS herbicide mutations are one or more-point mutations conferring resistance to herbicides. Therefore, the objective of this study was to provide insights into amino acid substitutions in AHAS enzyme giving rise to resistance to AHAS inhibitor herbicides in tomato and potato. The results showed that all AHAS proteins were abundant with Ala, Gly, Leu, Pro and Val amino acids while deprived of Cys, His, met and Trp residues. All proteins investigated in this study were composed of three multiple domains with similar protein properties. Furthermore, AHAS proteins had highly well conserved residues across the species but differed in length. Monocot and dicot separation was clearly observed among species. The most similarity was found between AtAHAS and StAHAS followed by those of OsAHAS and StAHAS. In terms of mutation analyses, Lys and Arg in StAHAS were identified as protein stabilizing residues for ile124 while Lue was found for Met266 and Ala, Pro and Ser were changeable for Leu272. Similarly, Ala, Phe, Arg, and Val in SlAHAS were mutable residues for Lys541 in terms of preserving enzyme activity whereas Ile was for Val542.

Keywords: Acetohydroxyacid synthase (AHAS), Acetolactate synthase (ALS), Herbicide resistance, Mutation

Leaf Two- Dimensional Electrophoresis of Maize Inbred Line B73 Infected by *Fusarium verticillioides* (Sacc.) Nirenberg

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Abstract: Maize (*Zea mays* L.) with a production of 1021 million tons in year 2016 was one of the most important cereals in the world. Many pathogens attack corn., One of the most important of these factors is Fusarium of decay cluster or ear disease. This disease is caused by the fungus Fusarium spp. F. verticillioides species is widespread pathogen. To verify the proteins involved in response of maize Inbreed line B73 against Fusarium disease, two-dimensional electrophoresis pattern of its leaf proteome was investigated. TCA-acetone method was used to extract leaf tissue total proteins. Isoelectric focusing was used to resolve proteins for the first dimension and the second dimension was as SDS-PAGE. Gels were stained with Coomassie Brilliant Blue and after destaining, they were scanned and analyzed by PD-Quest software. The results showed that from 99 repeatable protein spots, 36 spots changed under stress via F. Verticillioides. There were 12 spots with up-regulation. Probabilistic identification of proteins was done by pI and molecular weight. Candida proteins involved in energy production, canalization and messenger, defense and the structure of other proteins. The major portion of these changes (33%) belonged to defensive proteins. All proteins involved in energy production had down-regulation. The half of defensive proteins and channel and messenger proteins had down-regulation. In the case of proteins involved in the structure of other proteins, only the Isoform 3 of Protein-L-isoaspartate O-methyltransferase 2 showed an up-regulation which has important role in repairing damaged proteins and this increase may indicate the response of plant

Keywords: Biotic stress, Fusarium rot, Proteomics

Oral Presentation

Identification the Reactions of Some Cotton Varietes Against Verticillium Wilt Desiase Caused by *Verticillium dahliae* Kleb.

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Abstract: In this study, 299 cotton genotypesfrom our germplasm stockused to determine their response against Verticillium wiltdiseaseand to use the tolerant ones in our Verticillium wilt tolerant genotype breeding program. The trial was conducted in a randomized plot design with four replications in the growth chamber to determine the response of some cotton varieties according to 0-4 scala against a defoliating and non-defoliating pathotypes of Verticilllium dahliae Kleb. by using Conidia Suspansion Method. In this experiment there were four control genotypes; as tolerants (ACALA MAXA, CARMEN) and susceptibles(ÇUKUROVA 1518 and ACALA S.J.2). Variance analysis showed significant differences ($p< 0.01$) among varieties. The highest disease severity value of defoliation pathotype was determined in FLASH (2.98), variety, followed by AB196 (2.75) and BA811, while CARMEN control variety determined as tolerant variety almost resistant. The most tolerant varieties found in G. arboreum L. cotton was W2 and followed by G. herbaceum L. variety W1 and come after G. barbadenseL. species varieties GIZA45, GIZA70, and SPHİNX(1.0) belongs to G. hirsutum L. The highestinoculum value of non-defoliation pathotype (VD11) identified in the G.hirsutumL. genotypes were ÇUKUROVA1518 (3.97), SHAEL-1 (3.91) and fallowed by IS-4 VE SPEARS 3.The lowestinoculum value found in G. herbaceum L. cotton variety W1 (1.3), G. barbadense L. cotton varieties GIZA45 andGIZA70 (1.47) and followed by G. hirsutum L cotton variety SEMARKANT (1.50). As a result, to develop new tolerant cotton varieties against Verticillium wiltdiseaseit wasrecommended to use CARMEN, SPHINX, SEMARKANT, GIZA45 and GIZA70 cotton varieties and wild types in breeding programs.

Keywords: Verticillium wilt, Resistance, Cotton

Starch/Potato: Cellulose/Pistachio: Lignin/Barley Straw Characterization and Comparison of Three Kinds of Plants-Contained Poly

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Abstract: Most biomass consist of cellulose, hemicellulose, starch and lignin that contain more than one hydroxyl group in the moleculer chain, which in liquefy can be used for preparing composite materials. In this study, starch/potato waste: cellulose /pistachio peel: lignin/barley straw were liquefied with two different acid catalyst concentrations and in two different liquefaction periods by micro-wave heating method. Synthesis reactives were used as 0-80 mesh-sized milled form of plants and reaction's completion temparatures were detected. 350 watt/min micro-wave energy, 300 rpm/min mixing speed and mass ratio of solutions PEG400/Glycerol 4/1 w/w had been constanted. The physical properties of biomass-contained polyols (reaction product) as density, viscosity and surface tension were measured in accordance with ASTM-4669, ASTM D 4878 and pendant drop method respectively. In addition to this, the number of the acid and hydroxyl ions which situated in the polyols were determined in accordance with ASTM D 4662-08 and ASTM D 4274-05. The reaction enthalpy of liquefaction synthesis reactions were calculated theoretically. The maximum liquefaction ratios were realized for potato waste with 9% w/w x (mPEG400 +mglycerol) acid catalyst concentration and 30 min reaction period and pistachio peels with 9% w/w x (mPEG400 +mglycerol) catalyst concentration and 15 min reaction period, none the less, this condition for barley straw was realized with 15% w/w x (mPEG400 +mglycerol) catalyst concentration and 10 min reaction period. All liquefaction reactions were exothermic and enthalpies were negative. As a novel tecnology, liquefaction of biomass components have stil many issues, and further efforts.

Keywords: Plant, Waste, Liquefaction, Polyol

Acknowledgements: We are grateful for the financial support provided for this research by Van YuzuncuYil University Scientific Search Project Department (2013-FBE-D060).

Plant Mediated RNAi Strategy to Induce Insect Resistantce in Transgenic Potato Lines

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Abstract: Most of the commercialized insect resistant transgenic crops express cry gene (s) isolated from Bacillus thuringiensis, however, intensive cultivation of Bt crops over almost two decades has been questioned regarding its sustainability and durability in pest management. Pest resistance in Bt plants appear to be more and more problematic as evident from recent studies. RNAi has also proved its usefulness in functional genomic research on insects recently and is considered potential strategy in crop improvement for the control of insect pests. The present study focuses to knock down highly specific 20-hydroxyecdysone hormone – receptor complex interaction by using RNAi approach to silence Ecdysone receptor (EcR) gene in transgenic potato plants in order to develop insect-tolerant potato plants. The partial cDNA of Ecdysone receptor gene of Colorado Potato Beeetle (CPB) was amplified using specific primers in sense and anti-sense orientation and cloned in pRNAi-GG vector flanked by an intronic sequence (pdk). Leaf and internodal explants of Agria and Granola cultivars were infected with Agrobacterium strain LBA4404 harboring plasmid pRNAi-CPB, pRNAi-GFP (used as control). Neomycin phosphotransferase (nptII) gene was used as a plant selectable marker at a concentration of 100 mg L-1. The primary transformants obtained have showed proper integration of T-DNA in plant genome by standard molecular analysis. The transgenic plants of both cultivars are being evaluated for their efficacy against larvae as well adults of CPB. The transgenic lines are expected to inhibit expression of EcR protein gene, hindering their molting process, hence leading to increased potato yield.

Keywords: RNAi, Transgenic technology, Molting, Resistance

Various Gene Editing Strategies and Developments Based on CRISPR Technologies in Plants

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Abstract: CRISPR (Clustered regularly interspaced short palindromic repeat)-Cas9 (CRISPR-associated nuclease 9) technology derived from the bacterial immune system against viruses has emerged as a breakthrough in engineering genes in plants with precision along with RNA-guided nucleases. The repair followed by the double strand break is error-prone usually mediated by non-homologous end joining (NHEJ) pathway introducing the insertion or deletion of small number of nucleotides, thereby knocking out the gene. If the donor gene is present with the fragment homologous to the flanking sequence, then repair is done by the homology-directed repair (HDR) mechanism. The specific 'seed sequence' in the single-guided RNA has been implicated with genome-wide off-target mutations. dCas9 (dead Cas9) are the disabled nucleases utilized in the regulation of gene expression as they can recognize and bind the target DNA sequence without cutting the DNA strand. Fok I nucleases can be fused to catalytically inactive Cas9 protein enzymes requiring Cas9 proteins to form dimers in order to cleave the DNA as a strategy to efficiently mitigate the potential off-target mutations in the undesired genomic sequences. Various other CRISPR technologies such as CRISPR-Cas13, CRISPR-Cpf1, etc. have been discovered, developed and modified in the course of time for ameliorating the technique for efficient gene knockout editing as well as reducing off-target mutations in plants. In this presentation, we aim to provide a synopsis of the various CRISPR technologies being utilized and envisaged for plants with their main accomplishments, impediments, and future prospects.

Keywords: CRISPR/Cas9 knockout, Cas13, Cpf1, dcas9

Acknowledgements: We would like to thank TUBITAK 2215 for providing scholarship to Mr. Sarbesh Das Dangol for his PhD studies

In silico Identification and Characterization of Potential Molecular Markers Related with Iron Deficiency Tolerance in Soybean

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Abstract: Iron (Fe) is one of the essential micronutrients for both plants and humans, and iron deficiency is among the most common nutritional deficiencies. Iron deficiency is caused by iron deficiency chlorosis (IDC), which is caused by the decrease of chlorophyll biosynthesis in plants. This directly lowers crop yields. A legume and an oil seed crop, soybean (Glycine max L.) is the top second plant in terms of seed iron content; yet, the iron deficiency encountered during its development reduces soybean yields to a great extent. Although there is a huge number of studies revealing the physiological responses of soybean under iron deficiency in detail, the studies dealing with this response at the molecular level are limited. A total of 37 quantitative trait loci (QTL) regions have been identified related with IDC tolerance in soybean. By using in silico analyses, we scanned these QTL regions, and found a total of 5651 genes. Expression levels of Arabidopsis homologs of these genes under iron deficiency revealed that only a small group was differentially expressed (≧ 2). Gene structure and phylogenetic analyses showed the identified Arabidopsis homologs are classified into two different groups. Co-expression analysis of the genes in these groups identified four large groups of genes known to be related with iron deficiency in Arabidopsis. This study determined some known and novel potential markers related with iron deficiency in soybean, and they will be confirmed in soybean germplasm.

Keywords: Soybean, Iron deficiency, QTL, Molecular marker, Bioinformatics

PCR-RFLP Polymorphisms of iNOS Gene in Broiler Chicks at High Altitude Condition

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Abstract: Genetic markers and their applications to animal molacular genetics have commonly been used to determine polymorphisms. Restriction Fragment Length Polymorphism (RFLP) is a molecular method exploiting variations in homologous DNA sequences, therefore being considered as one of the informative genetic markers. Hypoxia is due to the partial O2 pressure triggering a failure for the tissues and cells in the organism to function normally. The objective of the research was to examine the polymorphisms for inducible Nitric Oxide Synthase (iNOS) gene in high altitude conditions during embryo development of the broiler chicks under oxygen supplementation and high temperature incubation. Ninety two of 720 hatching eggs from 45-week-old Ross 308 broiler breeders of genomic DNAs were isolated from blood samples at two different chick ages. Based on the 5 'flanking sequence of the chicken iNOS gene (Gene Bank accession number: U465031), the reference primers designed by Zhang H. et al. 2010 were amplified. The amplified PCR product with the length of 603 bp was digested with BsmI restriction enzymes and it displayed the presence of iNOS/BsmI homozygous AA genotype with fragments plain 603 bp and heterozyogous AC genotype with fragments 220 bp and 383 bp. In However, homozygous CC genotype did not appear. Moreover, the population was observed not to be in Hardy-Weinberg equilibrium (HWE). The present study concluded that iNOS/BsmI could be used as a genetic marker in Broiler chickens for hypoxia adaptability.

Keywords: Broiler chickens, iNOS gene, BsmI- RFLP, Hypoxia adaptibity

Acknowledgements: This project was financially supported by Van YuzuncuYil University Scientific Search Project Department, with the number of 2014-ZF-B222.

PCR-RFLP Polymorphisms of Growth Hormone Gene (GH1) in Norduz Sheep

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Abstract: Genetic markers and their applications to animal molacular genetics have commonly been used to determine polymorphisms. Restriction Fragment Length Polymorphism (RFLP) is a molecular technique in which organisms may be differentiated by analysis of patterns derived from cleavage of their DNA with restriction endonuclease enzyemes, consequently being considered as one of the informative genetic markers. The growth hormone (GH) gene plays major roles in growth regulation and development of higher organisms and the growth traits are complex traits involving multiple genes, loci and interactions. The aim of the research was to detect GH polymorhisms in Norduz sheep. Forty five genomic DNAs were isolated from blood samples of Norduz sheep and GH1 primers based on the 5 'flanking sequence of the sheep GH1 gene (Gene Bank Accession Number: D00476) designed by Hua et al. 2009 were amplified. The amplified PCR product with the length of 422 bp was digested with HaeIII restriction enzyme and the results displayed the presence of GH1/HaeIII homozygous AA genotype with fragments 366 bp and 56 bp and heterozyogous AB genotype with fragments 422 bp and 366 bp. However, homozygous BB genotype did not appear. Additionally, the population under investigation did not exhibite to be in Hardy-Weinberg equilibrium (HWE). The present study concluded that GH1/BsmI could be used as a genetic marker in sheep for growth characters.

Keywords: Norduz sheep, Growth hormone (GH1) gene, HaeIII RFLP

Acknowledgements: This project was financially supported by Van YuzuncuYil University Scientific Search Project Department, with the number of 2017-ZF-5418.

Maternal High Protein Diet Changes the Expression of Growth and Development Related miRNAs in Fetal Skeletal Muscle

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Abstract: Maternal nutrition during pregnancy is critical to the growth and development of the fetus while microRNAs (miRNAs) are regulating the genes involved in growth and development. However, the underlying mechanisms of miRNA modulation in growing fetus through maternal nutritional input is poorly understood. Furthermore, the effects of maternal high protein diet on the global expression of miRNAs has not been investigated yet, either in animals or human. This study was conducted to examine the effects of maternal high protein diet on the expression of miRNAs in fetal skeletal muscle. Twelve ewes, with similar age and body score, were grouped into two groups, 6 ewes in each group. One group was fed standard protein diet (SPD, 83-116 g/day) while the other group was fed high protein diet (HPD, 182-270 g/day) during the pregnancy. The fetal skeletal muscle was collected on day 105th of the pregnancy and the expression of miRNAs was evaluated using Affymetrix GeneChip® miRNA 4.0 Array which contains 30424 mature miRNAs from all organisms. The results showed that a total of 11 miRNAs including miR-3957-5p, miR-432, miR-200c, miR-362, and miR-409-3p were differentially regulated (DR). Surprisingly, all the DR miRNAs showed upregulation trend in HPD compared to SPD. Target prediction and pathway analysis showed that several pathways related to growth and development were affected by the genes predicted to be targeted by the DR miRNAs. Our result showed that maternal high protein diet could influence the abundance of miRNAs that could potentially affect different pathways related to growth and development.

Keywords: Maternal nutrition, High protein diet, Skeletal muscle, MicroRNA

Isolation of PGPR Strains from Erzurum and Their Molecular Evaluation by Using Newly Designed Specific primers for NifA and PqqA Genes

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Abstract: Plant growth promoting rhizobacteria (PGPR) comprise a huge variety of soil bacteria. In these bacteria, PGPR interact with not only plant roots but also influence plant health, soil fertility, nutrient uptake. Their use in crop production can decrease the agrochemical use and stimulate to sustainable food production. In this context, soil samples for PGPR isolation studies were collected from agricultural fields in Erzurum. Dilution series (10-1-10-7) were spread on Luria-Bertani (LB) agar plates and single colonies were selected further purification studies. Then, each of isolates was inoculated onto Nitrogen Free Medium (NFM) agar plates for determination of its N2-fixing capability and Pikovskaya's agar plates for phosphate solubilizing capability. From molecular perspective, presence of nifA and pqqA gene regions, closely related to N2-fixing and phosphate solubilizing mechanisms of bacterial strains, were monitored by using PCR with newly designed specific primers (5'-GTCGACGTCCGGCTCATATT-3'/5'-GTAGAGCATACCCGACCTGC-3' for nifA and 5'-ACTACGAAGAACGCCCCAAG-3'/5'-CGTTCATTGCGAAAGGCCAA for pqqA). Additionally, the molecular characterization of the active isolates was done based on the 16S ribosomal RNA gene region sequence analysis method. When the results were evaluated, three isolates were determined as active PGPR strains. B2 and B11 have N2-fixing and B8 has phosphate solubulizing activities. They also gave positive results for PCR amplification patterns for the related primer sets, showing presence of nifA and pqqA genes. Finally, these were identified and as Bacillus megaterium TAGEM15-70-B2, Pseudomonas sp. TAGEM15-70-B11 and Rhizobium sp. TAGEM15-70-B8, and deposited in the NCBI GeneBank®. This study was supported by Republic of Turkey–Ministry of Food, Agriculture and Livestock: TAGEM-15/ARGE/70.

Keywords: PGPR, NifA, PqqA, Phosphate solubilizing, N2-fixing

In vitro Evaluation of Antimicrobial Activity of Kefir Products from Different Origins Against Various Plant Pathogens

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Abstract: Kefir is a unique dairy product produced by fermentative activity of "kefir grains" composed of a diverse range of lactic acid bacteria, acetic acid bacteria, and yeast. In vitro and in vivo studies on the functional properties of this fermented dairy product such as antimutagenic, anticarcinogenic and antimicrobial effects are ongoing to understand the complexities of the product. There are many studies about antibacterial effects of kefir against some human pathogenic bacteria. In this study, we revealed the antimicrobial spectra of five types of kefir products (EG, AN, KF, KY, and SD) obtained from different regions of Turkey fermented for 24 and 48 h against some gram positive and gram negative plant pathogenic bacteria for the first time. Antibacterial activity was investigated by the disk diffusion agar method. Their antibacterial potencies varied according to the type of kefir and the fermentation time. Test organisms were inhibited to different extents by different products. Antimicrobial activity of ethanol, lactic and acidic acid was also tested against our test organisms. Our overall data suggested that the antimicrobial activity is attributable to antimicrobial substances secreted during the fermentation rather than low pH.

Keywords: Kefir, Pathogen, Antibacterial, Fermentation

Comparison the Effects of Different Plant Growth Regulators on Potato (*Solanum tuberosum* L.) Micropropagation

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Abstract: The study compared the effects of 1.0 × MS medium containing 0.1 mg L-1 gibberellic acid (GA3) and α-naphthaleneacetic acid with 2.0 mg L-1 of kinetin (KIN), 2.0 mg L-1 of benzyl aminopurine (BAP), 2.0 mg L-1 of zeatine riboside (ZR), and 0.5 mg L-1 of jasmonic acid (JA) combinations for the improving micropropagation of three potato (Solanum tuberosum L.) cultivars Pasinler, Granola, and Caspar using binodal stem cuttings. The results of this study clearly indicated that inclusion of JA among plant growth regulators significantly increased shoot regeneration and other characteristics of all potato cultivars used in the study. The minimum days to shoot induction on three cultivars ranged 4.0 - 5.5 d on 1.0 × MS medium containing 0.5 mg L-1 JA. The minimum time to root induction (11.0 d) was noted on cv. Pasinler on the same medium. The maximum number of shoots (15.25), nodes (19.0), maximum shoot length (17.25 cm), leaves (19.0), and roots (25.25) were noted on cv. Caspar. The longest roots (18.45 cm) on cv. Pasinler, and the maximum fresh weight (404.87 mg), and dry weight (61.85 mg) of plantlets from cv. Granola were also observed on 1.0 × MS medium supplemented 0.1 mg L-1 GA3 + 0.1 mg L-1 NAA + 0.5 mg L-1 JA.

Keywords: Cytokinin, Auxin, Jasmonic, Gibberellic acid, Zeatine

Development Biologically Active Substances of Ganoderma spp. by Biotechnological Methods

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Abstract: Ganoderma spp. belongs to the wood decomposing fungi that have been used for medicinal purposes for centuries and often used for health and healing, long life, knowledge, and happiness. These mushrooms contain protein, low fat, carbohydrate, fiber, ash, and some vitamins and minerals, with potassium, calcium, phosphorus, magnesium, selenium, iron, zinc, and copper. They also contain a wide variety of bioactive substances, such as terpenoids, steroids, phenols, nucleotides and their derivatives, glycoproteins, and polysaccharides. Polysaccharides, peptidoglycans, and triterpenes are three major physiologically active constituents in G. lucidum spp. Studies revealed that G. lucidum spp. may possess antiallergic, antioxidant, analgesic, antifungal, antiinflammatory, antitumor, antiviral, antiparasitic, cardiovascular, antidiabetic, immunomodulating, hepatoprotective, hypotensive and hypertensive, kidney and nerve tonic, and sexual potentiator properties; it also prevents bronchitis and inhibits platelet aggregations and lowers blood pressure, cholesterol, and blood sugar levels. Several studies have been conducted to illustrate the genetic diversity in Ganoderma spp., such as isozyme analysis, RAPD, AFLP fingerprinting, ITS,PCR-RFL, SCAR, ISSR) and SRAP analysis. In recent years, biotechnological attempts for enhancing quality control procedures to define and standardize G. lucidum spp. preparations are employed to determine mechanisms of action and to help characterize the active components of this putative medicinal mushroom. The purpose of this study is to analyze the current status of Ganoderma spp. products, starting from the detailed process of cultivation to the development of their products by biotechnological methods. Increase in common knowledge on Ganoderma spp. will provide a beneficial reference for research, commercial production and farmer's income nationwide.

Keywords: Ganoderma spp., Mushroom, Biotechnology, Health

Drought Assessment in Turkish Bread Wheat Varieties Using a Molecular Approach

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Abstract: Bread wheat, Triticum aestivum L. 2n = 6x = 42 (AABBDD) is an allohekzaploid plant that containing three genomes (A, B and D). Wheat production is very common in our country. Drought has become an important stress factor in the world and in our country due to global warming. Drought causes negative changes in the formation of spikes in wheat and leaf area after flowering. In this study, 6 SSR markers (Xgwm-11, Xgwm-148, Xgwm-257, Xgwm-369, Xgwm-159, Xgwm-626) were used as a simple and practical approach previously published by Xgwm (Gatersleben wheat microsatellite)) farming often made using 66 winter drought tolerance relations of bread wheat varieties in Turkey were examined in marker levels. As a result of the study, a total of 16 scorable bands were obtained with 6 SSR primers used in 66 genotypes. The polymorphic information content (PIC) values of these bands ranged from 0.2777 (gwm626) to 0.4958 (gwm257). There were significant differences in the alleles examined at the molecular level among the varieties.

Keywords: Drought, Wheat, SSR

Morphological and Molecular Analyses of Edible Fungus Species; *Hebeloma mesopheum*

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Abstract: Ectomycorrhizal fungi such as Hebeloma genus have considerable economic and ecological importance. Some species of Hebeloma have generally been considered as poisonous while few of them such as *H. mesopheum* are used as food by humans. The aim of the study is to determine phylogenetic relationship of edible *H. mesopheum* within the genus using morphological and molecular analyses and contribute to conservation of mycogenetics of Turkey. After identification of samples, genomic DNA was extracted from basidiocarp. The nuclear ribosomal internal transcribed spacer region (nrITS) was amplified with PCR method. Sequences of different Hebeloma species were retrieved from NCBI to increase interspecific diversity. Phylogenetic tree was constructed based on nucleotide variations via the Maximum likelihood (ML) method using MEGA with 1000 replications. *Hebeloma mesopheum* is characterized by brown basidiomes, brown velar remnant on stipe, elliptical spores, absence pleurocystidia and fusoid ventricose cheilocystidia. In the phylogenetic tree, studied sample clustered with *H. mesopheum, H. psammophilum, H. subtortum* and *H. versipelle* dowloaded from NCBI and caused sect. Hebeloma. These species are related taxa with dextrinoid spores and presence of veil remnants. Identification of Hebeloma species is really difficult because of morphological similarities among species. Most of species are poisonous and selecting the edible one is very important. At this point, not only morphological characters but also molecular data are needed for reliable identification.

Keywords: Edible fungus, Hebeloma, ITS, Phylogeny

Detection of Genetically Modified Organisms in Rice Products by DNA-Based Techniques in Turkish Market

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Abstract: Plantation area of the genetically modified crops which are designated to acquire resistance to increased product quality, pest and disease is increasing day by day. For GMO detection, DNA based methods is the most reliable choice because of its specificity and high sensitivity. DNA based methods are primarily based on multiplying a specific DNA with the PCR technique. Since 1994, genetically modified rice have been on the market. Recently, insect-resistant, increased product quality and herbicide-tolerant rice varieties have been introduced. Rice is one of the most important crops in Turkey. During the past 10 years, DNA-based methods have been developed and applied for detection of transgenic rice and their derivatives. The objective of the research is to assess rice products in the Turkish market to verify compliance with legislation using Polymerase Chain Reaction assay to detect the presence of GM rice. In this study 12 kinds of rice product obtained from different location of Turkey were used. The 12 sample were screened qualitatively by PCR analysis based on determination of hygromycin, 35S promotor and nos terminator which used as regulatory sequences in many transgenic approved by the European union. Foreign genetic elements were identified in 4 samples as a result of PCR analysis. PCR analysis determined that many rice samples, including processed rice sold in Turkey contain GMO's products. In conclusion, we hope that the findings in this study can be used as a guide in selecting suitable DNA extraction methods for the examined rice products.

Keywords: Genetically modified organism, PCR, Rice, DNA-based techniques

Molecular Markers in Plant Breeding: KASP; a Recent Tool in Efficient Breeding

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Abstract: Plant breeding is a dynamic and integrated area of many applied science. Recognizing the enormous potential of DNA markers in plant breeding, world is rapidly adopting the capacity for marker-assisted selection (MAS) and more recently genomic selection. A shift from uniplex to multiplex assays will allow the simultaneous analysis of multiple linked/functional markers and increase MAS efficiency. Different diagnostic markers have been cloned and more recently multiplex assay for different diagnostic/linked markers have been developed in main crops particularly in wheat. Recent developments in molecular marker technology gain momentum with advancements in next generation sequencing and high throughput phenotyping and lead towards the genomic selection. In Turkey, use of DNA molecular markers in plant breeding is limited particularly in tagging the QTL/gene of important traits of economic interest due to lack of population development using Turkish genetic resources. Therefore I will give some brief examples about the some uses of molecular markers in plant breeding such as in identifying dwarfing genes, vernalization and photoperiod genes, grain hardness genes, genetic diversity assessments in some important crops and identifying QTLs/genomic regions through biparental mapping population and genome wide association mapping (GWAS) for some traits of interest in some crops of economic importance. I will also highlight the recent trends of marker technology in world for increasing the MAS efficiency through multiplex marker protocol and in genomic selection. 180 genes related with biotic and abiotic stress as well as agronomic traits have been multiplexed through KASP technique by CIMMYT-Beijing and its application in Turkish wheat breeding is discussed with some example.

Keywords: DNA molecular markers, QTL mapping, Marker assisted selection, Genomic selection, KASP

Determination of Genetic Diversity Between Some Beans Genotypes through SSR and ISSR Markers

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Abstract: This study aimed to determine genetic relationship among a core collection of common bean accessions collected from different regions of Turkey and Van Lake Basin with SSR and ISSR primers. In addition, 8 differential set cultivars that known gene pool and used to determine race of agent of anthracnose disease and 2 commercial varieties were included in this study. For molecular characterization, a total of 53 primers, 15 for SSR and 38 for ISSR, have been tested. According to result of this study, 5 SSR and 8 ISSR primers giving clear readable band were used; also SSR and ISSR method were obtained 28 and 53 polymorphic bands, respectively. The mean number of polymorphic bands was 6.63 in the SSR method and 5.6 in the ISSR method. The mean PIC (Polymorphic Information Content) value was 0.70 in the ISSR method and 0.86 in the SSR method. Dendograms obtained by using the data of SSR and ISSR together showed similarity and it was emerged that genotypes that are thought to belong to the Andean and Mesoamerican gene pools were more clearly distinguished generally. Two groups were also formed in the SSR dendogram, but it was determined that the genotypes did not distinguish clearly according to the gene pool.

Keywords: Common bean, Genetic variation, ISSR, Molecular characterization, SSR

Acknowledgements: We are grateful for the financial support provided for this research by Van YuzuncuYil University Scientific Search Project Department (2015- FBE-YL288).

Assessment of Genetic Variation and Population Structures in Wheat Mutants Using Molecular Approaches

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Abstract: Wheat, the staple food of Pakistan, is the top significant crop around the world. It belongs to monocotyledon subclass of the Angiospermae. The allohexaploid wheat has 2n=6x=42 chromosome number with genome size of about 17 GB which is five times more as compared to human genome. Also known as common bread wheat it is being an important member of grass family Poaceae. Generally, the mutation is classified into point mutation (intragenic) that is present inside the gene as well as intergenic modification of structure in chromosome (translocation, inversion, duplication and deletion). Such kind of mutation in any organisms causes changes in ploidy level. In nucleotide structure EMS (ethyl methane sulfonate causes chemical variation that leads toward base substitutions and mispairing. Microsatellite is repetitive DNA sequence and some treatments (ranging from 1-6bp) were repeated in it for 2-20 times. These markers are highly mutable and from generation to generation mutation rate varies from the range of 102 to 108. Principal component analysis have a valuable method from applied linear algebra that is used to classify the relationship between traits in complete multi trait system. For evaluation of genetic variation in Galaxy Mutants, 8 morphological characters recorded and fifteen SSR (Simple sequence repeats) markers were utilized. The maximum mean value was observed in plant height which is 71.5161 having standard deviation of 10.3630. The lowest mean value observed in 100 grain weight i.e: 4.1832 having standard deviation 0.2588. To identify the similarity between 1 wild and 30 Galaxy wheat mutants by using

Keywords: Simple sequence repeats, Ethyl methane sulphonate, Polymorphic information content

In vitro Screening of Potato Advanced Breeding Clones for Drought Stress

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Abstract: Potato (*Solanum tuberosum* L.) crop is susceptible to drought stress, reducing yield and tuber quality when the soil water potential dropped. For this reason, preparing sufficient water is very important for increasing potato yield, yield parameters and quality. By applying conventional and unconventional breeding techniques will open new avenues to create genotypes with high productivity and drought tolerance. With employment of in vitro techniques made possible to screen stress tolerant potato breeding lines or varieties in a very short time. In this research, the response of potato advanced breeding clones to artificial water deficiency stress was determined at plantlet stage. The experiment was carried out at the Erzurum Eastern Anatolia Agricultural Research Institute, Turkey, by inducing water stress with polyethylene glycol (PEG-8000) at three levels (0, 4.8 % and 9.6 % w/v) in the Murashige and skoog basal medium. Four potatoes advanced breeding mericlones, obtained from meristem culture, were used in randomized complete block design with five replications. Mericlones were incubated four weeks and number of leaves, stem and root lengths, fresh and dry weight of stem and root were determined. Experiment results showed that there were significant differences among clones in terms of their response to water deficiency and the growth of potato plantlets decreased by increasing as PEG concentrations. It is also clear from the results that the genetic variability had the major effect of their response to drought stress. Findings from in vitro simulation of water deficiency stress could be used as a pre-screening component in potato breeding programs to identify drought tolerant clones for field estimate in the future studies.

Keywords: Abiotic stress, *Solanum tuberosum* L. Drought, PEG, Water deficiency

Improved Rooting and Acclimatization of Micropropagated Shoots of *Pistacia khinjuk* Stocks

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Abstract: The present study involves optimization of in vitro rooting of Pistacia khinjuk Stocks with the aim to increase survival rate after acclimatization. Shoots (20-30 mm) which were regenerated in vitro were subcultured on Murashige and Skoog (MS) mediumsupplemented with 1 mg/l BA, 6.5 g/l agar for the production of mature P. khinjukStocks cultures. For rooting, the effect of various parameters such as type of auxins IBA (Indole-3-butyric acid), NAA (1-naphthaleneacetic acid), 2,4-D (2,4-Dichlorophenoxyacetic acid), IAA (Indole-3-acetic acid) and concentrations of NAA(1, 2, 3, 4, 6, 8,10 mgl-1) and the types of compost (sterile, semi-sterile and non-sterile)for acclimatization were tested. Full strength MS medium supplemented with 1 mg•L−1NAA, 3% sucrose and 47 µmol m−2s−1PPFD were found as suitable conditions for optimal induction of roots. Best rooting response was obtained on MS medium containing 1 mg/l NAA. In vitro regeneratedkhinjukplantlets were successfully transferred to potting medium containing sterile, semi-sterile and non-sterile (peat:perlite:soil; 1:1:1) compost and they gave a survival of 60, 40 and 20%, respectively.The potential use of rooting and acclimatisation protocol for commercial explotation is presented.

Keywords Micropropagation, *Pistacia khinjuk* stocks, Auxins

Introduction of a New Chemical Chlorine Dioxide for Surface Sterilization in Plant Cell and Tissue Culture Studies

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Abstract: Sterilization is of great importance to plant tissue culture maintaining the viability of cells that damage plant tissues to a minimum level. Although Chlorine dioxide has not been used in plant tissue culture and has not been thoroughly investigated, it is a new, environmentally friendly disinfectant that is widely applied in disinfection of water, air and is considerably active against microorganisms. There are concerns about use of other chemicals like NaOCl, mercuric chloride and others that demands exploration of new used in surface sterilization. The study aimed to evaluate aqueous chlorine dioxide solution for use in plant biotechnological studies. It was observed that this solution does not present the same concerns and could be used as an alternative, with wide applications as disinfectant for use in plant tissue culture. The results further showed high cell viability, better surface sterilization on wheat and barley seeds when compared wiith seed disinfection using NaOCl. The efficacy of chlorine dioxide in infecting microorganisms, was very strong. The solution was partially active to disinfect leaves of polyphenol-rich and polyphenol-restricted plant species where it reacts with polyphenols and leads to rapid free radical accumulation.

Keywords: Chlorine dioxide, Surface strilization, Plant tissue culture, Micropropagation, in vitro

Studies on Obtaining Embryogenic Callus in *Vaccaria hispanica* (Mill.) Rauschert for Somatic Embryogenesis

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Abstract: Apart from a few flora based investigations, there is scarcity of studies on Vaccaria hispanica (Mill.) Rauschert (Caryophyllaceae) in Turkey. However, the recent studies on this species in the world have drawn attention. Because of its precious starch grains, triterpenic saponins and cyclopeptide content, it has quite high economic potential. This kind of plant species with valuable ingredients have high demand in market, which requires their numerous production. Various plant tissue culture tecniques can be used to supply this high demand. One of them is somatic embryogenesis technique which can produce clonal plants in very high numbers. The first step of somatic embryogenesis is to obtain embryogenic callus tissues. The aim of this study was to improve an efficient culture protocol to obtain embryogenic calli in V. hispanica. For this aim, the effects of various concentrations of different auxine (2,4-dichlorophenoxyacetic acid and naphtalene acetic acid) and cytokinin (6-benzyl adenine and thidiazuron) combinations were tested on leaf, stem, cotyledon and hypocotyl explants of two V. hispanica genotypes. As the response, different types of callus structures occured in the experiments in regard of colour and texture. According to our ongoing observations, embryogenic calli were obtained from different plant growth regulator combinations in accordance with our purpose.

Keywords: Auxin, Cytokinin, Embryogenic callus, Somatic embryogenesis, *Vaccaria hispanica*

Acknowledgements: This study was supported by The Scientific Research Projects Coordination Unit of Akdeniz University. Project Number: FYL-2016-1719

Direct in vitro Regeneration and Transient Gus Assay: Towards Stable Agrobacterium Mediated Genetic Transformation in *Trifolium alexandrinum* L.

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Abstract: The process of genetic transformation allows insertion of transgene conferring trait(s) of interest to genetically modified plants. Here, we describe methodology of agrobacterium mediated genetic transformation of Berseem (*Trifolium alexandrinum* L.). In vitro grown cotyledons of local berseem varieties "superlate Faisalabad" and "Anmol" were cultured on MS media supplemented with various concentrations of NAA and BAP for direct shoot induction. Individual shoots were rooted using MS media augmented with IBA or IAA. In vitro grown cotyledons were co-cultured with *Agrobacterium tumefaciens* strains EHA105 harboring plant transformation vector p7i-UG containing gus as a selectable marker. The GUS assay was used for tracking transient expression of transgene in cotyledons. Direct shoot regeneration from cotyledons was obtained with maximum efficiency while using MS medium supplemented with BAP 2.0 mg/L and NAA 0.05mg/L. For transformation, cotyledons were treated with Agrobacterium and gus expression assay was performed to study transient expression of reporter gene. Direct shoot regeneration for cotyledons was peculiarity of this study. After gus assay, other cotyledons of that batch may be used for further regeneration cycles to produce stable transformants. The results obtained would pave the way towards efficient and stable genetic transformation of *Trifolium alexandrinum* L.

Keywords: Direct in vitro regeneration, *Trifolium alexandrinum*, Transient gus assay, NAA, BAP

Effect of Vegetation Time on Antioxidant Potential of Devegülü Plant (Hollyhock) Grown in Van

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Abstract: Oxidative stress is an imbalance in the redox status of a cell between the production of free radicals - reactive oxygen/nitrogen species and antioxidant defense mechanisms. Antioxidant compounds have the ability to neutralize free radicals, by receiving or donating an electron, without becoming free radicals themselves as they are stable in both forms. Frequently, a high antioxidant capacity is an indication of a plant's health-attributing properties Hollyhock known as Devegülü is used as analgesic, diuretic, diarrheagenic, expectorant and antiseptic in folk medicine. It is a perennial herbaceaous plant range-expanding on steppes of 1750-2200 m altitudes in Turkey, Northern Iraq, and North-west Iran. This study targeted the effect of vegetation times on antioxidant defence system of Hollyhock plant. Therefore leaf samples of Hollyhock plant were harvested in different vegetation times (June as leaf stage, July as flowering stage and August as seed stage, 2017) from Konalga village, Çatak, Van. Two different lyophilized extracts including ethanol and pure water were prepared. Antioxidant capacities of extracts were asessed by using three reagent-based assays: oxygen radical absorbance capacity (ORAC) and ferric reducing antioxidant power and Folin-Ciocalteu Reducing assays (FRAP and FCR). Additionally phenolic compounds of the extracts were evaluted using HPLC-MS/MS. The highest antioxidant potential of ethanol extracts were detected in June samples. However, July samples was found as the highest antioxidant potent sample among infusion extracts. Consequently it was determined that antioxidant potential of Hollyhock plant due to the the vegetation time as well as solvent used in extraction procesess.

Keywords: Hollyhock, Antioxidant, ORAC, FRAP, FCR

Acknowledgements: We are grateful for the financial support provided for this research by Van YuzuncuYil University Scientific Search Project Department (FDK-2017-6160).

Determination of Changes in Photosynthetic Pigments and Antioxidant Enzymes in Some Wheat Genotypes Subjected to Drought Stress

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Abstract: The aim of this experiment was to study the effect of water stress on photosynthetic efficiency of wheat cultivars were investigated. Ten varieties of wheat (*Triticum aestivum*) — Sarıçanak-98, Karahan, Sönmez 2001, Kate-1, Altay 2000, Bayraktar, Harmankaya 99, İzgi 2001, Gerek 79, Sultan 95— were grown up for 40 days. At the end of the growing, wheats subjected to water stress and samples was collected on the 3rd, 6th and 10th day of stress. Chlorophyll A, B quantities were determined according to Arnon after extraction. And also, the amount of carotenoid was determined by the Jaspars formula with same extraction method. The absorbance of the obtained supernatant at 645, 663 and 450 nm was measured by spectrophotometer. The amount of mg pigment / ml extract was calculated from the following formulas. Chlorophyll A = 12,7 x A663– 2,69 x A645 Chlorophyll B = 22,9 x A645– 4,68 x A663 Total Chlorophyll = 20,2 x A645+ 8,02 x A663 Carotenoids = 4,07 x A450– (0,0435 x Chlorophyll A + 0,3367 x Chlorophyll B) Catalase, peroxidase, ascorbate peroxidase and polyphenol oxidase enzyme activities were examined by homogenization from tissue samples. Characterization measurement showed that, polyphenol oxidase and catalase activity generally increased. The increase in peroxidase activity was slower than the other enzymes. Ascorbate peroxidase activity increased during the onset of drought, but decreased during the days of stress.

Keywords: Drought stress, Antioxidant enzymes, Photosynthetic pigments

Acknowledgements: This study was supported by Karamanoğlu Mehmetbey University Scientific Research Projects Council. Project Number: 31-M-16.

Comparison of *Prunus microcarpa* and Some Stone Fruit Rootstocks with Respect to Salinity Tolerance in ex vitro

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Abstract: In this study, ex vitro salinity tolerance of three *Prunus microcarpa* genotypes (G1, G2 and G3) selected from South East Anatolia was investigated in comparison with that of some standard rootstocks (MaxMa 14, GiselA 5, Pixy, SL-64, and Garnem). To determine salinity tolerance of rootstocks, explants were propogated in in vitro culture on Nas and Read (2004) Medium (NRM). in the greenhouse (ex vitro) plants were transplanted to pots containing a mixture of peat, perlite and sand (2/1/1) and were watered with 0, 50, 100 or 150 mM NaCl solution. Four weeks after the application of salinity treatments shoot growth, chlorophyll a, chlorophyll b, Proline, Lipid Peroxidation (MDA), Hydrogen Peroxide (H2O2), leaf tissue damage, leaf tissue electrical conductivity, leaf relative water content and activity of antioxidative enzymes (SOD, POX,) were analyzed. Salinity stress inhibited the growth and development of all genotypes in ex vitro and depending on genotypes the response to salinity stress varied. Under salinity stress particularly at 100 and 150 mM NaCl level Proline, MDA, SOD, CAT, POX, APOX and GR increased in all genotypes. Prunus microcarpa, especially G2 genotypes, seemed to be more tolerant to salinity stress compared to the genotypes of the other species tested. Prunus microcarpa genotypes of Turkey origin tested in this study could be used as potential rootstocks in soils suitable for fruit culture, in lightly saline soils and when irrigation water is brackish, at least as safe as the other standard rootstocks tested

Keywords: Antioxidative enzymes, *Prunus microcarpa*, Rootstock, Salinity stress

Determination of Antioxidant Activity and Chemical Compounds of Some Edible Macrofungi

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Abstract: Since prehistoric times, mushrooms have been used as food and healing resources because of their flavor and biologically active compounds. At the present time, clinical and experimental research has shown that they are among the alternative sources for prevention of chronic diseases and increase the quality of life. Therefore within this study antioxidant activities and bioactive chemical contents of lyophilized pure water and sequential (n-hexane, ethyl acetate, chloroform, acetone, ethanol, pure water, respectively) extracts obtained from five wild edible macrofungi species naturally grown in Van and Hakkari province (Tricholoma scalpturatum (Fr.) Quél., Tricholoma populinum J.E. Lange, Neolentinus cyathiformis (Schaeff.) Della Maggiora & Trassinelli, Chlorophyllum agaricoides (Czern.) Vellinga, Lycoperdon utriforme Bull.) were statistically investigated. Antioxidant activity was determined using oxygen radical absorbance capacity (ORAC), ferric reducing antioxidant capacity (FRAP) and Folin-Ciocalteu reagent (FCR) methods. The most active antioxidant extracts were identified in ethanol fractions of L. utriforme, C. agaricoides and in T. populinum ethyl acetate and acetone fractions. Data obtained in the analysis of chemical content show that protocatechuic acid is the predominant phenolic compound in the extracts, followed by gallic acid and chlorogenic acid. Palmitic acid and stearic acid were detected as the major lipophilic compounds in the extracts with oleic acid and linoleic acid.

Keywords: Antioxidant, Bioactive compound, Extraction, Macrofungus

Potential of *Rosmarinus officinalis* for Phytoremediation of Soil Contaminated with Cadmium

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Abstract: In this study, the use of *Rosmarinus officinalis* was investigated to clear soil contaminated with Cd. The soil sample for pot experiment is taken from the old municipal waste storage in Mardin. The pot experiment conducted in the greenhouse. Increasing dose of Cd (0-5-10-20 mg/kg as 3CdSO4 form) and 0.005 mM citric acid applied to the soil and all pots were incubated for 30 days. The fertilizer (200 mg N kg) applied before seedling and then plant seedlings transferred to the pots. The plants were grown for 45 days in the greenhouse. After harvest Cd, N, P, K, Mn, Fe, Cu, and Zn concentrations of plant samples were determined in ICP-MS. The highest Cd content (8.31µg plant) was obtained in 20 mg Cd/kg treatments. The result of the experiment was shown that the *Rosmarinus officinalis* was not suitable for pyhtoextraction of Cd-contaminated soils.

Keywords: *Rosmarinus officinalis*, Phytoremediation, Cadmium, contaminated soil, Decontamination

International Agricultural Science Congress

AGRICULTURAL ECOLOGY



I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

The Importance of Occupational Health and Safety in Agriculture

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Abstract: In this review study, it was aimed to compile information about occupational safety and accidents that can be encountered by workers at plant and animal production. It was also aimed to provide suggestions for occupational health and safety in agriculture. The agricultural activities in Turkey have been characterized by the prominence of different applications. The issue of occupational health and safety in agriculture is very important as it is in many other areas. In general, possible dangers of workers in the agricultural sector in Turkey are the ergonomics, the noise, the air conditioning, the chemicals, the pesticides, the animal attacks, the bites, the injuries, the accidents in transport, the psychological stress and, the skin-borne diseases etc. Taking precautions related to the occupational health and safety has been neglected for the workers at the agricultural enterprises and the factories, and the field and the laboratories. Moreover, it is not possible to say that there is enough sensitivity about the occupational health and safety in the workers. However, over the past decade, it has been observed that the relevant ministries have put in legal regulations related to the issue. The primary ones to make are identifying hazards (tractors, overhead electrical lines, ladders, confined spaces, processing machinery, and hazardous chemicals), eliminating or controlling hazards (eliminate hazards by using machines, by substituting nontoxic for toxic chemicals, and by using material handling equipment to lift heavy items) and, ensuring that everyone knows how to work safely and applies that knowledge on the job.

Keywords: Agricultural enterprises, Agricultural production, Occupational accident, Occupational illness

Seasonal Water Quality Analysis Using Limnological Studies of Duhok Lake and Using GIS in Duhok (North of Iraq)

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Abstract: The Duhok Lake is a freshwater lake located in Duhok governorate-north of Iraq, which supplies water for crops land and many other purposes and is home for native aquatic organisms and plant species, therefore the water quality and health is vital for the conservation of ecosystem and human health. The study aimed at seasonal water quality analysis of Duhok Lake using limnological studies that related to physical and chemicals characteristics of Duhok lake water. Also using the statistical analysis and using GIS interpolation map for this study. The physiochemical characteristics have been studied and analyzed at four differed months in the different season, during October-December 2016 to March-July 2017. Seasonal variation of seven different surface water-sampling stations in different part of the Duhok Lake has been observed. Several parameters have been studied and analyzed including ‘’air temperature, water temperature, dissolved oxygen, turbidity, pH, electrical conductivity, total dissolved solid, total alkalinity, total hardness, calcium, magnesium, chloride, sulfate, nitrate, sodium, and potassium’’. The study has revealed that there are significant seasonal variations in some physicochemical parameters and as a whole analyzed data depicted the higher values of studied parameters during the summer season and lower contents during the spring season. Moreover, the higher data obtained from the sample station S3, which the hot spring water is directly discharged into the lake water body. In the station S3, the higher values of the studied parameter were recording in all season which is higher than the permissible level of drinking wateraccording to (WHO).

Keywords: Seasonal variations, water quality, limnology, Duhok Lake, GIS interpolation

Effect of Wood Vinegar Obtained from Hazelnut Shells on the Soil Enzyme Activities

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Abstract: This study was carried out to investigate the impact of wood vinegar obtained from the hazelnut shells, on the Alkaline phosphatase and Beta-glucosidase soil enzymes' activities. This study was done in 2015 and 2016 as four replications in random block design in Muş province. Six levels of wood vinegar 0.5%, 1.0%, 2.0%, 3.0%, 4.0%, and 5.0% mL were considered. Results of Repeated Measurement ANOVA indicated that the main effect of the Period (P=0.000) and the effect of Treatment x Period interaction (P=0.014) were statistically significant. Therefore, the effect of the Treatments on Alkaline Phosphatase activity varied based on the Periods. It was observed that the highest amount of Alkaline Phosphatase activity was obtained in 2015 when the 1.0% treatment was applied. For 2016, the highest value of the enzyme was obtained when no treatment (Control) was applied. For Beta Glucosidase activity, the Year x Period (P=0.001) and Treatment x Period interactions (P=0.000) were statistically significant. For 2015, it was seen that the highest Beta Glucosidase activity value was obtained when 3.0% treatment was applied while the maximum amount of the Beta Glucosidase activity for 2016 was achieved when any treatment was not used. As a result; it is possible to conclude that the wood vinegar is effective on soil enzymes. On the other hand, in order to get more detailed information about the effect of different levels of the wood vinegar on soil enzymes, it is need to conduct more detailed experiments under stable and controllable environmental conditions.

Keywords: Agroecosystem, alkaline phosphatase, beta-glucosidase, soil enzyme activities, wood vinegar

Effect of Different Doses of Pinus Brutia Leaf Phenolic Compound Extract on Proteus sp And Staphylococcus sp. Reproductive

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Abstract: P. brutia is a species of pine that can be grown in the eastern Mediterranean region and has the ability to grow up to 5-20 meters in suitable environment. Tannin is a phenolic compound that exists in plant tissues at different ratios and tends to form compounds with other molecules. Tannins are natural preservatives. Tannins are a vegetable extract with no pollutant effect on the environment. They also have antibacterial, antifungal and antiviral properties. Proteus and Staphylococcus are very common bacteria in nature. In addition, these bacteria cause diseases in humans and animals with different clinical traits. In the study, the tannin contained of Pinus brutia leaves grown in the Eastern Mediterranean region was determined in three stages as total soluble tannin, tannin-free phenols and extractable condensed tannin. The obtained tannin extract was applied to the bacterial at different doses (10µl = 0,04µg, 30 µl =0,11µg, 45µl = 0,17µg, 60µl = 0,22µg, 75µl = 0,28µg). Antibacterial activity was determined by standard disk diffusion method. The effect of these bacteria on the reproduction was examined. Different zone diameters were determined at each applied dose. The tannin extract of Pinus brutia leaves has Staphylococcus sp. and Proteus sp. it has been shown that the bacteria slowed or even stopped of reproduction. It has also been observed that the sensitivity of Staphylococcus sp to tannin is greater than the sensitivity of Proteus sp.

Keywords: Pinus brutia, Proteus, Staphylococcus

Microbiological Cleaning of Pesticides in the Soils of the Poison Collection Point of the Suzak District (Model Experiments)

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Abstract: In the Suzak district there are two pits containing POPs-persistent organic pollutants. The latter includes the well-known DDT, which was banned for use in agriculture more than forty years ago. And also a whole list of other pesticides that have been polluting the environment for many years, since after the collapse of the USSR, the puddles turned out to be without due attention on the part of government agencies, and therefore they are currently in an emergency condition. So, we took samples of soils from the pits and isolated aboriginal microflora of these soils. The same microorganisms were used for biodestruction of pesticides. So, we conducted experiments during 3 months, with the soil selected from the poisonous collection point of Suzak A, in the laboratory. Thus, in the control soil of Suzak A, A-BHC content was 15.956 mg, whereas in the soil where an association of 5 microorganisms was used, the A-BHC content decreased to 12.849 mg / kg and in soil where only one species of microorganism, 10.955 mg / kg, for other types of pesticides their content varies.

Keywords: Soil, pesticides, microorganisms

Climate Change on the Scale of Van Lake Basin and its Ecological Effects

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Abstract: Climate is long-term averages of weather events consisting of temperature, rainfall, humidity and pressure factors. Long-term changes in climate factors are the greatest indicators of climate change. In this study, climate change observed in Van Lake Basin will be evaluated in the context of temperature and rainfall. Van Lake Basin, which has the lowest point of the lake shore (1646 m.) and the highest point of Süphan Mountain (4058 m.), is a high area. In this high geography, the continental climate prevails. This general knowledge, known as the winters are cold and rainy, the summers are hot and dry, change in recent years. Reduced snowfall especially in winter and the tendency of precipitation to rain from snow will cause major problems. If this continues, snow masses that accumulate in high mountain summits and melt in hot summer months will decrease. For this reason, plains on the lower meters where life is intense will deprive in terms of surface and ground water in summer. The increase in temperature will cause rainfall to rain as rain, increase the floods and erosion. At the same time, this change in rainfall type will increase the surface flow and cause the lake level to rise. When it is considered that the most productive production areas are around the coast, it is inevitable that these areas will be damaged.

Keywords: Climate change, Van Lake basin, ekology

The Bactericide Effect of Tebuconazole Fungicide on Halophilic Bacteria

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Abstract: In this study, 15 halophilic bacteria have been isolated from salt-effected soils of Sanlıurfa. The effect of fungicide (tebuconazole) allowed to be used from the Republic of Turkey ministry of Food, Agriculture(RTFA) and livestock for the treatment of different disease in wheat, apple, apricot, bear and tomatoes. The bacterial isolates have been identified with classical and molecular methods (16 S rRNA sequence analysis). Tebuconazole in 25 % and 50 % percent was applied to the each bacterial isolates in well diffusion methods at a concentration of 30 µg/ml. The effect of the tebuconazole were measured and recorded at 1st, 3rd, 5th and 7th day, but 1st day was evaluated as bactericide effect. While the lower concentration (25%) of tebuconazole has no effect on the growth of 2 isolates (H1 and H5), both concentrations (25 and 50 %) have no effect on 5 isolates (H2, H6, H11, H12 and H13). While both concentrations of tebuconazole have same effect on the growth of bacteria H10, it affected the other bacterial isolates in a dose dependent manner. RTFA and livestock allows the tebuconazole to be used at concentration of 250 µg/ml. Even the concentration of tebuconazole was lower than the allowed concentration; it has a 66.6 % bactericidal effect. Even if the fungicidal effect of tebuconazole seems to be advantages in a short term, it will impair the soil microbial balance. RTFA and livestock should allow a fungicide that has no bactericidal effect or reduce the concentration of the tebuconazole to be used.

Keywords: Pesticide, tebuconazole, halophilic bacteria, bactericidal

A New Edible Macrofungus Record for Turkey

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Abstract: Mushrooms had long been used for food and medicinal purposes since decades. It is now increasingly recognized that correct diet, controls and modulates many functions of human body and consequently participates in the maintenance of state of good health, necessary to reduce the risk of many diseases. In the present work, some macrofungi specimens were collected from coniferous forests in Sarıkamış Allahüekber Mountains National Park between the years of 2014 and 2016. During field studies, the colorful photographs were taken, ecological features and the information on collected samples provided from local people were recorded. Macrofungi specimens were identified according to morphological and microscopic studies. In conclusion, it has been determined that the Tricholomella constricta (Fr.) Zerova ex Kalamees is edible and has been collected for the first time in our country by this study.

Keywords: Edible macrofungi, new record, Sarıkamış

Edible Mushrooms from Gürpınar (Van) District

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Abstract: Mushrooms are highly important for health as they have low calorie in addition to includes such as high protein, vitamin and nutrients. Edible mushrooms are among the best vegetables and animal protein sources. Furthermore fungi can be handled as an alternative nutrient to lack of food for growing population of the world. The present study is aimed to raise the public awareness of the region about edible fungi. The materials of the study comprise the patterns of fungus collected from boundaries of Gürpınar region between 2015-2017. The morphological and etnomycological aspects of the fungus were identified and recorded. Their photos also were taken in their natural habitat and subtrate. Identification of the materials was carried out according to data obtained after determining microscobic properties of macrofungi taken to laboratory. Whereas 36 edible mushrooms were identified in district only Agaricus species and Pleurotus eryngii are collected and consumed by local public.

Keywords: Macrofungi, new record, Gürpınar, Turkey

A New Edible Macrofungus Record for Turkish Mycobiota

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Abstract: Objective: Edible mushrooms have low carbohydrates, fat and calories as well as high protein, vitamins, and fibrous and giving a feel of fullness due to the difficulty of digestion in the stomach could be a source of nutrients appropriate for a healthy metabolism. Because of much difference in terms of geographical features, our country have rich and diversity of fungi. This wealth is not sufficiently evaluated by the local people. Material and Method: The study material is the mushroom sample collected in the border of Gürpınar (Van) District in 2016. The collected morphological characteristics of this sample were recorded and photographed on natural habitats and substrates. From samples which are carried to laboratory and subjecting to the from necessary mycological techniques were obtained microscopic features. The samples are diagnosed using the necessary literature. Results and Conclusion: As a result of this diagnosis, a fungus belonging to the Ascomycota divisio was determined for the first time by this study and added to the variety of mycobiota in our country. Morchella prava is a very delicious, eaten and exported mushroom. Thus, this study contributed to the country's mycobiota.

Keywords: Macrofungal diversity, New record, Gürpınar, Van

Determination of Fatty Acid Composition of Laserpitium Carduchorum Hedge&Lamond

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Abstract: Apiaceae is an rich plant family with 460 genus and 3700 species worldwide. Members of Apiaceae family have biologically active molecules. Those active ingredients have antibacterial, antioxidant, hepatoprotective, vasorelaxant, antitumoral properties. Lasepitium L. from Apiaceae family have about 20 different plants with aromatic properties. Some species of Laserpitium L. genus is being used in traditional medicine in some European countries. In this study it was aimed to determine fatty acid composition of endemic Laserpitium carduchorum Hedge&Lamond growing in Van-Hakkari region. Laserpitium carduchorum Hedge&Lamond plant was collected from B9 Bitlis: Kotum (Küçüksu) Karz mountain, high catchment, about 2200 m and dried in ambient temperature in shade. Lipid extraction from crude plant was followed by conversion into non-volatile and stable methyl esters for analyses of fatty acids. Then analysis were performed with Agilent 7890A/5970 C model GC-MS device. Laserpitium carduchorum Hedge&Lamond fatty acid content showed an important amount of C12:0 (Lauric acid %4.50), C14:0 (Myristic acid %5.08), C16:0 (palmitic acid %29.67), C18:0 (stearic acid %20.21), C24:0 (Lignoseric acid %10.95) fatty acids and also unsaturated fatty acids C18:1 (oleic acid %6.15), C18:2 (linoleic acid %17.51), C18:3 (linolenic acid %5,93). Analysis showed that Laserpitium carduchorum Hedge&Lamond species is rich for four main components including palmitic acid(C16:0), stearic acid (C18:0), lignoseric acid (C24:0) and linoleic acid (C18:2).

Keywords: Laserpitium carduchorum, fatty acids

Effects of Landscape Activities in Van Yüzüncü Yıl University Campus on Ornithofauna of the Site

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Abstract: The aim of this study is to present the effects of landscape activities in the campus settlement on the bird existence of the site. This study has been produced from the synthesis of scientific ornithological observation results performed in the campus and region between 1991-2017 years. The campus settlement started in the site in 1990's. Prior to this process, it was engaged in wheat agriculture in the site. Accordingly, the most predominant birds in the site were skylarks. Each plant species planted for the purpose of landscape lead the different bird species to be seen in the site. Rock dove, Common Kestrel and Little Owl started to reproduce in the roof cavities. With the pine trees, Northern Long-eared Owls' nest emerged. Rook and Eurasian Jackdaw reproduction colonies were created in poplar trees. With succulent fruity central refuge plants, Robin and Northern Wren entered into the site. Willow Warbler, Great Tit, Blue Tit and Common Chiffchaff concentrated in the regions where willow trees are present. In the recent times, Eurasian Blackbird has emerged due to small number of junipers planted. It is apparent that the ornithofauna of the site has changed with the establishment of university campus. It is seen that each plant species planted into the site creates an environment for different bird species.

Keywords: Agriculture, forestation, birds, ornithofauna

Impacts of Kowashe Industrial Area on Groundwater Pollution in Semel District-Duhok City-Northern Iraq

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Abstract: Ten artesian wells are selected adjacent and the downward Kowashe industrial area in Semel district, Duhok governorate, North Iraq as a source of groundwater to study the impacts of industrial effluents pollutants in these wells. The results are summarized below. The temperature of studied artesian wells distributed around the industrial area is ranged around 20-22 oC. The turbidity is ranged between 0.5-0.9 NTU. The EC ranged between 435-738 µS. The TDS levels were ranged 278 mg/L to 472 mg/L (in location 4). The pH recorded between 7.3 in location 5 and 7.7 in location 6. The TH high level recorded at Girash 404 mg/L. The DO is ranged between 5.7 mg/L as a minimum in location 1 and 8.54 mg/L as a maximum in location 7. The content of Ca ranged between 67 mg/L in third locations to 89 in Sarshor location. The high content of Mg was recorded at Girrash with 48 mg/L. The content of K recorded high level over 7 mg/L. The high content of Na level was found in location 6 (27 mg/L). As anions, the content of SO4 ions are relatively low in location 3 which is 2.8 mg/L and high level was recorded in Girrash 28.6 mg/L. The chloride ions concentration is low from location 1 to 5 but relatively high from location 6 to 10 recording high level in Girrash locations (30 mg/L). The concentration of NO3 recorded high level in Girrish location of 55.3 ml/L which is not safely for drinking water.

Keywords: Groundwater, pollution, industrial area, Semel-Duhok, heavy metal

International Agricultural Science Congress

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I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

An Evaluation of Agricultural Higher Education with Respect to Recent Changes in Turkey and the World

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Abstract: The trends in agriculture are a sustainable agriculture and rural development, priority of food security and safety, a production increase based on genetics and a production for bioenergy. On the other hand, it is also true that production is very inadequate due to the need for food and hunger is experienced in many parts of the world. Due to various structural problems, productivity has not yet reached the desired level in many countries. World higher education is in a very rapid change and development. Reconsidered education systems, internationalization efforts in response to the globalization and high education fees are the recent developments in universities where increased curriculum diversity, student-centered education, and easy access to educational materials are taking place. Low demand for agricultural higher education taking place in the world. As a reflection of this, the vast majority of agricultural programs in many universities are closed. Low demand for agricultural higher education also causes to have relatively low-skilled students. The objective of this study is to find a new perspective to agricultural higher education by conducting a SWOT analysis to explain the problems. The major strengths is the existence of a historical strong higher education while the inability to catch up with the rapid change in the world is the main weakness. On the other hand, gradually decreasing demand for higher education is the most important threat while the young population from rural areas is important opportunity. To highlight strengths, strengthening weaknesses, eliminating threats and assessing opportunities may be necessary.

Keywords: Turkey, Agricultural higher education, SWOT analysis

Determination of the Opinions of the Farmers about Irrigation Organizations by Factor Analysis

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Abstract: In this study, the opinions of the farmers who were affiliated to the organizations undertaking the irrigation administration in Edirne, Kırklareli, Tekirdağ and Çanakkale provinces about irrigation organizations were analyzed. Within the scope of the study, surveys were conducted in 70 irrigation cooperatives, 67 municipality and legal entities, 7 irrigation unions and 1 DSİ irrigation organization. Total of 567, 113, 227 and 7 surveys were conducted in the irrigation facilities administrated by irrigation cooperatives, irrigation unions, municipality and legal entities and DSİ, respectively. Total of 301 surveys in 74 villages of 9 districts in Edirne, 168 surveys in 43 villages of 5 districts in Tekirdağ, 156 surveys in 36 villages of 4 districts in Kırklareli and 289 surveys in 69 villages of 11 districts in Çanakkale were conducted. The conclusions of the farmers were evaluated by using five point likert scale. It was determined that the irrigation organizations did not notice the training of the farmers, did not include these trainings in their working schedules and similarly, they did not conduct studies aimed at the conscious and balanced use of the agricultural inputs. Factor analysis was used for the evaluation of the opinions of the farmers about irrigation organizations. KMO and Barlett test statistics was used in order to examine the convenience of the opinions to factor analysis and KMO value was found as 0.891. According to factor analysis results, 13 variables were gathered in three factor groups named as “Administration”, “Ownership and Service” and “Consciousness Raising”.

Keywords: Irrigation administration, irrigation cooperative, irrigation union, factor analysis

A Research on Production Costs and Profitability of Apricot Producing Farms in Malatya Province, Turkey

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Abstract: Calculation of production costs and profitability of dried apricot producing farms in Akçadağ, Central and Darende districts of Malatya Province, Turkey, was aimed in this research. The research area covers more than 50 % of apricot production in Malatya province. Data of 2013 years were collected from 159 farms in nine villages using proportional sampling method. The farms were classified into three groups (>= 25 decares, 26-50 decares and 51+ decares). The farms had average 26.41 decares apricot area. The fresh and dried apricot production quantity per decare were 877.26 kg and 197.12 kg, respectively. 38.99% of all farmers marketed their dried apricots to merchants. The average farmers' prices of one kg fresh and dried apricots were 1.52 TL and 5.70 TL, respectively. The average gross production value, production costs and net income of apricot per decare were 1,607.43 TL, 975.29 TL and 632.14 TL, respectively. Proportional profit was calculated as 164%.

Keywords: Dried apricot, Production costs, Profitability rate

Acknowledgements: This study has been supported by Ege University Scientific Research Projects Commission. Appreciation is expressed to farmers and other individuals who provided assistance.

Factors Affecting Producers' Agricultural Insurance Purchase Decisions: A Case of Konya Province

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Abstract: Agricultural sector is the most affected sector from natural, social and economic risks and uncertainties. One of the easiest way to reduce these risk and uncertainties is agricultural insurance. Agricultural insurance is not only compensate farmers for their production losses but also maintain the existence of enterprises. The purpose of the research is to determine the factors that affect producers' purchase decision of agricultural insurance. The research was conducted in Ilgın Province of Konya. The material of the research is obtained from 95 producers by face to face interviews in 2017. Descriptive statistics and probit regression were used to evaluation of the data. According to the results the factors that affect producers' purchase decisions of agricultural insurance are found; producer's age, number of member in family, production income, keeping record of the enterprise, working in non agricultural sector, contract farming, education status and cooperative membership. Education status and cooperative membership has negative effect on insurance purchase decision. In conclusion it is important to inform producers about the importance of agricultural insurance through cooperatives.

Keywords: Farms, Crops, Agricultural insurance, Decision making, Probit regression

Ipard Supported Beekeeping Businesses' Socio-Economical Structure and Problems: A Case Study of Van Province

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Abstract: In this study, businesses promoted by IPARD (Instrument for Precession on Agricultural and Rural Development) are examined in Van province based on investments on agricultural businesses to restructure and upgrade to community standards. The aim of this study is to determine not only whether IPARD programme has led the businesses modernization or improved the number of the holdings but also defining the problems by examining the business managers' socioeconomically statuses and therefore suggesting solutions, in Van Province, holds an important place in honey production throughout Turkey. The study was conducted on full count method of 94 businesses through filled questionnaires based on 2016's production data. The mean age of the business managers is 36,4 and men/women percentage is 79% to 21 % respectively. 43% of the managers are found to live on by just beekeeping, while 57% has off-farm income. Although migratory beekeeping is performed by 76% of the businesses, 24% live on constant beekeeping. While 98% of the businesses prefer to produce just beekeeping products, 2% does combined production. Bee species analysis revealed Caucasian honeybee hybrids, Producers 72% are satisfied with the efficiency of the bee species while 26% are not. Examined businesses owners' questionnaires showed 71% are pleased to do beekeeping and the rest not. The percentage of Businesses supported by goverment are %19, while 89% are not supported by the government. When the educational level is investigated, 69% of the businesses have had some education about beekeeping, while 31% have not had any

Keywords: Beekeeping, Socio-economic structure, Honey, Ipard, Van

The Ideas of Beekeeping Enterprises about the Project Supports of the Agricultural and Rural Development Institution: TRA2 Region Example

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Absract: The European Union has established a new framework for assistance to candidate countries and potential candidate countries by the IPA Council Regulation (EC) No 1085/2006, the Instrument for Pre-Accession Assistance. IPA Rural Development Programme (IPARD Programme) of Turkey has been designed by taking into account both the priorities and needs of the Country in the pre-accession period within the context of rural development. The Agricultural and Rural Development Support Institution (ARDSI), which was established to distribute EU rural development funds in Turkey, is the only accredited distributor. The IPARD grants applied in the TRA2 region contribute to the production and processing of animals in more modern, hygienic and appropriate conditions and agricultural production and food in more modern enterprises. The measure Farm Diversification and Business Development, beekeeping, processing and marketing of bee products, aims to improve rural economy. Study material consists of 49 questionnaires applied to enterprises receiving grants from ARDSI and 64 questionnaires applied to enterprises which have not received any grants in Kars and Ağrı provinces, which can represent the TRA2 region. During this study in 2015, the production, productivity, technology level used in enterprises, the expectations of grants and the results obtained were compared with the grants within the scope of IPARD Program in Kars and Ağrı provinces. 55.1% of the beneficiaries reported that they were very satisfied with the grants while 12.2% of the producers who were not satisfied at all. The reasons for not applying for grants are as follows: 29.7% of the departments put bureaucratic procedures in the first place, 28.1% of them have no knowledge of grants and 20.3% of them show capital insufficiency in the first place.

Keywords: ARDSI, IPARD, Grant, TRA2 Region, Beekeeping

Support Program of Machinery-Equipment Levels Evaluation of the Effects of Personnel Level Worked in Agricultural Enterprises

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Abstract: In this study, it was tried to evaluate the effect of the support program for purchasing machinery-equipment under the Rural Development Investment Support Program. The agricultural production potential is very high and we have conducted surveys with producers in 7 different provinces in 7 geographical regions, representing our country, benefiting as much as possible from the support program. These include; Aydın (Aegean Region), Antalya (Mediterranean Region), Bursa (Marmara Region), Konya (Central Anatolia Region), Samsun (Black Sea Region), Sanliurfa (Southeastern Anatolia Region) and Erzurum (Eastern Anatolia Region). The base (basic) year in the study was based on the 2011-2012 production period, during which the producers who were present in the application constituted the entire population. The producers are divided into groups that benefit from and do not benefit from the support of this application. The survey was conducted in 2015, so the data take into account the 2014-2015 production period. The control group could not be created because there was no such person in the province of Şanlıurfa and the applicant applied to the related support program. Therefore, Şanlıurfa province was not evaluated at this stage of the study. A total of 1932 producers / businesses, including 1393 supported and 539 non-beneficiaries, were surveyed. On the level of employment per enterprise (including permanent and temporary workers); the average treatment effect (ATET), the average treatment effect on the treated (ATET), the regression adjustment (RA), the propensity score matching (PSM) and nearest neighbor matching (NNM). According to the calculated results, it was determined

Keywords: Propensity score matching, Impact assessment, Intervention effect predictors, Avarae tretment effect

Factors Affecting the Utilization of Farmers from Plant Production Supports

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Abstract: The agricultural sector differs from the other sectors in economic, social, political and technical aspects. For this reason, countries interfere agriculture sector by various political instruments and according to their priorities countries implement different agricultural support policies. The aim of this study is to determine the socio-economic characteristics of producers and the factors that affect the utilization of farmers from plant production supports in Kahramanmaras. The main material of the study is obtained from the questionnaire survey conducted with 97 producers determined by proportional sampling method. Descriptive statistics and probit regression was used for the evaluation of the subject. It is determined that age, membership of cooperative and production according to soil analysis have negative, number of persons working in agriculture, experience, income, technical assistance and land asset have positive effect on the utilization of farmers from supports. As a result it is important to encourage elderly producers to benefit from agricultural support will positively impact producers' income. Also producers should be informed about soil analaysis and its benefits.

Keywords: Plant Production, agricultural supports, probit regression, Kahramanmaras

Analysis of the Effects on Agricultural Production of Agricultural Support Policies in Turkey

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Abstract: The agricultural sector has an important role in the countrys' economy in terms of meeting basic nutritional needs. The high dependence of the agricultural sector on the natural conditions and other features it possesses makes it necessary to support this sector. In addition, effective, productive and appropriate determination of agricultural support policies is as important as the amount of support at least. In this respect, it is very important to examine the effects of agricultural support schemes applied in Turkey, the periodical changes taking place in these developments and their support on agricultural production. The aim of this study is to examine whether there is a causal relationship and cointegration relationship between agricultural supports and agricultural production in Turkey. For this purpose, Granger causality and Johansen cointegration tests were applied with the percent change occurring in the agricultural supports for the period 1981-2016 and the percentage change in the agricultural production. The findings show that there is no causal relationship between agricultural supports and agricultural production for the period in question. This suggests that other factors are more decisive than in the agricultural supports of the increase in agricultural production. One of the main reasons why agricultural subsidies can not be decisive for agricultural production can be that appropriate subsidy policies can not be identified or are not appropriately used for the purposes of subsidies.

Keywords: Agricultural supports in Turkey, Granger causality, Cointegration analysis

The Comparison of Innovative Technology Usage Levels of Dairy Farms Supported and Non-Supported by Ipard Program: A Case Study of Konya

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Abstract: The purpose of this study is to compare innovative technology usage levels of dairy farms, supported and non-supported by The Instrument for Pre-accession Assistance-Rural Development (IPARD) program, by scoring their usage level of 10 innovative technologies in their dairy farms. Another purpose of the study is to determine the factors associated with the innovative technology usage levels of dairy farms. The main material of the study is dairy farms supported and not supported by the IPARD program in Konya. Full count sampling method was used when determining the dairy farms supported by IPARD Program and Neyman allocation sampling method was used when determining the dairy farm non-supported by IPARD program. Research data were collected from 50 dairy farms supported by IPARD program and 100 dairy farms non-supported by IPARD program by administering a questionnaire filled during the face-to-face interviews conducted with each individual respondent. As a result of the study, it was determined that the average gross production values and gross profits of dairy farms supported by IPARD program were 4 times higher than those non-supported by IPARD program. While innovative technology usage level of dairy farms non-supported by IPARD program were entirely low level, 90% of dairy farms supported by IPARD program were high level. From the point of view of dairy farm scale, it was determined that innovative technology usage levels were high (69.84%) in dairy farms that had 51 and more milking cows. As a result of chi-square test, statistically significant relationship was found with 12 factors.

Keywords: Innovative technology usage, Dairy farming, IPARD program

Present Situation of Research-Extension-Farmer Relations in Turkey Viticulture and Recommendations for Empowering

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Abstract: In this article, it is aimed to determine the relations between grape producers/grape business, publishing organizations and research institutions in important provinces of Turkey viticulture. For this purpose, Focus Group Meetings (FGM) were held with the participation of farmers engaged in viticulture, public and private publishers and researchers of University Instructors and Research Institute conducting research on viticulture. Meetings were held in a total of 16 provinces which have viticulture potential. Participants were asked to answer questions related to the subject and discussed with the participation of stakeholders. With this work suggestions have been put forward for empowering RESEARCH-EXTENSION-FARMER (REF) relations and for more efficient ealuation of Turkey viticulture potential. Although the relationship between RPF in the study has been addressed in terms of viticulture, in fact, this situation and proposals can be applied to the spreading of all agricultural activities and the strengthening of cooperation among stakeholders. For this reason, it is possible to consider viticulture as an example for agricultural activities in the study.

Keywords: Turkey, Viticulture, Extension, Producer, Researcher

An Analysis on Factors Effecting Being Member of Agricultural Organizations: The Case of Cattle Farms in Van Province

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Abstract: The study aims at estimating the effect of producers' socio-economic characteristics and the farm structure on the probability of becoming a member of an agricultural organization. To this end, Ordered Probit Model was applied. The data of 2010 production period was collected from 66 dairy cattle farms through questionnaires based on stratified random sampling method. While 74.2 % of producers were not a member to any organization, the remaining 18.2 and 7.6 % were members of one and more than one organizations, respectively. The result of study showed that the variables of experience, education level, milk yields, having milking machine and record keeping rate increased the probability of becoming a member to any agricultural organization. Government financial, technical and educational supports towards increasing the number of cattle farms, with high educated and experienced labor and high productivity levels, which are associated in an agricultural organization, could promote the willingness of producers in the region in participating of agricultural organizations as a member.

Keywords: Dairy cattle farms, Agricultural organization, Ordered probit model, Van province

A Study on Economic Efficiency of Agricultural Consultants within the Context of Extension and Consultancy Services: The Case of TR90 Region in Turkey

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Abstract: The objective of this study is to put forward economic efficiency of agricultural consultants within the context of agricultural extension and consultancy in terms of number of visit frequency they make to the farmers. In this research, it is planned to make a survey with a full count method in TR90 region of Turkey with 243 agricultural consultants in 6 provinces. For some reasons, 41 agriculture consultants could not participate in the survey; face to face survey was made with 202 agricultural consultants. The ordered logit model was used and the model was estimated by analyzing the data obtained from the survey. According to the study and research data, it is concluded that, %56,9 of agricultural consultants in the region are women and %43,1 are men, %59,9 are between 20-30 ages, %49,5 visit the farmers every 15 days. It is estimated that the frequency of the visits of the consultants increased in the cases of consultant being male and younger and having previous work experience. It is also determined that the farmers should be identified and announced in advance for the interested parties.

Keywords: Agricultural extension, consultant, Turkey, TR90 region, Ordered logit model

Analysis of Factors That Affect Food Groups Expenditures in Turkey

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Abstract: Known of how the food expenses of households with respect to structure of socio-demographic and economic factors changed can contribute to producers to make in the subject of ideal investments. In this study, food (I. group cereals including bread; II. group vegetable-fruit; III. group meat and meat products; IV. group milk and dairy products; V. group other food includes tea, coffee, snacks,…etc..) that vital in balanced and healthy diet was covered in the scope of this study and was searched how socio- demographic and economic factors affect food expenses. The factors affecting household food expenses were determined and so, the consumption pattern of food in Turkey was identified with Multiple Tobit method. The data used in the research were obtained from face to face interviews. When missing and contradictory observations are made, sample size has been defined 1437 households. The results show that there is a positive relation between the households in high income group and the food group expenses in above. When regarding the age variable, the household heads who are 30 and under tend to spend more for five food groups. On the other hand, the household heads who are between 30 and 40 tend to spend more to meat and meat products, milk and dairy products and the other food group.

Keywords: Turkey, Food expenses, Multiple Tobit

Sustainability in Marketing: Some Practices from the Agricultural and Non-Agricultural Sectors

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Abstract: Since the 1970s, several marketing concepts have emerged that consider marketing within its social and environmental context and to deal with the ecological and social issues relevant to marketing. These marketing approaches are societal marketing, social marketing, ecological marketing, green marketing, environmental marketing and sustainable marketing. Especially, sustainable marketing represents a logical evolution from these earlier approaches to socially and environmentally sensitive marketing that extends and integrates them. Sustainable marketing represents a new trend in satisfying the needs of customers and other stakeholders in a sustainable way. Sustainable marketing is a holistic approach with the aim of satisfying the needs of customers while putting an equal emphasis on environmental and social issues, thus generating profit in a responsible way. Sustainable marketing is also a practice of creating long-term satisfying relationships with key partners, customers, suppliers and distributors for the purpose of maintaining long-term preference and business. The aims of this study are to explore what sustainable marketing involves, and also to examine and discuss the some examples of sustainable marketing practices attempted in the agricultural and non-agricultural sectors.

Keywords: Sustainability, Marketing, Sustainable marketing, Agriculture, Non-agriculture

Establishment of ISO 22000:2005 Food Safety Management System in Olive Oil Plants and Encountered Difficulties in the Application

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Abstract: All organizations involved in the food chain can either adhere to the ISO 22000: 2005 Food Safety Management System alone, or also create outsourcing using the help of a consulting firm. This study investigated the opinions of the olive oil establishments that have established or are considering establishing ISO 22000: 2005 Food Safety Management System on their difficulties when they decide to apply the system. In addition, because the opinions of difficulties are composed of data containing a large number of variables, it has been reevaluated with the aid of factor analysis.

Keywords: ISO 22000:2005, Food safety, Olive oil, Factor analysis

The Comparative Analysis of Olive and Table Olive Sector in Turkey

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Abstract: In Turkey olive sector contributions to labour and formation of a market by inputs used and crops produced. Olive account for 3, 6% of total arable land and 9,7% of the total olive. In olive sector there are several technical and economic problems. Table olives is important product for our country's economy and international market. In the 2016/2017 season, 690 thousand tonnes of table olives were exported in the world. In this study a general assessment of current status of olive and table olives sector was considered. Major producing countries in the sector between Turkey and the olive and table olives comparisons and SWOT analysis was used to highlight necessary measurement needed to be taken to develop the sector. Olive sector in Turkey was dealt with production, consumption and export – import situations, also inside strong and weak of the sector, in the light of statistical data based on yearly production. To capture this aim, SWOT analysis technique was applied to reach a decision on insides strong and weak of the olive and table olive sector of Turkey in terms of production, exports and organization of trade aspects. The subject was dealt with the sub-tittles strengths, weakness, opportunities and threats (Johnson ve ark, 1989; Bartol ve Martin,1991). The study material consists of the statistics of related organizations and the result of the researches has done before a large scale.

Keywords: Economy, Olive, Table olives, SWOT analysis

Investigation of Factors Affecting Olive Oil Consumption: A Case Study of Tire District, Izmir Province, Turkey

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Abstract: Besides being an important food for health, olive oil contains vitamins A, D, E and K as well as minerals such as calcium, phosphorus, potassium, sulphur, magnesium, iron and copper. Despite the fact that Turkey takes the 4th place after Spain, Italy and Greece in terms of production, the consumption level is very low. Consumption habits of consumers in Tire district of Izmir province and determination of consumer characteristics which are effective in these habits are aimed in this study. A face-to-face questionnaire survey was conducted with 384 individuals determined by the Cochran method in 2013. T-test was conducted between income, age, education, chronic illness, diet, number of households, preference of packaged product and monthly olive oil consumption. The findings revealed that there existed statistically significant difference between individuals' ages, the number of households and the consumption of packaged olive oil and monthly olive oil consumption quantity ($p<0.05$). Consumers above 40 years compared to below 40 years; the family size below four persons compared to above four persons; those who preferred olive oil without packaged compared to those preferred packaged oil, consumed more olive oil. Monthly consumption quantity of olive oil per family was 3.23 kg. The preference of consumers of olive oil were extra virgin, rivieria, refined and flocculation with 51, 24, 11.7 and 13.3 % respectively.

Keywords: Olive oil, Consumption preferences, T-test, İzmir

Evaluation of Decisions of Farmers on Land Transactions with AHP Method: A Case Study for Izmir

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Abstract: The study aims at the priorities of farmers on land transactions. The sample size was calculated as 89 farms with 95 % confidence interval and 10 % error margin using proportional sample method. The data of research were obtained from the survey conducted with farmers in Menemen district, Izmir, Turkey. Socio-economic and land ownership characteristics of the farmers were determined and factors effective on decisions of farmers related with land transactions were analyzed by means of hierarchy process method. A five-point likert scales was used in determining the attitudes of farmers about land market. The results showed that farmers were reluctance to sell their land unless they were in difficult financial situation while they would be willing to buy land. When farmers decided to buy and sell lands, the first concern for them was land productivity, followed by distance from the main road, other farmers' land sales prices, size of parcel, location of parcel, and shape of parcel, respectively.

Keywords: Land market, Decision analysis, Analytical hierarchy process, Attitude analysis

Proposals on Beekeeping Enterprises: A Case of Bingol Province

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Abstract: This study was carried out in the province of Bingöl, in order to determine the structural status, basic problems and solution proposals for beekeeping enterprises. A questionnaire was made with 87 operators by proportional sampling method. Regression analysis was used to determine the factors affecting yield of honey per hive. According to results of the study, the average age of the farmers was 47.3, the average duration of beekeeping was 18.1 years, the average number of hives was 133.6/breeder and the average amount of honey per colony was 11.1 kg. A large part (84%) of the breeders were stroller beekeepers and 78.2% of the beekeepers had place and accommodation problems. It was determined that the most important 3 factors for the breeders in the development of the Bingöl beekeeping; not enough knowledge in beekeeping (32.2%), inadequate support (29.9%) and marketing problems (23%). It was also observed that the honey yields were higher in beekeeping enterprises with more professional experience, fewer hives and stroller beekeeping. As a result, it was determined that the training of bee breeding should be taken into account seriously and local and national education should be provided, the input about beekeeping and the marketing of bee products should be carried out for the activation of producer organizations. It also determined that the development of strategies and policies aimed at farmers engaged in stroller beekeeping, in which succeeded in solving the problem of accommodation and occupational experience, will significantly increase honey production and yield in the region.

Keywords: Bingol, Professional experience, Stroller beekeepers, Hive number

A Research on the Production Costs and Profitability of Raisin in Manisa, Turkey

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Abstract: Turkey plays an important role in raisin production in the world because of favorable ecological conditions. Turkey's raisin production is mainly concentrated in the Aegean Region, especially in Manisa, Turgutlu, Salihli, Akhisar, Menemen, Kemalpaşa, Çal and Çivril districts. The raisin cultivated area is approximately 100,000 ha in this region. Total raisin production in Turkey was 310,000 tonnes in 2017, of which Manisa contributed 268.000 tonnes. Sultani grape is the main variety for raisin. Major production of raisins (90 per cent) in the world comes from this variety. The aim of this study was to determine the unit production costs of producing raisins in Manisa, Turkey. The results of this study would be useful to policy makers and would help growers in making decision. In addition, this study will help planners and decision makers to adopt effective strategies for development and expansion of raisin industry in other regions with similar conditions. This study was carried out by Viticulture Research Institute in Manisa during the production period 2017 -2018. Data were obtained by vineyard records. The study results showed that, raisin's variable and fixed costs per decare (da) were 1181 TL and 371 TL, respectively. On the other hand, gross and net profit per decare was 769 TL and 398 TL, respectively. The costs of one kg of raisin was 3.10 TL. The Benefit-Cost Ratio (BCR) for raisin was 1.26, which means the income was 26 % greater than the costs.

Keywords: Raisin, Production costs, Profitability

Analysis of the Factors Affecting the Willingness of Farmers to Make Drought Insurances

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Abstract: The effects of climate change and global warming continue to increase in the world. The report about the foundation and structure of climate change, published in 2013, comes at the beginninProvinceg of the expected drought problem in Turkey. Drought is a danger that occurs secretly in nature and has the highest share of natural disasters with 26%. Measures must be taken against drought. In this context, drought insurance is at the forefront in taking necessary measures. In this context, drought insurance is a precondition to take necessary measures. This research was conducted with the aim of determining the factors that affect the willingness of the farmers to make drought insurance. Questionnaire study was conducted with 105 farmers in Konya and Binomial Probit model was used in the analysis of obtained data. According to the results of the analysis, it was determined while factors which are age, the number of individuals in the family and non-agricultural working status have negative effect on making drought insurance, factors which are income, being member of a producer association and being aware of herbal product supports have positive effects on making drought insurance. In conclusion it is important to inform older producers about advantages of drought insure by agricultural extension employees.

Keywords: Farmers, Drought insurance, Supports, Binomial probit

A Research for Increasing Producer Income and Yield in the Tea Production: The Case of Artvin Province

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Abstract: Tea is produced in five provinces located in the Eastern Black Sea region in Turkey. Among these provinces, Artvin provides 10% of the tea production in Turkey and ranks the 3rd. However, tea yield in Artvin is not as high as in Rize province. For this reason, the aim of this study is to help the economic development of tea producers both by decreasing the effects of the factors causing the inefficiency in tea production and by increasing the price of tea with improvements in quality and environmentally friendly production. The sampling size of the study was determined using Unclustered Probability Sampling Method, and face-to-face interviews were conducted with 100 individuals in 2017. The data were analyzed by factor analysis and Ordinary Least Squares (OLS) method. As a result, it was found that as the price of tea in the previous year increased, the yield of tea increased. In addition, the yield was higher in households that considered tea earnings low. Apart from these two factors, increase in the amount of fertilizer, product experience, and land area increased the yield as well. Moreover, as household income and subsidy for tea increased, the tea yield fell. Fertilization and pruning done consciously in low-efficient lands will increase both tea yield and quality. In addition, it is thought that removing old tea gardens where yield cannot be increased through fertilization and pruning and planting new tea plants will increase the welfare of the household.

Keywords: Artvin, Tea, OLS method, Income, Yield

Policy Implications of Trends in Turkey's Dairy Sector with Respect to 2023 Vision

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Abstract: Turkey has become one of the leading emerging economies in the world with highest 8.9 in 2010 and then 11.1 percent economic growth in the third quarter of 2017. Forecasting impacts of this developments in coming 6 years might have very important policy implications for the dairy sector in the framework of 2013 vision of Turkey. In this study, annual time series data which contain several key variables of dairy sector in last 30 years (1987-2016) are used to forecast the variables of coming nine years (2017-2025) to drive policy implications by considering the impacts of high economic growths, crises and major policy changes. Forecasted future values of the variables for 2023 in the sector that are assessed and compared recent national and international values to drive policy implications. Time series data for dairy products primarily from the Turkish Statistical Institute and FAO are used. Prices and income are deflated to reflect real values in Turkish Lira and USA Dollars. Unit root tests are applied to univariate time series variables in order to identify the degree of stationarity before applying the ARIMA model for forecasting future values for the variable in question. The results show that the economic growth resulting increase in per capita income and thus increased demand for meat seemed to foster the dairy sector. Therefore, these macroeconomic factors need to better in addition to improvements at micro level in order to have competitive dairy sector to be established and aimed consumption of dairy products to be reached.

Keywords: Turkey, Dairy sector, 2023 vision, Forecasting, Macroeconomic policies

Revealed Comparative Advantage Index: An Application on Cherry Sector in Turkey and the Competing Countries

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Abstract: The purpose of this study is to uncover the competitiveness of Turkish cherry sector in the international trade by years through Index of Revealed Comparative advantages (RCA) and compare its competitiveness with rival countries such as USA, Spain, Chile and Greece which have important shares in world cherry trade. In accordance with this purpose, RCA values have been calculated for all five countries using yearly data coverig the period 2007-2016. According to the calculated RCA values, the five countries have been stated as competitive countries for cherry trade in the world for the past ten years. Turkey's RCA values have decreased from 20,6 in 2007 to 8,4 in 2016 and it shows the decreasing trend in Turkey's competitiveness. İn the study RCA values calculated for USA, Greece and Spain have also decreased during the past ten years. But decrease in Turkey's competitiveness is more severe than the other countries. On the other hand it was observed that Chile's RCA value increased from 28.5 to 84.3 significantly during the period.According to figures of 2016, while Chile exports almost 90% of the cherry it produces, this rate is %15 in Turkey. As a result while turkey's cherry producthave inreased, its competitiveness decreased in the last decade years. So Turkey should produce more qualify cherry which is suitable for export and find potential market.

Keywords: RCA values, Competitiveness, Potential market, Export

Analysis Competitiveness of Citrus Export in Turkey

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Abstract: Citrus fruits are the most grown and consumed fruit group in the world. And citrus is one of the most important products for Turkey which has 3% of the world citrus production. Regarding Turkey Citrus Annual Report (GAIN Report, 2017) in marketing year 2016/17 that produced 4.3 million metric ton of citrus, including orange, lemon, mandarin, and grapefruit. Aegean and Mediterranean coast of Turkey in ensuring that 95`% of citrus production can be divided into three main sections. Each of these sections specializes in the cultivation of a different citrus variety. 26.6 % of total citrus is produced in Adana, 24.5 % is produced in Mersin and 21.1% is produced in Hatay region. 60 % of all mandarin, 10 % of orange, 5 % of lemon and grapefruit production of Turkey are covered by Adana region alone. Today, there is a relentless competition among the countries to capture market or increase the market share of international export markets. For this reason, it is important that the competitiveness is high in order to be successful in the international market. In this study the Revealed Comparative Advantage Approach, Net Trade and Grubel-Lloyd Index used to assess Turkey's comparative advantage in citrus products. At the end of the study RCA and NTI are found to be high but GLI values are low in Turkey. Finally, Turkey has revealed comparative advantages and net exporter position during the period 2001- 2016 for citrus sector. In addition, the level of intra-industry trade in the citrus sector has been found to be low.

Keywords: Citrus production, revealed comparative advantage, export, Turkey

Determination of the Factors Affecting the Purchase Behavior of Tractors of Farmers in Erzurum Region

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A**bstract:** Today, especially in the developed countries agricultural areas have reached to their last limit of arable land. This condition makes the use of intensive farming necessary to meet the increasing demand. The most important components of intensive farming in agricultural production are chemical input, qualified work force, high - capacity production material and mechanization. In recent years there has been a significant increase in the level of mechanization in developing countries such as Turkey. According to the data of 2016 while the number of tractor is 53.7 per 1000 Ha cultivated agricultural area, the number of tractor below 50 HP is %51.6. However in Erzurum, where the study is carried out, the number of tractor below 50 HP is %35.2 while the number of tractor per 1000 Ha cultivated agricultural area is 31.3. This study is carried out with the aim to determine the factors affecting tractor brand preference and purchase behavior of farmers in Erzurum region. The study material is obtained from the questionnaries conducted with face to face interviews with 174 farmers who are randomly selected from Yakutiye, Aziziye, Palandöken and Hasankale districts. According to the results of the study, the average land size of enterprises is 179 whereas in %57 of this land irrigated farming is practiced. The average parcel number of the enterprises is 7, while the distance of these parcels to the enterprises is confirmed to be 3.2 km. % 56.2 of the producers have bought their tractors first hand. Considering the factors affecting the

Keywords: Erzurum, agricultural area, the number of tractors, brand pereference

Volatility Spillovers in the Turkish Hazelnut, Gasoline and Exchange Rate Chain: Vecm-Bekk Mgarch

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Abstract: We have investigated short term shocks and the long term volatility between prices of hazelnut, gasoline and effective exchange rate in Turkey using 6:2005-11:2016 data and using VECM-BEKK MGARCH model. The model includes two equations, one of which deals with the change in price levels with Vector Error Correction Model (VECM), while the other is about the volatility spillover in conditional variance and covariance of multivariate GARCH model. The change in price levels was integrated into the conditional mean equation and the degree of the long run relationship between markets was found using the Johansen cointegration technique. We then derive the error terms to be used in the conditional variance-covariance equation. We found a cointegration among markets studied, and volatility spillovers between markets. Volatility of markets are influenced from their lag volatilities along with cross volatilities between markets. In such case, fluctuation in one market influence market swings in another market. In this case transmission of uncertainties between markets exits and policy makers or stakeholders can minimize these effects by hedging against risks. We also compute hedging ration that stakeholders can use against risk.

Keywords: Hazelnut Prices, Gasoline Price, VECM-BEKK MGARCH Volatility

Comparison of Consumer Gender on the Effect of Shopping Mall Behavior

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Abstract: Shopping malls today have become an important part of the consumer. The number of shopping centers in Turkey is 379 in 2016. Thirty percent of shopping malls and 37 percent total rentable area in Turkey is located İstanbul. The number of shopping centers in Anatolia is increasing day by day. In particular, the shopping malls that Anatolian cities have just introduced need to be evaluated in terms of urban economy, sociology, consumer psychology, and behavior. The purpose of working in this framework is to examine consumer behaviors according to sex in shopping malls which become a new consumption place and a form of retail activity which is becoming increasingly widespread in our country in the case of Erzurum city. The data was obtained from questionnaires that were applied to randomly selected subjects among the consumers currently in the shopping mall. The data will be evaluated using descriptive statistical methods and ANOVA. A total of 184 questionnaires were evaluated. 62.5% of the respondents were male, 37.5% were female, and the average age was 33.5. 51.6% of the respondents are married and 65.2% are university graduates. The average monthly income of the participated individuals is 3073.1 TL and the monthly average shopping center expenditure is 375.7 TL. To the shopping center, 18.4% of the respondents are on weekdays and 59% are between 10.00-18.00.

Keywords: Shopping malls, Consumer behavior, Gender, Erzurum

Econometric Analysis of Factors That Affect Milk and Milk Types in Turkey

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Abstract: In this research impacts of household and household head related socio-demographic and economic factors on milk and milk types expenditures probabilities have been identified. To reach this, firstly milk consumption generally in Turkey and then consumed milk types by households (street, packed and organic milk) in seven area have been searched with Probit and Multiple Probit methods. Data has been used in the research is obtained from face to face interviews. When missing and contradictory observations are made, sample size has been defined 1437 households. To research results, the household heads who are young (30 and under 30) decrease milk consumption expenditure probability comparing household heads who are 40 and above. When we make evaluation according to the education level, in household heads who have at least highschool degree consumption and expenditure probability is higher compared to household heads who have lower education level. Household heads who are hosewife have showed more milk consumption and expenditure probability than household heads who are not. Households tend to %5.6 more milk consumption in Mediterranean, %6.1 in Aegean, %5.5 in Marmara, %5.3 in Blacksea, %7 in Anatolia and %3 in Eastern Anatolia according to reference region in the model. When we looked at the correlation coefficients, relation level is at the first place between street milk and packed milk, moreover packed milk with organic milk and street milk with the organic milk relation levels follow respectively. On the other hand exchange catch rates in milk consumption probabilities for majority variables in the model

Keywords: Turkey, Milk and milk types, Consumption expenditure levels

Subliminal Messages' Effects on Consumption of Food Products in Turkey: Case of Van Province

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Abstract: This study was carried out in the district of İpekyolu in the center of Van. In the study, the data used were obtained by face-to-face interviews with consumers. The sample volume in the study was determined by the method of Unclassified One Stage Random Probability Proposal Based on Anakitle Ratios and 385 questionnaires were made. In the distribution of the questionnaires, different socio-economic strata, the district population was taken into consideration. The share of the neighborhoods, in the total population was found and the rate of each neighborhood was multiplied by the total number of the individual questionnaires, reaching the number of the questionnaires to be made in the neighborhood. In the study, factor analysis was conducted to reveal the factors affecting food consumption through subliminal messages. According to the results of factor analysis, the variables that affect the consumer of subliminal messages were collected in 4 factors. The sum of these factors constitutes 65.16% of the total variance. These are respectively; Advertising has been defined as sexuality, packaging appeal, consumer informing, consumer influence.

Keywords: Food consumption, Subliminal messages, Advertisement, subliminal, unconscious Advertisements, Van

The Analysis of Factors Influencing Shopping Tendencies from District Bazaars: A Case of Izmir Province

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Abstract: District bazaars have an important role, especially in terms of meeting the needs of consumers who have low purchasing power. In this regard, district bazaars are evaluated as alternatives to greengrocers, groceries and shopping centers by costumers. In this study shopping tendencies from district bazaars in Izmir were investigated. The main material of the study was obtained with face-to-face interview of 120 consumers who were determined by the method of purposeful sampling. It was determenied that 71% of the consumers who participated in the survey do shopping once a week in the district bazaars. 67% of the consumers stated that they are satisfied with shopping in the district bazaars. The most important reason that consumers prefer district bazaars is that there are many kinds of products there. However, the most important reason that consumers don't satisfied to shop in district bazaars is that it is so crowded. The freshness of the products is the most important factor that influence consumers' shopping preferences. Increasing the number of district bazaars in Izmir or establishing the district bazaars in larger areas can avoid the crowd that occurs in the bazaars. Some stallholders sell at high prices, which is one of the most important complaints of consumers. This can be significantly reduced by tightening the controls.

Keywords: District bazaars, Shopping tendency, Izmir

Struggle Methods with Drought in Wheat Breeding: A Case Study of Nevşehir Province

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Abstract: Among the meteorological factors, the factor having the most comprehensive effect is drought. While drought causes yield of crops, it also causes threats life of living beings. Drought stress on wheat development and its effect on yield; the developmental period in which stress occurs is dependent on the severity and duration of the stress. Drought stress on wheat development and its effect on yield; the developmental period in which stress occurs is dependent on the severity and duration of the stress. The effect of drought stress on wheat development yield depends on the developmental period of wheat in which stress occurs, stress level and duration of the stress.The main cause of the reduction in yield is due to negative effect of drought on spike formation and leaf area after flowering. Rainfall levels below 310 mm indicate that rainfall is inadequate to produce wheat. In this research, it was aimed to determine the farmers' measures taken in the wheat growing during dry periods and the methods of struggle against drought. Survey study was conducted with 105 wheat producers in the province of Nevsehir. Two independent sample t tests were conducted between the use of drought tolerant varieties and agricultural income and it was found that those with high income use drought tolerant varieties. Chi-square test was applied to determine the relation between interview frequency with agricultural establishments and irrigation method in dry periods and it was determined that those with high interview frequency prefer drip irrigation method to prevent drought. As a result, it has been determined that those who are able to produce wheat in arid conditions use durable varieties, receive information from agricultural establishments and make changes in irrigation systems.

Keywords: Agriculture, Wheat, Drought, Meteorological events

Village Poultry Structure in Diyarbakır Province in Turkey

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Abstract: This study was carried out to investigate the structure of village poultry in Diyarbakır province. The data were obtained from 87 village poultry breeders in the selected villages through questionnaires using simple random sampling method. The data belonged to 2016-2017 production periods. The results revealed that the family size was 11.8 person and the family had 663.52 TL average monthly income. The number of poultry per coop was 82. The breeding rate of poultry by the families for market remained at 5.7 %, which means the poultry activities were concentrated on self-consumption structure. The number of chickens differed significantly among the districts in the province. The coops was infected by some diseases and the chickens were vaccinated to prevent and fight against these diseases. The major problems reported by the breeders were diseases, government supports, feed costs and marketing with 61, 23, 11 and 5%, respectively. We suggest that dynamic and educated breeder who are volunteer to make the production for the market should be encouraged and supported. Thus, the poultry breeders would be more resistant in coping the major problems faced, namely, diseases, feed costs and marketing.

Keywords: Diyarbakır, Diseases, Poultry, Feed costs

The Factors Affecting Producers' Satisfaction in Broiler Production in Mersin

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Abstract: Animal proteins are very important for a healthy and balanced nutrition of individuals. Broiler production is very important in poultry sector because the duration of production is very short, needs less labor, cheaper than red meat and a good source of protein in terms of nutritional value. The aim of the study is to determine the factors that affecting producers' satisfaction from broiler production. The main material of this study was collected from 87 broiler producers by face to face survey. The study was conducted in Tarsus district of Mersin in 2013. To determine the factors affecting producers' satisfaction, probit regression model was used. It is found that producers' age is 45.39, producers' experience is 20.36 and education level is 6.16 years. According to the probit regression; although producers' age, experience and income has a positive effect, the number of individuals in family, type of chicken, distance of farm and chicken mortality rate has negative effect on producers' satisfaction.

Keywords: Broiler production, Probit regression, Producer satisfaction, Mersin

Priority of Fertilizer Usage in Terms of Yield and Quality Criteria: The Case of Izmir Province

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Abstract: There is no doubt that fertilizer usage plays a very important role in increasing yield and quality in agricultural production. There are technical, economical etc. factors which have different impact on farmers' fertilizer usage. It is thought that besides these factors, the personal preferences of farmers are effective in fertilizer usage decisions. The aim of this study is to determine the preference priority of fertilizer usage of farmers compared to other cultural processes in terms of yield and quality in Izmir province. Priority of fertilizer usage is determined by using Analytic Hierarchy Process (AHP). The main material of the study is the original data collected from the Menemen, Torbalı and Tire districts of Izmir by the questionnaire for the production period of 2016 from 165 farmers. According to the results of the research; the interviewed producers are about 50 years old and educated for about 8 years. In terms of agricultural experience, it has been determined that the farmers have about 27 years of experience. According to the AHP analysis results; yield and quality criteria have been found to be equally important (0.50) by farmers. It has been determined that fertilizer usage (0.22) is the most preferred alternative by farmers in terms of yield and quality criteria after soil preparation (0.29).

Keywords: Fertilizer usage, Yield, Quality, Analytic hierarchy process, İzmir

Investigating Job Satisfaction of Women Working in Agricultural Sector: The Case of Karaman Province

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Abstract: Women's existence in the home economy is as old as human history. However, the emergence of certain discipline and paid female labour in the world and the starting of female into business life have been realized with the industrial revolution. Although women work in quite different business lines in almost every sector, they face many common problems. The aim of this study is to investigate the problems of the women who play an active role in agricultural sector. For this purpose, face-to-face survey has been conducted with 165 workers determined by proportional sampling method among female workers operating in agricultural sector in Karaman province. Different statistical methods have been used for the purpose of study. Binomial Probit model has been applied to determine the factors affecting the satisfaction level of the wages that female workers receive. The age and educational level of female workers have negative; their incomes, the status of having regular incomes, the situation that the needs are met by the employer and the number of individuals in the family have positive influence of female workers' satisfaction with their wages. Consequently, the structural regulations to be made towards the working conditions and wages of female workers are considered to positively affect their job satisfaction and job efficiency.

Keywords: Agriculture, Female, Binomial probit, Karaman

Investigation of Regional Efficiency in Turkish Agriculture: Data Envelopment Analysis

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Abstract: Turkey has hosted many civilizations throughout history. Because of climate diversity and a lot of fertile agricultural land in the region, agricultural activities have been done intensively in civilization. But nowadays, it does not seem to be at the desired level of agricultural production in Turkey. Lack of agricultural production due to scarcity of agricultural land shows that there is not a good place according to Turkey's many other developing countries in agricultural activities. The aim of this study is to determine the regional technical efficiency in NUTS 3 level in Turkish agricultural production using Data Envelopment Analysis in 2007-2016. Value of crop production, agricultural credits, employment, electricity consumptions for irrigation, total arable land, number of agricultural equipment and machinery, urbanization rate are used to examine regional technical efficiency in Turkey. According to the findings there are regional differences in agricultural efficiency in Turkey.

Keywords: Agricultural production, Technical efficiency, Data envelopment analysis, Turkey

International Competitiveness of Turkey's Cheese Sector in Comparison with EU-28 and Selected European Union Countries

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Abstract: Cheese, in addition to being a rich foodstuff in terms of protein and calcium, it also has an important place in international trade. Cheese export consists 40.3% of world's dairy products exports. European union countries (Germany Netherland, France, Italy and Denmark), USA, New Zealand and Australia have an important market share in international cheese trade. Germany, Netherland, France, Italy and Denmark export 54.8% of world and 71.8% of EU total cheese export in 2016. Turkey is in 24rd place in the world ranking with exports value of $150 million in 2016. About 45.0% of Turkey's dairy products is exported in the form of cheese exports. The objective of this study is to analyze the competitiveness of Turkey's cheese sector and compare with EU-28 and selected European union Countries like Germany, Netherland, France, Italy and Denmark. The data of this study was provided from International Trade Centre (INTRACEN) database for the period 2001-2016. Balassa and Vollrath's Indexes were used for measuring the international competitiveness level of Turkey in cheese sector. In addition to these indexes Trade Balance Index (TBI) was also used for comparison. The results revealed that the average RXA, RTA, RC and TBI scores for Turkey and EU-28 were 0.437, 0.341, 1.513 and 0.488, (2.205, 0.339, 0.166 and 0,098), respectively. Although Turkey has a comparative advantages in the international cheese trade, EU is more comparative advantageous than Turkey. Turkey and EU are also a net exporter country in international cheese trade.

Keywords: EU-28, Turkey, Cheese, Competitiveness, Balassa and Vollrath's Index

Measuring the Distribution of Public Agricultural Investments in the Southeastern Anatolia Region with the Gini Coefficient

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Abstract: In the study, the Gini coefficient is used to measure how much the public agricultural investments in the Southeastern Anatolia region are evenly /unequally distributed, using the public investment data for the period of 2000-2017 of the Ministry of Development. The empirical findings in the study show that public agricultural investments are not evenly distributed. The Gini Coefficient calculated for the year 2000 is 0.714, and the Gini Coefficient for the year 2017 is 0.729. Gini Coefficient values show that in 2000-2017 this change has increased inequality over the years. In the study, analysis of the Gini coefficient values is also performed in order to understand the determinants of intra-regional and inter-regional disparities. The results of the analysis show that the proportion of intra-regional inequality within total inequality increased from 2000 to 2017.

Keywords: Public agricultural investments, Regional development, Gini coefficient, Southeastern anatolia region

Young Consumers' Environmental Policy Preferences: A Case of Ege University

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Abstract: Environmental awareness has become increasingly important in recent years since environmental problems have increased. The environmental consciousness and awareness of these young consumers are extremely important in terms of determining applicable environmental policies for increasing environmental problems. The aim of the study is; toward the young and well-educated individuals' opinions, to suggest the alternative environmental measures and policies appropriate for different cultural background and lifestyles and to examine the effects of agriculture and industry on the environment. The main material of the study is obtained from face to face interviews with 379 undergraduate students from 12 faculties of Ege University. While determining the young consumers' environmental awareness by five point likert Scale, on the other hand Best-Worst analysis was used to designate the trends about measures that have to be taken to protect environment. Research result indicated that according to students participated in the survey even as "human health" is most affected in uncontrolled release of harmful waste; the most effective incentive for waste control has been "provision of tax exemptions for enterprises with waste control facilities". The students also stated that the most effective penalty given to those who leave the waste will be "decertification of enterprise".

Keywords: Environmental problems, Best-Worst analysis, Young consumers, Policy

Examining Consumers' Personal Values in Izmir

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Abstract: Values are defined as enduring belief that a specific end-state of existence is preferred personally or socially over an opposite one. It is generally accepted that values are a powerful force leading behaviors in different areas of consumers' lives. Researchers prove the relationships among personal values, lifestyle and behaviors via conducting valid and reliable approaches in the literature. These approaches reveal that consumer behaviors are mostly influenced by the relative importance of one value to others. The primary objective of this study is to determine consumers' personal values in Izmir. The study also attempt to identify the underlying dimensions that capture the meaning of personal values and classify consumers regarding these values in the research area. Data were collected from a random sample of 385 consumers in Izmir via face-to-face interviews. Factor analysis was used to determine the underlying dimensions that summarize personal values in order to make these values comparable and understandable in terms of their effects on consumer behaviors. Following factor analysis, cluster analysis was applied to segment consumers into homogeneous groups with respect to personal values. Lastly, multidimensional unfolding (MDU) was employed to designate consumer perceptions of personal values. The results showed that two dimensions named "respected accomplishment" and "warm relationships with enjoyment" represented the meaning of personal values. Consumers were classified into three segments: "accomplishment oriented consumers (%22.3)", "accomplishment and enjoyment oriented consumers (%69.4)", and "enjoyment oriented consumers (%8.3)". Perceptual map of personal values indicated that consumers were positioned intensively over fun and enjoyment in life.

Keywords: Personal values, Consumer segmentation, Factor analysis, Cluster analysis, Multidimensional unfolding

Fast-Food Consumption Habits of Students (Gaziosmanpaşa University Example)

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Abstract: The 21st century, where you experience many changes, has also created some changes in people's eating habits and preferences. The main problem of this research is that fast food businesses as well as traditional enterprises have been intensively preferred in meeting the nutritional needs and these enterprises have spread very rapidly. This study was designed to determine fast food consumption habits of university students. 268 university students aged 18-29 were included in the study. The average age of the interviewed individuals was 21.07, 55.97% were female and 44.03% were male and 99.05% were single. As a result of the survey, it was determined that 61.94% of the young people consumed fast food, 71.08% consumed it because of its speed, but 12.65% found these foods hygienic. For this reason, it is necessary to take precautions for healthy and conscious young generation starting from primary school age.

Keywords: Student, Fast food, Nutrition, Consumption

Awareness on Functional Food of Students Who Have Nutrition and Dietetic Education

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Abstract: Functional foods are an important factor in improving quality of life in activities that strengthening and encouraging the physical activity. Besides functional foods are an important part of a healthy lifestyle that includes a balanced diet and physical activity. In this study, it is purposed that researching awareness intended for attitudes and behaviours on functional food of 1st grade and 4th grade students at Department of Nutrition and Dietetic, Faculty of Health Sciences, Adnan Menderes University (ADU). Original data of the study is obtained from the questionnaire performed face to face interviews with department of nutrition and dietetic students that was determined according to the complete counting method. While the responses taken from on attitude and behavior scale regarding functional food is investigated by explanatory factor analysis, some socio-demographic and economic parameters are analyzed by quantitative analysis (crosstabs and hypothesis testing). At the end of the study is determined relation of the functional food consumption frequency with parameters such as cancer, cardiovascular diseases, diabetes, health expenditures, quality of life, stress. Besides first-year students have lower awareness than senior final-year students because final-year students have some optional lessons such as Probiotics and Health, Functional Foods and Health.

Keywords: Functional food, Awareness, Life quality

Determination of Willingness to Pay for Conventional and Organic Milk

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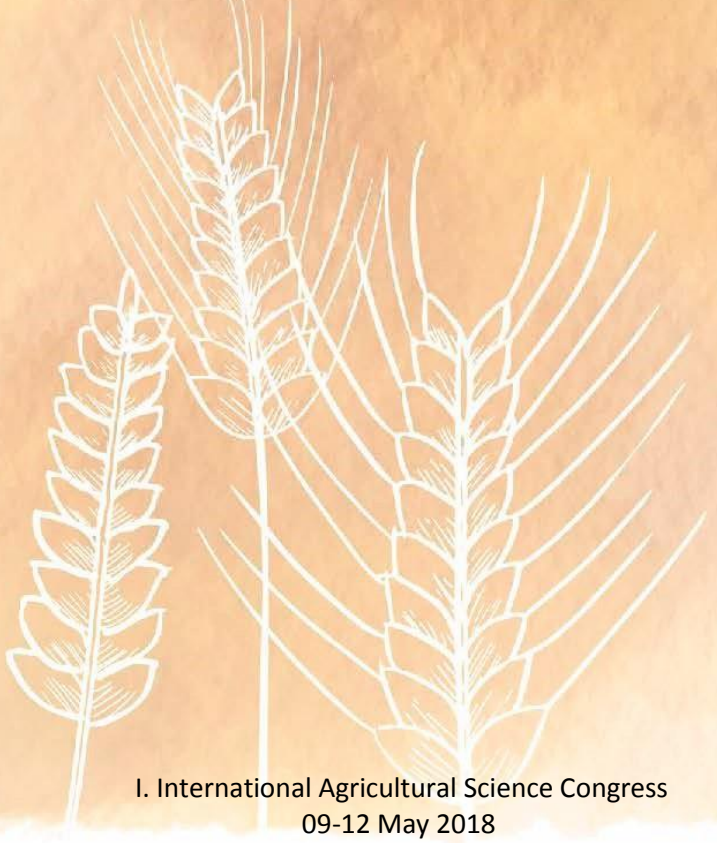
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Abstract: In this study, it is aimed that the analysis of willingness to pay for conventional milk types and organic milk which have importance in agriculture economy. For this purpose, Contingent Valuation (CV) were used and the economic benefit of milk types with different scenarios was estimated. The benefit by households about how much more they will pay in comparison with available milk prices for certain scenarios with the milk types was identified. The research sample size consists of fourteen provinces in seven areas in Turkey and first hand cross sectional data has been obtained from 1570 household interviews. When missing and contradictory observations are discarded, the sample size has been defined as 1437 households. According to results, the average accepted trimmed willingness to pay price/ lt for a household is 3.55 TL in street milk, 3.44 TL in conventional milk and 5.17 TL in organic milk. When the available milk prices/lt are considered, the household heads are ready to pay %42 more in street milk, % 7,5 more in packed milk and % 23 more in organic milk. The results obtained from this study show that the market has 70.000 TL and 100.000 TL potential values for especially street milk and organic milk. Therefore, the investors can use these as a reference to make profit on milk investments.

Keywords: Turkey, Conventional milk, Organic milk, Willingness to pay, Contingent valuation

Oral Presentation

AGRICULTURAL MACHINERY AND ENERGY SYSTEMS



I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

Energy Efficiency of Different Soil Tillage-Sowing Methods in Vetch Farming

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Abstract: Soil tillage process generally causes most of the power consumption with 60 % among the agricultural processes. Usage of more than half of the required operating time for vegetative production makes soil tillage processes exclusively important. In this study, numerical comparison of the relationships between inputs and outputs of traditional and different soil tillage–sowing methods (GT: Traditional tillage, AT1: Reduced tillage–1, AT2: Reduced tillage–2, NT: No tillage) in vetch production in terms of energy units is aimed by considering traditional alternation in dry and irrigated conditions. Direct (fuel–oil, human labor) and indirect (machinery, fertilizer, seed and herbicide) energy inputs were examined in systematic analysis of energy usage of soil tillage–sowing methods and energy resources were examined as renewable (human labor and seed) and non–renewable (machinery, fertilizer, fuel–oil, herbicide). Energy audits (energy ratios, specific energy in MJ kg^{-1}, energy productivity in kg MJ^{-1} and net energy yield in MJ) of the methods were determined from the energy outputs which were calculated from vetch grass yields and the energy inputs used for vetch production. According to the results; conventional soil tillage–sowing method was the highest non–renewable energy source consuming method (79.95%–79.72%) and no–tillage (NT) method was the method using the lowest non–renewable energy sources (77.01%–73.29%) in either agricultural conditions (irrigated and dry). Chemical fertilizer was determined as the highest energy input in terms of energy input distributions in either agricultural conditions. Reduced soil tillage–1 (AT1) was determined to be the best method in irrigated conditions and no–tillage (NT) was determined to be the

Keywords: Direct drilling, Energy efficiency, Reduced soil tillage, Renewable energy, Traditional soil tillage

Effects of Growing Season and Root Presence on Some Yield Components and Fatty Acid Composition of Sesame in Cukurova Region

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Abstract: Sesame is harvested manually in Turkey. The traditional harvesting system which are ripped and bound in small bundles by labor and later dry plants are threshing. This system is being not only increases the cost of sesame, but also leads to a gradual decrease in planting area of sesame in Turkey. In the Turkey has been working on complete mechanization of sesame harvesting and threshing. Till now, the farmers do not prefer to mechanical harvest system because they are considering that the quality of seed are reduce by cutting the roots at the harvest. The main purpose of the study is to determine the relationship between root presence and seed quality in sesame. For this purpose, some quality parameters were compared to the seeds obtained from rooted and without root plants. It was carried out randomized complete split plot design, four replicates in Cukurova Region and for two years under main and second crops conditions. In the study, 1000 seed weight, fat-protein ration and fatty acid composition were determined in sesame seeds obtained from plants rooted and without root. As a result, this study found that root presence has no statistically significant effect on palmitic, stearic, oleic, linoleic acid. But, it was determined that root presence was a significant effect on seed weight ($P<0.05$). Despite could be determined that the growing season (main and second crop conditional) has statistically significant effect on stearic ($p<0.05$) and oleic acids ($p<0.01$), could not be determined this effect on palmitic and linoleic acid.

Keywords: Sesame, Root presence, Harvest, Fatty acid composition

Determination of Energy Use Efficiency in Safflower Production (Sivas-Gurun Example)

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Abstract: In this study, it was aimed to determine the energy inputs and outputs used in safflower production in Gürün county of Sivas province and determine the energy use efficiency of applied soil tillage systems by applying survey method. According to the two different tillage systems used in the study, necessary informations such as the manufacturing energies of the equipment and machines, fuel-oil consumption, fertilizer and seed quantities were obtained from various sources and catalogs from surveys and other studies. Safflower land area sizes were grouped as 0-10 da, 10.01-20.0 da, 20.01-40.0 da and >40 da. The results of the evaluation were evaluated according to the land area groups and the soil tillage systems. As energy efficiency parameters; energy efficiency, specific energy (MJ kg^{-1}), energy productivity (kg MJ^{-1}), net energy yield (MJ ha^{-1}) and energy profitability were calculated in evaluations. It has been determined that the values of energy efficiency parameters decreased as the land sizes in safflower production. Among the groups, the highest input ratio was found in the use of chemical fertilizer, followed by pesticide and fuel oil energies.

Keywords: Central Anatolia Region, Land size, Tillage system, Safflower, Energy use efficiency

Pepper Harvest Mechanism

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Abstract: Plant cultivation issue due to increased food need has started to come more often on the agenda. As in all stages of plant cultivation, the importance of harvesting is increasing. Due to the consequences of shifting the workforce to different areas in the developing world, tools and machines manufactured for use in agriculture need to be mechanized with greater efficiency. The studies on pepper harvesting mechanisms have been going on for many years. They are operated at certain harvest effectiveness values and produced by some companies, despite of the fact that available mechanisms in the market have been offered for sale, it has not been fully mechanized. It is estimated that the pepper harvest mechanisms can still be improved. It is necessary to continue their efforts to increase the importance of harvesting mechanisms in our country.

Keywords: Pepper, Harvest, Mechanism

Effects of in-Furrow Planting/Irrigation Method on Soil Salinity Distribution and Water Productivity of Winter Wheat

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Abstract: Shortage of irrigation water and soil/water salinity are two major constraints that influence crops production in arid and semi-arid regions. This study was conducted to investigate the effects of in-furrow planting with furrow irrigation method on soil salinity distribution and water productivity of winter wheat. Experiments were carried out in a field located at east of Urmia Lake with a loamy soil texture and salinity (EC) of 12 dSm^{-1}. Soil ridges with 10 cm height were constructed by a special grain drill which plants wheat seeds into furrows. The experimental treatments were related to planting and irrigation methods included (i) planting on a smooth soil and conventional flood irrigation; (ii) planting into the furrows with 60 cm width and furrow irrigation; (iii) planting into the furrows with 100 cm width and furrow irrigation. According to the results, reducing the width of the furrow from 100 to 60 cm resulted in better soil leaching from inside the furrows to the ridges and reducing irrigation water consumption. In terms of crop yield, there was no significant difference between treatments. However, due to less water consumption, the water productivity of planting in 60 cm furrows, was significantly higher than other treatments. Therefore, in semi-arid areas with saline soils, planting within the narrow furrows and furrow irrigation is preferable.

Keywords: In-furrow planting, Furrow irrigation, Soil salinity, Water productivity, Wheat

A Study on Olive Harvester Use in Akhisar Region

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Abstract: One of the indispensable foods of the Mediterranean cuisine, olives are produced in the Aegean, Marmara and Mediterranean regions of the Turkey. The most time-consuming and tiresome activity in the production chain is the harvest. The harvest accounts for about 50-60 % of the production cost. Due to ease of harvesting and the provision of time savings, the demand for olive harvester has increased in the country in recent years. Olive harvesters are mostly imported in different models and types, and some of them are produced locally. Generally, hand-carried rakes or shakers can be used on the slope side, while on the flat areas; a small number of trunk shakers are also purchased and used by our producers. The opinions, criticisms or likenesses of the farmers using these machines will reveal the way to be followed about the olive harvesters and the necessary improvements. In the study conducted in Manisa (Akhisar) which is one of the important olive growing regions in the Aegean Region, data were collected by making face to face interviews with the producers. The obtained data were subjected to statistical analyzes and evaluations were made. Thus, the socio-economic conditions of the farmers who use olive harvests were revealed, the opinion on machine harvesting and olive harvesters were examined and the opinions of the ergonomics and safety of the machine harvesters were determined. As a result, it is aimed to put forward the problems experienced through these opinions, to determine the most suitable harvesting machines for the region.

Keywords: Olive, Olive harvest machine, Harvest rakes, Ergonomics, Labor safety

Investigating Maize Harvest Waste Profile in Fields and Determining the Performance of a Machinery Alternative to Burning under Cukurova Conditions

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Abstract: This study was carried out in Çukurova conditions to determine the characteristics of the harvest waste profile of maize fields and to determine the performance of a stubble breaker as an alternative to burning. Experiments were carried out on parcels in 2.8x50 m dimensions with 3 subject and 4 replications according to randomised complete block design. After 4 days of harvest, the stem waste contained 16-22% humidity, average stem diameter was 23.5 mm and stem density was 95%. In addition, the amount of biomass on the surface of the field was measured between 146-161 kg/ha. Also, the machine workforce, fuel consumption and income-expenditure ratios of the stubble breaker used in the research were evaluated.

Keywords: Corn stalk, Stubble burning, Stalk breaker, Cukurova

Projection of Agricultural Tools and Machinery Usage in Agriculture in Turkey

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Abstract: Agricultural mechanization is the most critical factor that provides effective usage of agricultural inputs. In order to increase the technical efficiency in mechanization, organization quality and mechanization operation need to be increased. In this study, it was aimed to determine the projection of the usage of agricultural tools and machinery in agriculture in Turkey. Projection coefficient was calculated based on past ten years production and usage amounts of the agricultural tools and machinery used in agriculture. Next ten year projections of technology equipment used in agriculture in Turkey have been determined in line with the increase or decrease of the projection coefficient. Within this framework, the projections of 40 agricultural tools and machinery widely used in Turkey are taken into consideration. It has been concluded that the projections of 35 tools and machinery technology used in agriculture in Turkey will increase up to 2026 in accordance with determining positive projection coefficients and 5 tools and machines usage in agriculture will decrease in line with determining negative projection coefficients.

Keywords: Turkey, Agricultural machinery, Mechanization, Projection, Tools

Agricultural Machinery Industry in Turkey: Major Agricultural Machineries or Equipments Manufactured in the Country, the Production Trend and the Main Constraint

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Abstract: Manufacturers of agricultural implements contribute most to the industry development of the country. Their growth generally interrelates to agricultural production. Therefore, it is important to know the current situation of agricultural machinery industry and agricultural production, and their main constrains for developing a sound policy framework that supports the productivity, the sustainability and the competitiveness of the agricultural machinery industry in world. The aim of this study is to review the current status of manufacture of agricultural machinery, its growth, market trends, progress, challenges, opportunities, government regulations, technologies in use, growth forecast, major companies, upcoming companies and projects etc. in the Agriculture Machinery sector of Turkey. In this purpose, the reports, records and statistics of the Turkish Association of Agricultural Machinery and Equipment Manufacturers, the Ministry of Food, Agriculture and Livestock, The Ministry of Science, Industry and Technology was reviewed. The results of the study showed that there were numerous companies registered in the agricultural machinery, but most of them are minor businesses in the form of lathe and welding workshops. Manufacturing companies in Turkey have considerable knowledge and experience in tractors, soil working, sowing and fertilization, and harvesting machines. It was seen to be reported in all reports and records that the production costs of agricultural machinery were considerably high due to low productivity and small size enterprises.

Keywords: Agriculture machinery, Turkey

Impact of Surfactant Sprays on the Ratio of Hold on to Different Target Surfaces

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Abstract: The first process of holding the spray liquit on the leaf surfaces is drop sticking. The water wettability of the surfaces also has a great effect on the adhesion of the drops. drop contact angle, contact height, and contact diameters in the 3rd and 10th seconds were measured with the drop Shape Analysis 10 device to determine the application of 10 different surfactants to different leaf surfaces with to determine the levels of adhesion, spreading and clinging. The adhesion and spreading ratios of the droplets formed on different leaf surfaces were determined from the data obtained at the two time points. The spreading ratios of the prepared mixtures were determined as the adhesion rate considering the change rates during the last seven seconds between these two time periods. The coverage of the envelopment rates of the surfactants of different properties on the surfaces were evaluated as possible business success according to the adhesion, spreading and adhesion levels to be predicted in the spray. The surfactants and leaves according to their results on the application surfaces were assessed in terms of their similar properties and evaluated statistically according to the SPSS 15 program. Surfactant mixtures with sodiumcarboxy methylcellulose and carboxymethylcellulose content have the largest drop contact angles and contact heights at the leaf surfaces and the smallest drop contact diameters, resulting in very poor spreading performance for seven seconds. Surfactant mixed droplets containing trisiloxane, allyloxypolyethyleneglycol and alcoholethoxylate, alkylphenolethoxylate were found to form the smallest contact angles, minimum droplet heights and largest

Keywords: Clinging to, Contact diameter, Drop heights, Leaves

Evaluation of Anhydrous Ammonia Applications in Sunflower

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Abstract: The aim of this research is to evaluate of the anhydrous ammonia application in sunflower farming. Anhydrous ammonia is used as a nitrogen fertilizer in developed countries in agriculture. Anhydrous ammonia is used and stored under high pressures due to its chemical properties, which requires specially designed equipment. It must be injected directly into the soil and covered to prevent gas escaping directly to the atmosphere. For this reason, the use of ammonia for nitrogen fertilization is not common. But, it has the highest nitrogen content (82 %). It is sufficient to apply once before sowing, which is an important advantage. In this study, the traditional application and anhydrous ammonia application were compared in sunflower for nitrogen fertilization. It was determined that the amount of nitrogenous fertilizer used in farmer applications is 2.4 times higher than that of anhydrous ammonia application. The unit product costs were calculated as 1.02 TL/Kg in the traditional application and 0.75 TL/Kg in the anhydrous ammonia applications. At the same time, grain yield in the anhydrous ammonia application was 27 % higher than in the traditional application. These results show that anhydrous ammonia may be preferred for nitrogen fertilization in sunflower.

Keywords: Anhydrous ammonia, Fertilizer, Nitrogen, Sunflower

Demand Management of Electric Energy Produced by Photovoltaic in Livestock Enterprises

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Abstract: In the study, a 24 hour energy demand management system was designed to manage the enterprise operation requests to electricity generated by photovoltaic panels in cattle shelters. In the studies conducted for this purpose, it has been determined that energy consumption is realized in maximum 9 different points per day in cattle shelters. It has been observed that 6 activities consume electricity energy in serial or in parallel within 24 hours and these activities have accumulated between 06:00-10:00 and 14:00-19:00 during the day. A Demand Management System developed in accordance with this data which includes work flow charts and diagrames appropirate to energy consumption behaviors. In addition, designed electric energy demand management system within the scope of the study were compared to others used in different sectors.

Keywords: Agricultural business, Demand management, Electricity, Photovoltaics

Composite Material Utilization in Agriculture Machinery and Equipment

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Abstract: Composite material utilization in different industries is growing rapidly in order to meet the demand of lightweight and everlasting materials of those specific industries. As an example, only glass fiber market in the U.S. has reached to 2.5 billion pounds in terms of volume and $ 2.1 billion in terms of value in 2017. The major sectors in the demand and utilization of those composite materials are aerospace, automotive, transportation and construction. In this study, it was aimed to investigate the agricultural machinery parts and equipment that were produced from composite materials. It was sought to determine that in which parts or equipment the composite materials can be used and in which parts or equipment they cannot be used for agricultural application. Besides, mostly used composite material production techniques were determined. It was seen that in agricultural market composite material are mostly used for tractor fenders, hood enclosure, battery trays, body panels and substructures, impellers, fittings, valves, floor mat, top roof cover, roof hatch, console box assy, air duct, chassis and drawbars in foraging and harvesting, trailer components, snow plow hitches, sprinkler system and equipment cases. Most utilized production techniques were found to be compression molding and thermostamping or thermoforming.

Keywords: Composite materials, Agricultural machinery, Composite based agricultural equipment

Effect of Spatial Variability of Nutrients on Fertilisation Requirements of Cherry

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Abstract: Objective of this research was to compare conventional fertilisation as fixed rate fertilisation and variable rate fertilisation by determining spatial variability of nutrients for soil and leaf. In addition yield map and quality parameter of harvested fruits were also investigated in terms of spatial variability. Research has been carried out in a cherry orchard in Tekirdag Vineyard Research Institute. In this research, soil, leaf and cherry fruit samples were taken with their GPS coordinates and analysed in the laboratory. Cherry orchard divided in 2 parts to create variable rate and fixed rate fertilisation. This study includes first year results of an ICT AGRI project "Variable Rate Operations in Orchards". Amount of the mineral fertiliser requirement was calculated by using leaf analysis for variable and fixed rate fertilisation. In addition, spatial variability of soil texture, pH, and nutrients amount of N, P, K, soil and leaf, yield and quality parameters were determined and investigated.

Keywords: Cherry, Precision farming, Spatial variability, Fertilisation, Yield map, Variable rate

AGRICULTURAL STRUCTURES AND IRRIGATION



I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

Identification of the Agriculture and Irrigation in Somalia

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Abstract: Somalia is situated in northeastern Africa and covers an area of 637660 km^2. Located in an arid and semi-arid climate with an extremely low, variable and often unreliable rainfall, on average, the country receives 300 mm of rainfall per year, while the annual potential evapotranspiration varies between 1500 mm on the south coast and 2900 mm on the north coast. Southern part receives relatively more rains. Agriculture is a major employment activity and the largest economic sector in the country. There are two major river basins in Somalia: the Shabelle River Basin and The Juba River Basin. Both of these two rivers dominate Somali's southern landscape. The total area of the Shabelle river is approximately 307000 km^2, more than half is within Ethiopia, while the Juba River Basin is 233000 km^2, 65 % of which is in Ethiopia, 30 % in Somalia and 5 % in Kenya. Both of these two rivers supply the rice bowl of Somalia, and support important economic areas in southern Somalia. The Juba and Shabelle rivers have for a long time been used for irrigation by farmers in the medium to large irrigation schemes in Southern part. Irrigation potential is estimated at 240000 hectares. Spate and surface irrigation are the most common irrigation method used. It has been observed that there is inefficient water use, and deterioration of the dams. Irrigation and drainage systems are very poor. Also irrigation-induced salinity is an increasing problem.

Keywords: Irrigation, Water resources, Somalia, Water use

The Current Status of Irrigation in Sudan and its Comparison with Turkey

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Abstract: Sudan lies in Northern Africa covering 188.61 Mha, with desert and arid climates and annual rainfall 254 mm and very high evaporation 1000-3000 mm/year. Turkey lies in Asia and Europe (3 %) covering 78.36 Mha with a mountains land, variety climates in all Turkey and annual rainfall 574 mm. Agriculture and livestock are the main economic sectors in Sudan and employed more than 80 % of population. Sudan cultivated area is 30 Mha, however less than 20 % are utilized under three major farming sub-sectors: the irrigated, the semi-mechanized rainfed and the agro-pastoral traditional rain- fed with irrigable land 2.5 Mha. Turkey cultivated area 28 Mha under two major farming sectors: the irrigated and rain- fed with irrigable land 8.5 Mha. While the total water volume coming from the rainfall in Turkey is 450 km^3/year, Sudan's total natural renewable water resources are estimated to be 149 km^3/year, of which 20 percent is produced internally from rainfall. The status of irrigation in Sudan and Turkey comparing with each other the most irrigation systems in the both country is the surface irrigation system (93 %, 7 % spate irrigation) and 90 % respectively, but the application of the water and the canals designs (covering canals) in Turkey is more developing than Sudan. In Turkey 10 % of the irrigated areas are irrigated by pressurized irrigation techniques. whereas pressurized systems in Sudan have been used just by private sector. Just 2/3 ratio from irrigation potential in Sudan has been actually irrigated, due to deterioration of irrigation and drainage infrastructures.

Keywords: Sudan, Turkey, Irrigation systems, Land use

Yield and Water Use of Silage Maize in the Different Tillage Practices

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Abstract: Silage maize is an important crop to meet the fresh forage needs of cattle in Turkey's Eastern Anatolia Region. Increasing global demand for fresh water every day makes it imperative for effective water demand management and policies to be realized. In this context, the effects of three different tillage methods (Conventional tillage-CT, Reduced tillage-RT and no-tillage-NT) were investigated in order to determine the water-yield relationships in silage maize grown in the conditions of Erzurum-Pasinler, where has semi-arid climate in high altitude. The silage yield obtained for the 3148 m^3 water spent for unit area (ha) in the CT practice, where water was consumed the most, was 75.1 ton ha-1. This yield was 9.5 % lower than obtained in the NT practice, which consumed 3.9 % less water. Soil moisture content in 0-90 cm depth in the harvesting time in the NT practice was 10.6% higher than the value of the CT practice. The germination rate in the CT practice was determined 87 %, which was reached 14.8 days after sowing. Germination rates in the RT and NT practices were 91 and 98 %, 14.3 and 14.1 days after sowing, respectively. The CT practice provided profit of 15947 TL for 2082 TL cost considered the results of gross profit analysis. While the profits in the RT and NT practices were higher as 4.4 % and 12.3 % and, the costs were lower as 7.7 and 12.4 %, respectively.

Keywords: Silage maize, Water use, Conventional tillage, Reduced tillage, No-tillage

Irrigation Situation in Niger: Problems and the Proposals for Solutions

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Abstract: Niger is a landlocked country in West Africa covering 126.7 Mha. Yearly total evaporation varies between 1700-2100 mm. The area of cultivated land approximately covers 15 Mha and irrigable land potential is estimated at 0.27 Mha. Agricultural and livestock sectors are the main source of economic activity in the country and employ 83 % of the active population. There are two major river basins in Niger: the Eastern Niger Basin and The Niger Basin. Total renewable water resources are estimated to 33.65 km^3/year but the vast majority coming from neighboring countries (more than 30 km^3/year). The source of irrigation water was groundwater for a large majority of the farms practicing irrigation from wells and catch basins for 64 % and boreholes for 5 % of them, surface water for 18 %, drinking water supply for 1% and the remaining (17 %) escaping from the hydrographic system. Irrigation techniques used on irrigated farms are mainly dominated by manual surface irrigation (74 %) and surface irrigation (21.4 %) with moto-pomp. Pressurized techniques are almost non-existent (2.3 %) use sprinkling and 0.5 % drops only in small irrigation and the rest (1.8 %) using uncontrolled submersion. Although drainage requirement is high in the country, the drainage systems are not sufficient. Among the main problems related to irrigation: the excessive wastage of water related to the irrigation techniques used and the insufficiency of the water resources. Therefore planning for good irrigation management is inevitable.

Keywords: Niger, irrigation, Drainage, Water resources, Water use

Agricultural Practices to Reducing of the Salt Stress in Plants

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Abstract: Salt stress is one of important abiotic stress factors which effect development of plants especially in arid and semi-arid regions and it is becoming more important every day due to reductions in quality of water resources. Salinity is a great problem in the world soil. Approximately 10 million hectares areas disappearing per year in the world together with increase in salinity level of the soil. There is about 1.5 million hectares saline area in the Turkey. Irrigation made with saline water appers changes in the normal physiological functions of plants with increased salinity in soil. Osmotic stress is occured in the root rhizosphere with increase amount of salt and plants can't get water from the soil although there is enough water in the soil. Practices such as development of salt-tolerant plant varieties, remediation of saline soils, improvement of water quality, use of special techniques in plant cultivation have been applied to reduce harmful effect of salinity. In this study, the effects of salt stress and special techniques to be taken against salinity are described and discused.

Keywords: Abiotic stress, Salt stress, Saline soil, Saline waters, Soil remediation

Effects of Intermittent Leaching at Different Water Proportions on Soil Salt Distribution

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Abstract: Salt accumulation in the soil productive part is a very common problem in the world, especially in the Mediterranean countries. Leaching of the salt from the root zone is the only solution to alter this problem. This study was conducted to understand leaching trends on salt movement with proportionally increased water amounts and its behavior in the soil columns with light and medium textured soils. During the experiment, 93 cm leaching water was intermittently applied in equally increased 5 different portions (3 cm, 6 cm, 12 cm, 24 cm ve 48 cm) to the columns under laboratory conditions. Time between leaching intervals were decided according to three different moisture drying ratios (15 %, 30 % 45 %). There were statistically significant differences among the results of leaching applications at different moisture levels of soils at all depths. The most effective salt leaching from the soil profile was at 45 % moisture drying level for both light and medium textured soils. Leaching water as a 1.5 fold of soil depth leached out 91.43 % of total salt from light textured soil, 87.23 % of total salt from medium textured soil.

Keywords: Salinity, leaching, Soil texture

The Dripline Uniformity in the Irrigation with Different Reclaimed Wastewaters

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Abstract: In this research, it was investigated the effects of treated wastewater on the performance of the driplines used cauliflower and red cabbage irrigations for two years. The experiment was conducted in a randomized complete block design with three replicates using four different water (fresh water, filtered wastewater, filtered and aerated wastewater and the mix of fresh water with filtered wastewater named diluted water). It was determined the changes in the dripper performances by calculating the statistical uniformity coefficient from the drippers flows measured at the harvests. Langelier Saturation Index (LSI) values of the waters were also calculated to evaluate the chemical clogging effects of irrigation waters on the drippers. The uniformity coefficients of driplines for all waters in first years end was calculated approximately 97 %. End of second year, the uniformity coefficients in the filtered and filtered and aerated wastewater applications was in poor class due to the between 60-70 %. The uniformity coefficients were determined as fair (70-80 %) and excellent classes (> 90 %) for diluted and fresh water conditions, respectively. It could be concluded that positive LSI values determined for both the filtered wastewater and filtered and aerated wastewater pointed out to an extra chemical risk in clogging of drippers.

Keywords: Dripline, clogging, Uniformity coefficient, Wastewater, water

Irrigation Scheduling for the Crops Grown at Atabey Irrigation Scheme in Isparta

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Abstract: In this study, the crop pattern occurring at Atabey Irrigation Scheme in Isparta in 2012 was determined by making use of Remote Sensing and the Geographic Information System and the irrigation scheduling for the crops in the pattern was performed by means of the CROPWAT computer software, which calculated evapotranspiration according to the Penman-Monteith method. The RapidEye satellite image of July 2012 was used to determine the crop pattern. In irrigation scheduling, an evaluation was made by taking the heavy-, medium-, and light-textured soils into consideration individually and the results were compared. As a result of the crop pattern classification and the ield observations, it was discovered that Apple, Maize, Vegetable, Grapes, Clover, Sugar Beet, Sapling, Rose and Poplar were contained in the crop pattern in the irrigated area within the scheme. The irrigation water requirement values of the crops were found as 528.7 mm, 535.4 mm, 563.4 mm, 405.4 mm, 639.4 mm, 677.1 mm, 368.6 mm, 552.1 mm, and 481.3 mm, respectively. The number of times of irrigation for the crops concerned ranged from 4 to 8, from 5 to 11, from 7 to 16, from 3 to 7, from 5 to 11, from 5 to 12, from 6 to 12, from 3 to 7, and from 3 to 6 according to their soil structures. At the end of the study, it was understood that remote sensing and geographic information systems could be used to determine crop patterns and that real-time irrigation scheduling could be performed.

Keywords: Irrigation scheduling, Remote sensing, RapidEye, Cropwat, Atabey

Evaluation of Pressured Irrigation Systems in Irrigation Schemes

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Abstract: Climate change and water scarcity occur one of most important issues in agriculture. It is necessary to use water effectively used in agriculture because of the increasing use of industrial and domestic water necessitates. Dissemination of pressurized irrigation systems is important for the sustainable use of soil and water resources. As a result, the use of pressurized irrigation systems has started to increase rapidly in recent years. From 2006, the Ministry of Food, Agriculture and Livestock has begun to support farmers using pressurized irrigation systems. 50 % of system cost is supported as a grant. In addition, 0 interest loan is granted for 5 years. Financial support has given rapid acceleration in the use of pressurized irrigation systems. This situation has also had an economic impact in addition to the sustainable use of land and water resources. In the 10th Development Plan, it was aimed to increase the share of water saving pressure irrigation methods in the plan period by 20 % to 25 % in the irrigation facilities developed by the General Directorate of State Hydraulic Works (DSI) within the scope of effective use of agriculture water. In 2011, irrigated areas with pressure irrigation methods accounted for 20 % of the total irrigated area, reaching 23 % in 2012, 24 % in 2013, 26 % in 2014 and 30 % in 2015. 70 % of the irrigated area is irrigated by surface irrigation, 17 % by irrigation and 13 % by irrigation with drip irrigation. In this study, the changes of the irrigation methods of drip and sprinkling in command area of transferred irrigation schemes will be evaluated. In this study, irrigation and drip irrigation areas of irrigation networks located in 25 regions will be evaluated with the Sprinkling Irrigation Area Ratio (YSAO, %) and Drip Irrigation Area Ratio (DSAO, %). Hierarchical multivariate clustering analysis will be used to determine similarities between irrigation schemes.

Keywords: Irrigation schemes, Sprinkler irrigation method, Drip irrigation method

Effect of Different Rate of Water Absorbent Polymers on Lettuce Growing

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Abstract: The research was carried out to determine the effect of different water absorbant polymer doses on crop yield, plant growth, water consumption and plant nutrient uptake in the lettuce. In the study carried out in greenhouse conditions in Yalova province, 5 different polymers were mixed with soil and it was carried out on conditions satisfied 50 % of plant water requirement. The study was conducted Randomized Plots Design with 4 replicates in 2017-2018 growing season. Water absorbant polymers were applied to the soil at 0 %, 0.2 %, 0.4 % and 0.8 % doses.

Keywords: Lettuce, Yield, Water consumption, Plant nutrient

Effects of Different Irrigation Regimes on Vegetative Growth of Young Walnut Trees Irrigated by Drip Irrigation[1]

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Abstract: The research was conducted during the growing season 2015 and 2016 to evaluating the vegetative growth parameters of young walnut trees (two years old) under different irrigation water levels. Irrigation water was applied at three different levels as 75 %, 100 % and 125 % of the evaporation values measured from the A-class evaporation pan in the 5 days irrigation interval. The number of irrigation applications for the first and second year were 23 and 22, respectively. In the first year of the study between 446,7 and 744,5 mm with irrigation application, the treatment in the second year of 439,6 and 732,4 mm of irrigation water irrigation was applied. The total amount of evapotranspiration during the growth period for the first and second year were calculated between 732,8-978,9 mm and 615,9-905,7 mm respectively. In the experiment, the effects of different irrigation practices on the vegetative growth parameters of walnut trees were also investigated. In the experiment, trunk diameter, trunk cross-sectional areas, canopy height, canopy width and canopy volume were obtained in the walnut trees. These values are based on the results of variance analysis; it concluded that the amount of irrigation water applied to the walnut trees vegetative growth parameters that not affect the results statistically.

Keywords: Walnut, Drip irrigation, Evapotranspiration, Vegetative growth parameters

[1] It was produced from PhD thesis.

Acknowledgment: The authors would like to thank the TUBITAK for its financial support to the project of 114O532.

The Performance of Evaluation of the Drip Irrigation System in Citrus Orchard

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Abstract: Drip irrigation is an irrigation method which has an important role both in natural sources and agricultural input and which aims efficient use of water an item which has gradual importance in the world but also decreasing in quantity. In order to provide productivity, first; a good system project has to be made as a following process, the performance of this project has to be evaluated. This study aims to evaluate the performance of drip irrigation system on bedded citrus orchard on bed. According to the results of this study, distrubition uniformity (EU) was 92 to 95 %; potential application efficiency (PELQ) was 86 %; application efficiency (AELQ) was 94 %; and percentage of wetted area was found to be 20 %.

Keywords: Drip irrigation, Uniformity, Irrigation efficiency, Irrigation system performans

Measurement of Climate Data in a Gothic Roof Covered with PE + PC Combination

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Abstract: Three types of greenhouses are become traditional in modern greenhouses in Turkey. They are venlo, arch and gothic type. The objective of the present study was to evaluate climate parameters of two-blocked greenhouse covered with PE+PC combination. The covering materials used in the greenhouse were low-density polyethylene (LDPE) supplemented with UV+IR resistant additive on roof sides and polycarbonate (PC) on side walls. The studied greenhouse has a width of 9.6 m, length of 55 and a height 5 m in dimensions. Climatic variables such as global radiation, air temperature and relative humidity were measured inside greenhouse and outside. These values recorded by data-logger. There was only roof went in the greenhouse. Passionfruit plant was cultivated in the greenhouse. The PE+PC covered greenhouse was not heated.

Keywords: Greenhouse, Cladding materials, Polyethylene, Polycarbonate, Microclimate

Trend Detection of Climate Indices-A Case Study to Assess Climate Change in the Van Basin, Turkey

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Abstract: One of the most vital concerns of the last few decades is climate change in the water limited regions world-wide. Although, numerous studies were dedicated to detect the magnitude of climate change, further research is required to evaluate the change for the future planning and management of the regional ecosystems. In this respect, this paper concerns the use of a procedure that identifies trends and magnitudes of climate indices over the time period of 1965-2015 (51 year period) and prediction of future climate change in the Van Basin (Turkey) for the 2070s. The procedure utilizes the Mann-Kendall non-parametric test and the sen slope estimator to detect the trends and the magnitude of the change. The research investigates temperature, rainfall, snowy days, the snow cover duration and the maximum snow depth for a network of 5 Turkish meteorological stations in the basin. Furthermore, climate projections were done with the HadGEM2 model by Hadley Center and run via the Representative Concentration Pathways (RCP2.6) scenario. The application of the trend detection technique to temperature has yielded the identification of significant increasing trends at the 0.05 level for most of the basin with the average magnitude of 2.02, 1.63, 1.44 and 0.75 °C 51 years-1 for winter, spring, summer and autumn respectively. However, almost no evidence of significant change was experienced with a general decrease in the rainfall. Snowy days, the snow cover duration and maximum snow depth were generally statistically decreased by 13.75 day 51 years-1, 14.41 day 51 years-1 and 16.

Keywords: Mann-Kendall, Sen slope, Temperature, Rainfall, RCP

Importance of Effective Irrigation Management under the Climate Change and Drought in Turkey

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Abstract: Scientific observations have shown that the average air temperature of the earth has increased about 0.6ºC during the past 100 years. Climate change is a multidimensional and complex challenge which poses serious environmental and socio-economic consequences. Drought is a natural but temporary imbalance of water availability, consisting of a persistent lower than average precipitation, of uncertain frequency, duration and severity. Over 75 % of available water in the dry areas is used for agriculture. Irrigation water use is primarily for production of water materials of food and fibre. The need to improve water use in agriculture is not only vital important for agricultural productivity but also for ecosystems health in dry areas. The amount of irrigation water of 5000-6000 m^3 per ha are used in the modern irrigation systems while water more than 10000 m^3 per ha are used for conventional irrigation in Turkey. Thus, one of the most effective ways for sustainability on water and soil resources and to save water in irrigated agriculture are to use and/or convert to modern irrigation systems. To sustain irrigation management and increase water use efficiency are water conservation and water saving practices and management, water metering, water pricing, crop resistance to water stress and water use efficiency, improving irrigation systems, improving irrigation scheduling, deficit irrigation and to use non-conventional resources. selecting crops adapted to the soil-climate environment and considering irrigation water availability might decrease risks on climate change and drought occurrences. In this article, sustainability of irrigation will be discussed.

Keywords: Climate change, Drought, Irrigation management, Modern irrigation, Sustainability

Development of a Software for Agricultural Meterology Stations to Measure Climate Data Used in Reference Evapotranspiration (ET_o) Calculation

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Abstract: In this study, it is aimed to develop a software for agricultural climate station measuring climate data using Programmable Logic Control (PLC) in the calculation of reference evapotranspiration (ET_o). Firstly, the climate station measurement parameters and the ET_o calculation flow chart were defined. Then the PLC reference evapotranspiration (ET_o) program was written in CODESYS-ST language using climate parameters and ET_o calculation flow chart. In the reference evapotranspiration (ET_o) calculation, the FOA Penman-Monteith method was chosen and an analog module was selected for PLC which will measure the climate parameter accordingly. In the climate station there are solar radiation, temperature, relative humidity, wind speed and wind direction sensors. ET_o was calculated using the FOA Penman-Monteith method with the climate parameters except the wind direction value. This study shows that ET_o can be calculated using climate parameters measured with PLC based controls.

Keywords: Irrigation, PLC, Climate station, ET_o, CODESYS-ST

Soft Computing for Reference Evapotranspiration Estimation: A Fuzzy Inference System Approach

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Abstract: Reference evapotranspiration (ET_0) is a climatologic variable as a result of function of temperature, wind, humidity and net radiation and is needed to improve the efficiency and management of water resources and agricultural production. In this study, fuzzy rule based soft computing technique was applied to design a model for daily reference evapotranspiration estimation based on agro-meteorological data. Some recorded hourly climatic data for the growing seasons between 2015 and 2017, that is, solar radiation, air temperature, relative humidity and wind speed by an automatic weather station located within the agricultural research station, are used as inputs to the Fuzzy Inference System (FIS) model. Estimated ET_0 values were compared with the FAO-56 Penman Monteith method in order to check system performance. FIS model had a coefficient of determination (R_2) of 0.92 and the results indicated that the ability of FIS favorably compared with conventional estimation models.

Keywords: Reference evapotranspiration, Fuzzy inference system, Soft computing

A Combination of Agriculture and Living Space: from Past to Present Rural Architectural Structures in Turkey

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Abstract: The villages and rural areas, which are indispensable sources of life, for human communities, especially nutrition, meet basic requirements, at the same time presents today's generations the most uncluttered state of architecture; they show the nature-human-culture interaction in the simplest form. Rural architecture, although often used for housing, and it is a peculiar architecture and includes all houses and other buildings built by the people according to the definition of the Encyclopedia of World Vernacular Architecture. Although the houses have a special place in rural architecture, they are located in the village settlements, haystack, barn, courtyard, garden, warehouse, village mescidi, mosque, warehouse, village coffee, mill, village buildings, bridges, toilets, wells, poultry houses, pavilions, workshops also fall into the domain of rural architecture. In this study, architectural spaces used in the rural area after agricultural production will be discussed as grain storages (warehouses), and grain mills. In particular, raw materials and mills made with different materials and techniques in different geographies of our country are important in terms of reflecting the life culture of the area in which they are located. The aim of the work is to draw attention to this construct which is faced with the danger of extinction today. As a method of working, the literature survey on these structures, which are used daily from the past, will be followed by the observation and examination of the field and the transfer of current situations with graphics, plans and pictures.

Keywords: Rural architecture, Grain storages (warehouses), Grain mills, Seranders

Water-Yield Relationship on the Effects of Application of Sunflower Genotypes Deficit Irrigation

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Abstract: This study was conducted as a field study at the experimental site of Siirt University Agricultural Faculty in order to determine the effects of application of different water contents (I_{100}, I_{75}, I_{35}) by drip irrigation on the water-yield relationships of sunflower genotypes (P64LE119, P64LL62, 64LC108). The study was carried out in three replications in a split parcel trial design in random blocks. The irrigation schedule is arranged every eight days. The parameters analyzed according to the results of variance analysis were found statistically significant ($P<0.01$ level). The lowest water use efficiency (0.53 kg/da-mm) was determined in the I_{100}xP64LC108 genotype interaction, while the highest water use activity (0.77 kg/da-mm) in the study was determined in the I_{35}xP64LE119 genotype interaction. Excessive water stress in work (I_{35}); I_{35}xP64LE119 variety with the lowest yield (2237.33 kg/ha^{-1}) and low chlorophyll content (33.20 spad) while the highest yield (2486.00 kg/ha^{-1}) was found in the I_{35}xP64LE119 variety interaction with high chlorophyll content (CC) (35.18 spad) interactions. The highest yield (3887.33 kg/ha^{-1}) was found in the I_{100}xP64LE119 variety interaction with high CC (48.14 spad), while the lowest yield (3768.00 kg/ha^{-1}) I_{100}xP64LC108 has been identified in a variety of interactions. As a result, it has been determined that P64LE119 genotype has come out in terms of water use efficiency and has evaluable properties in semi-arid climatic conditions.

Keywords: Sunflower, Deficit irrigation, Yield

Acknowledgment: This work was supported by Siirt University Research Paper (SUUZIR-52)

Soil Water Content in Mulch Applied and Non-Applied Conditions

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Abstract: Particularly in the arid and semi-arid climate zones, the importance of irrigation is increasing in agricultural production. The availability soil water enhances the effectiveness of other agricultural activities in vegetable production. It is a necessity to use water economically in the regions where water resources are limited. If, for any reason, water in the root zone of the plant is less than necessary, there is a significant decline in production. Therefore, it is extremely important to conduct studies on water loss in the soil. In general, mulch application may be preferred to avoid water loss from the soil surface by evaporation. In this study, the change of soil water content was investigated in mulch applied and no-applied conditions within a certain period of time. In the study, the water content in the soil profile over time after saturating with water indicated a general tendency to decrease. However, the soil water content in the mulch applied treatment was at the higher level. In the study, it was concluded that mulching contributed positively to the soil water storage.

Keywords: Water harvest, Soil water content, Drought, Irrigation

Influence of Deficit Irrigation Levels on the Fruit Quality of Riored Grapefruit (*Citrus paradisi Mac.)*

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Abstract: In this study, the effects of different irrigation levels (full irrigation (100 % of crop evapotranspiration, I-100) and two deficit irrigation regimes (70 %, I-70, and 50 %, I-50) on the fruit quality of Riored grapefruit were investigated. The experiment was conducted in 2011-2012 in Adana Turkey. Fruit weight and diameter, index, rind thickness, juice content, total soluble solids, titratable acid, and TSS/TA ratio were determined in order to see the effects of different irrigation levels. In the first year of the experiment, the average fruit weight was between 241.82 gr (I-50) and 296.04 gr (I-100), and increased to 371.47 gr (I-50) to 474.64 gr (I-100) in the second year. Rind thickness increased by 48 % in the case of full irrigation (I-100) and by 27 % in the case of I-50. It has been determined that the water content applied at 50 % did not increase the rind thickness too much. The fruit slice numbers have declined by almost 5-6 % in almost all subjects, and the number of seeds has dropped further; so in the I-70 group it was understood to be at a very high level of 32 %. The amount of water-soluble dry matter increased by 21 % in I-100 and by 4 % in I-50, depending on the increase in irrigation water; while the amounts of acidity and usare decreased. Acidity decreased by at least 51 % in I-70 and by at least 39 % in I-50. Similarly, the quantity of usare is 29 % in I-70; on the I-50, it decreased by 12 %.

Keywords: Citrus, Riored, Grapefruit, Fruit quality, Deficit irragation

Determination of Tolerant Chickpea (*Cicer arietinum*) Genotypes in Drought Stress

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Abstract: This study was carried out as a field study in order to determine the tolerance of drought by using the plant water stress index (CWSI) values of 3 species of chickpea genotypes (Inci, Hasan Bey, Seckin) with drip irrigation method. The research was carried out at the experimental site of the Siirt University Agricultural Faculty during the winter season of the 2015 winter chickpeas in the split parcel trial design in random blocks. Irrigation applications consist of full irrigation (I_{100}) and partial irrigation (I_{50}) with 50 % cut from full irrigation and no irrigation water (I_0). Irrigation, varieties, irrigation X training interactions and plant water stress index values in the study were statistically significant at 1 % level. The highest yields in the group were determined in the İnci variety of I_{100} irrigation with a yield value of 2518 and 2717 kg/ha, and in the select range of I_0 irrigation with a yield of 1774 and 1749 kg/ha yield (Seckin), respectively. On the other hand, the highest plant water stress index (CWSI) value was determined for the I0 irrigation subject in the selective range of 0.57 (Seckin) and the lowest 0.20 irrigation subject in the İnci variety, respectively. According to the results of this research, it was determined that chickpea was partly sensitive to water stress and that the İnci genotype was more tolerant to drought compared to other genotypes.

Keywords: Chickpea, Crop water stress index, Tolerance, Yield

International Agricultural Science Congress

ANIMAL SCIENCE



I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

Organic Animal Production in Turkey

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Abstract: Organic animal production is an alternative production system aimed at protecting and improving the environment, animal and human health in a sustainable way. The production and marketing of organic animal production in the world has not been sufficient progress yet. However in the recent years there have been increases in organic animal production volume in Turkey as in the EU. The highest progress was realized in organic poultry industry in Turkey. In this paper, it is examined present situation of organic animal production in the world, EU and Turkey and focused on the opportunities for development.

Keywords: Turkey, EU, World, organic livestock, organic animal product

A Study on Increasing Fertility by Applying PGF2α with PMSG Hormone at Different Time Interval in Kilis Goats

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Abstract: The aim of the study was to investigate the effects of different hormone application protocols on the estrus synchronization and some reproductive characteristics as well as the birth and weaning weights. In this study, 120 heads Kilis goats were randomly allocated into 6 groups. The female and male goats were managed separately from the beginning of June, 2017. The first group was managed as control group. For animals in other groups, Prostaglandin F2α hormone was administered as 1 cc at 12:00 am on 11th August 2017 and 1th September 2017. The goats in 2nd, 3rd, 4th and 5th group were injected PMSG (500 i.u.) 0, 6, 12 and 18 hours before the application on 1th September 2017. After the second Prostaglandin F2α application, the teaser was left in the morning and evening for 1 hour. The goats were mated with the same buck after 12 hours and 24 hours after the first estrus detection. While the first group was managed under the conditions of the breeder, all other groups were offered additional food during the mating season and the last 45 days of the gestation. At the end of the study, the estruses in groups were synchronized between 67.6 and 100.9 hours. And, studies on other parameters are still in progress.

Keywords: Hormone application, litter size

Acknowledgement: The authors thank to the Research Foundation of Mustafa Kemal University for its financial support (Project No: 16791).

Some Environmental Factors Affecting to Fertility and Survival Rate in Blackheaded Merino Sheep (German Blackheaded Mutton x Karacabey Merino B_1)

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Abstract: This research was carried out in order to determine some environmental factors affecting to the fertility characteristics of Blackhead Merino (German Blackheaded Mutton x Karacabey Merino B1) sheep and the survival rate of lambs until the weaning period. The animal material of the research is composed of 282 different ages'ewe and 317 head lambs where have been reared in Bandirma Sheep Breeding Research Institute. In this research was used to data which birth information of sheep and lambs of Blackhead Merino between 2011 and 2015 years. Of the reproductive traits of Blackhead Merino sheep, in 2011, 2012, 2013, 2014, and 2015, the lambing rates were 74%, 100%, 50%, 83%, and 67%. Fecundity were 1.32, 1.33, 0.63, 1.25 and 1.04, and the number of lambs born per ewe lambing were 1.78, 1.33, 1.26, 1.50 and 1.56, respectively. The effect of years on all of the traits are significant ($p<0.05$). While rates of survival rate which between birth and weaning period find that 89%, 80%, 82%, 77% and 96% in 2011, 2012, 2013, 2014 and 2015, respectively, there are no environmental factor effect the these values ($p>0.05$).

Keywords: Crossbreed, fertility, lambing rate, survival rate, fecundity

Some Enviromental Factors Affecting to Fertility and Survival Rate in Ramlıc Sheep

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Abstract: This research is carried out in order to determine some environmental factors affecting to the fertility characteristics of Ramlic sheep and the survival rate of lambs until the weaning period. The animal material of the research is composed of 233 different ages' sheep and 227 head lambs where have been reared in Bandirma Sheep Breeding Research Institute. In this research was used to data which birth information of sheep and lambs of Ramlic between 2011 and 2015 years. Of the reproductive traits of Ramlic sheep, in 2011, 2012, 2013, 2014, and 2015, the lambing rates were 77%, 93%, 76%, 90%, and 91%. Fecundity were 0.87, 1.18, 0.80, 1.32 and 1.00, and the number of lambs born per ewe lambing were 1.13, 1.28, 1.06, 1.46 and 1.10, respectively. While the effect of years on lambing rate and the number of lambs born per ewe lambing are not significant but fecundity is ($p<0.05$). While rates of survival which between birth and weaning period found that 94%, 78%, 94%, 90% and 88% in 2011, 2012, 2013, 2014 and 2015 respectively, there is no environmental factor effect the these values ($p>0.05$).

Keywords: Ramlic, sheep, fertility, lambing rate, survival rate

Investigation of Some Reproductive Traits of Awassi and Romanov x Awassi Ewes (F_1) and the Survival Ability and Growth Characteristics of Their Lambs

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Abstract: This study was carried out to compare some reproduction characteristics of Awassi and RomanovxAwassi (RxA) (F1) crossbred sheep and to evaluate the survival ability and growth characteristics of their lambs. Animal materials consist of 30 Awassi, 37 RxA ewes and 79 lambs which were parturient from those ewes. Lambing rate, the number of litter size and twin rate were determined 0.83, 0.04 and 1.04 in Awassi, and 0.92, 0.56 and 1.56 in RxA ewes respectively. The survival rates of lambs up to weaning, 120th day and end of the pasture were 0.96, 0.85 and 0.81 in Awassi, and 0.81, 0.72 and 0.60 in RxA lambs. While the birth rates of RxA sheep are significantly higher than those of Awassi sheep, it is observed that Awassi lambs perform better than the RxA lambs in terms of their survival rates, and the death rate in RxA lambs reaches 40% at the end of pasture. The weight difference between Awassi and RxA lambs at birth and at the end of grazing period was found non-significant. Average birth weight, weaning weights and post grazing weights of lambs were determined 3.56, 14.81 and 20.93 kg in Awassi lambs; 3.33, 14.79 and 20.62 kg in RxA lambs. The effect of ewe age and birth type significantly affected the birth weight, weaning weight, daily weight gain during pre-grazing period and end of pasture weight. As a result, RxA crossbreeding improves fertility, but the survivability at various ages of the lambs is very low compared to Awassi lambs.

Keywords: Awassi, Romanov x Awassi, reproductive traits, survival ability, growth characteristics

The Determination of Some Reproductive Hormonal Levels of Norduz Ram

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Abstract: In this study was carried out, determination of some reproductive hormones from mating season levels 3-6 age of 11 head Norduz rams, from Akbulak village from Muradiye center to Van City. Blood samples were taken from vena jugularis of 11 rams by the 11x2x3 trial model to taken blood sample to twice of monthly the male reproductive hormones levels were determinated by RIA analysis method. Blood samples were taken, 15 days per day for 3 months 11X2X3 trial model. Accordingly, a total of 66 blood samples, blood sera, Radioimmunoassay technique (RIA) was used for FSH, LH, DHEA-S and Testosterone Norduz ram hormones were determinated by (RIA) method hormons levels; 0.84 nmol/ml, 0.67 nmol/ml, 1.92 ng/ml ve 2.89 ng/ml were respectively. The obtained Norduz rams hormones levels statistically significiant ($P \leq 0.005$). According to this research, that the performance of reproductive hormones of Norduz rams were higher than, that of other local ram breeds.

Keywords: Norduz, Ram, Hormones, RIA

Milk Production Abilities of Kıvırcık Ewes

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Abstract: Eşme district of Uşak province is one of the important centers in Western Anatolia in terms of sheep breeding. The main animal material of the breeders in the region is Kıvırcık sheep. While the income of the lamb is the first order in breeder incomes, the income from the milk is the second order. The Eşme district of Uşak province has a specific importance in the region in terms of traditional sheep cheese production. The aim of the present study is to determine milk yield characteristics of Kıvırcık ewes in extensive rural farm conditions at Eşme district of Uşak province. Milk yield characteristics of the breed were defined using test day milk records of 314 ewes in four farms. Test-day milk yield recorded at 14 days interval starting 15 days after lambing until the ewes dried off. The average daily milk yield, the length of lactation and lactation milk yield were 656.8 ml, 162.4 day and 107.6 liter, respectively. Lactation milk yield of ewes that ranged between 31.4 and 262.8 litre it points to the presence of high variation in this population. Means obtained for farms in terms of daily milk yield, the length of lactation and lactation milk yield were show us statistically significant differences. Results indicated that milk yield performances of Kıvırcık ewes is remarkable and the income of breeders can be increased by improving milk yield performances of ewes by exploiting of high variation by selection.

Keywords: Sheep, Kıvırcık, milk yield, lactation

Selection of Ewes for Higher Maternal Ability to Increase Lambs' Survival

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Abstract: In sheep breeding, lamb losses have significant effects on both animal welfare and sheep production economics. Lamb losses often occur within a few days after parturition, when the lambs are most vulnerable and in need of maternal care. One of the most common causes of lamb losses is the inability of fully establishing bond between mother and offspring during the early postpartum and thus the lamb's inability to acquire sufficient amount of colostrum. The quality of maternal care shown to the lamb is influenced by many factors, such as genotype and dam age/experience, including ewes' ability to cope with the stress due to isolation and lambing difficulty. In addition to the measures to be taken in management practices in sheep farms, selection for individuals with higher maternal ability are among the strategies that can be adopted to increase lamb survival. Heritability of lamb survival is low. Therefore, in the selection programs to be applied for the characteristics with low heritability, indirect selection method is preferred for the traits that have strong genetic correlation with subject traits instead of direct selection. The use of maternal behaviors as indirect selection criterion to improve lamb survival depends on the traits that can be easily measured and with its high genetic correlation with lamb survival. Maternal behaviors displayed by the ewe are also highly influenced by environmental factors. Therefore, environmental factors should be considered along with selection of ewes to improve maternal ability in the strategies aimed at achieving progeny with higher postnatal survival.

Keywords: Sheep breeding, maternal behaviours, lamb survival

Current Status, Some Yield and Structural Properties of Ruminant Livestock in Muğla I. Small Ruminant Production

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Abstract: In this study, it was aimed to determine the current structure and problems of sheep and goat breeding in Muğla province and to develop some suggestions to solution of these problems. In the study, 50 surveys were conducted to cover all the districts for each species. Surveys were evaluated with SPSS package program and frequency tables were created. According to these results, it has been determined that the breeding of sheep and goat in the region is usually performed by the people in middle age and above, and the education levels of them are insufficient. 6% and 4% of sheep and goat breeding establishments work with shepherds, respectively. The breeders in the region usually prefer open or semi open pens. Nomadic livestock breeding system still continues at a rate of 18% in sheep breeding and 26% in goat breeding. Merino, Chios breeds and their crossbreds breeding and Hair goat breeding are the most preferred in the Muğla province. Sheep and goat breeders also offer feed in different amount in addition to the pasture. If the goat breeders are organized and informed, the meat and milk produced by Hair goat can be organically certified. Breeders state that there are some problems in product marketing, inadequacy of pasture, animal health and breeding providing.

Keywords: Muğla, sheep, goat, problems and solution proposal

Acknowledgements: The authors thank to the Research Foundation of Mustafa Kemal University for its financial support (Project No: 14822)

Genetic Variability and Bottleneck Analysis of Güney Karaman Sheep

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Abstract: The present study was performed to reveal genetic variability of autochthonous Güney Karaman sheep breed, which is conserved as a genetic resource, using sixteen microsatellites marker recommended by FAO (2011). Animal material for the study was consisted of 119 Güney Karaman sheep raised in Bahri Dagdas International Agricultural Research Institute. A total of 277 alleles were detected from sixteen markers studied. Although total population size is very limited, the mean number of alleles (17.31), observed heterozygosity (0.81) and polymorphic information content (0.82) findings indicated that noticeable genetic variability in this population. Ten out of the sixteen microsatellite markers studied had a positive FIS value. The mean value of FIS was 0.042. The infinite allele model (IAM), two-phase mutation model (TPM) and stepwise mutation model (SMM) in the Bottleneck software were used to check genetic bottleneck. The L-shaped curve obtained from analyze indicates absence of bottleneck in Güney Karaman sheep population. Consequently, it can be said that the microsatellite markers used in the present study are sufficient to identify the genetic diversity. On the other hand, these results will help to develop conservation strategies for the Güney Karaman sheep population.

Keywords: Sheep, genetic resource, Güney Karaman, bottleneck, microsatellite

Paternity Testing for Verification of Pedigree Information Obtained from Hand-Mated Hair Goats

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Abstract: Hair goat is Turkey's main goat breed and raised many parts of the country. The aim of this study was to examine usefulness of 18 microsatellite loci for paternity testing of Hair goats and set up paternity panels for practical use. This study consisted of 42 buck and their 205 offspring from seven farms of Hair goat raised in some villages located in Aydın and Denizli provinces. Totally, three hundred and six alleles observed for 18 loci investigated. The observed (Ho) and expected (He) heterozygosity values were ranged between 0.39 and 0.95, and 0.72 and 0.92, respectively. Probability of exclusion (PE) values for tested 18 loci ranged between 0.316 and 0.719. Combined probability of exclusion (CPE) values obtained from one by one inclusion of each locus increased from 0.7188 to 0.9999 for panels including 1 to 18 microsatellites. CPE values obtained for paternity panels of different number of microsatellite loci indicated that panels including minimum of 7 loci (CPE=0.9992) have adequate exclusion probability value. In this context, panels of 7 or 8 loci formed with microsatellites that have higher PE values can be used for cheaper, practical and accurate paternity testing of Hair goat population. Present results could also be used as a reference for the other goat breeds in Turkey.

Keywords: Hair goat, microsatellite, paternity testing

Acknowledgements: The authors thank to the Research Foundation of Adnan Menderes University for its financial support (Project No: ZF-13002)

Investigation of CSN3 Genetic Polymorphism in the Anatolian Buffalo, Murrah Buffalo and Their Crossbreds

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Abstract: The present study aimed to determine the genetic polymorphism of κ-casein (CSN3) in the Anatolian and, Murrah buffaloes and their crossbreds (F_1,G_1, G_2, G_3) bred at the Bandirma Sheep Breeding Research Institute. A total of 209 heads of buffaloes as 50 heads of Anatolian, 31 heads of Murrah, 47 heads of F1, 47 heads of G1, 30 heads of G2 and 4 heads of G3 were used in the study. Genomic DNA's from each animal material were obtained and genotyped by the PCR-RFLP method using gene-specific primers and restriction enzyme AcuI. Three different genotypes were observed according to the bands on the agarose gel after digestion with the restriction enzyme. These bands were AA which had one band (453 bp), BB which had two bands (339 and 114 bp), AB which had three bands (453, 339, 114 bp). The above-mentioned findings helped determine the allele frequencies of A and B as 0.83 and 0.17, respectively. The total genotypic frequency of BB and AB genotypes was 0.30. Based on the breeds, the B allele frequencies of Murrah, Anatolian, and their crossbreds were 0.23, 0.15, and 0.02, respectively.

Keywords: Buffalo, CSN3, polymorphism, PCR-RFLP

Molecular Phylogeny of the *Pleuronema coronatum* (Ciliophora, Pleuronematidae) Isolated from Lake Van

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Abstract: *Pleuronema* is a species rich in genus, and have many freshwater and marine forms with very similar morphology. These similarities cause difficulties in identification of species and in determining species circumscription. In recent years, phylogeny has been discussed by comparing the morphological and molecular characterization of this genus. In this study, investigated the morphological and morphometric characterization of the *Pleuronema* population obtained from eastern shore of Van Lake by live observations and the silver staining methods. In addition to, the small subunit (SSU rRNA) gene characterization for the population of this genus were obtained for the first time in our country. Phylogenetic trees based on SSU rRNA gene sequences were constructed with Bayesian inference (BI) and maximum likelihood (ML) algorithms. Phylogenetic analyses showed that the members of this genus together with present population were clustered in a single clade, and form a monophyletic group. However, our population was far from other populations of *P. coronatum*. Despite the observed molecular differences, it is noticeable that our population is morphologically quite similar to the *Pleuronema coronatum* populations. In addition to, the population of *P. coronatum* isolated from China is more closely related to *P. binucleatum* than to populations in clade of P. coronatum. According to these data, many distinctive traits of the genus *Pleuronema* could be plesiomorphic characters of limited systematic value in the species level. A taxonomic revision of the genus will be necessary in the next future.

Keywords: *Pleuronema coronatum*, SSU rRNA, phylogeny, Lake Van

Effects of Pudding Addition on the Relative Feed Value in Alfalfa Silage

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Abstract: Alfalfa (Medicago sativa) is usually dried and given to animals. In recently, alfalfa silage has also become important. Especially, in the rainy regions and the last cutting alfalfa without adequate drying, they are generally maked as silage. The silage additive must be added to ensure the fermentation of alfalfa silage. Sugars, such as melas, glucose and sucrose, are used in legume plants that develop silage fermentation. Shelf-life foods and by-product generated during the food production process are economically disadvantageous. Pudding is one of these and can be used as a silage additive. In the study were evaluated the relative feed value (RFV) in alfalfa silages supplemented pudding in the laboratory conditions (18±2 °C). The treatments were tested: control (untreated silage), PUD2 (contains of 20 g/kg pudding), PUD3 (contains of 30 g/kg pudding), PUD4 (contains of 40 g/kg pudding). After 90 days of ensiling, the alfalfa silages were analyzed. The addition of pudding into alfalfa led to a decrease in neutral detergent fibre (NDF). Especially, the addition of 40 mg/kg pudding (NDF: %38.43) provided cell wall fractionation through stimulating activities of enzymes that fractionate cell walls. Accordingly, dry matter intake (DMI) has increased (PUD4: 3.12, Control:2.82). As a result, pudding improved silage fermantation and affected chemical characterisitcs of silages. In the regions where food industry is intensive, it was more advantageous to ensilage alfalfa with an addition of 40 g/kg pudding when compared to the control group.

Keywords: Pudding, alfalfa, silage, NDF

Comparison of Nutritional Changes in Mixed Feed through Solid State Fermentation by *Aspergillus niger* and *Bacillus subtilis*

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Abstract: Effects of Aspergillus niger and Bacillus subtilis on nutritional composition of mixed feed were compared in this study. Mixed layer feed was solid-state fermented with A. niger (ATCC 200345) and B. subtilis (ATCC 21556) separately. Fermented (A. niger; AN, B. subtilis: BS) and unfermented mixed feed were analyzed for crude protein (CP), ether extract (EE), ash, crude fiber (CF), neutral detergent fiber (NDF) and acid detergent fiber (ADF) whereas nitrogen-free extract (NFE) and hemicellulose (HC) were calculated with obtained data. CP increased ($P<0.001$) from 15.83% to 35.21 (BS) and 33.40% (AN), EE decreased ($P<0.001$) from 4.50% to 3.01 (BS) and 2.83 (AN), CF content (5.91%) did not change ($P>0.05$) in BS (6.15%) but increased ($P<0.001$) in AN (7.11%), ash increased ($P<0.001$) from 12.00% to 16.10 (BS) and 16.67% (AN), NFE decreased from 61.76% to 39.50 (BS) and 39.89% (AN), HC content (7.81%) did not change ($P>0.05$) in BS (7.10%) but increased ($P<0.01$) in AN (9.31%). NDF and ADF content (14.86 and 7.05%, respectively) did not change ($P>0.05$) in BS (13.60 and 6.50%, respectively) but increased ($P<0.001$) in AN (17.19% and 7.88%, respectively). This results showed that B. subtilis were better than A. niger for increasing CP content whereas A. niger showed better performance in increasing CF, HC, NDF, ADF content and both were the same in decreasing EE and NFE content.

Keywords: *Aspergillus niger*, *Bacillus subtilis*, mixed feed, solid state fermentation

The Effect of Molasses and Pre-Fermented Lactic acid Juice on Silage Quality and in Vitro Digestibilty of Sugar Beet Pulp Plus Wheat Straw Silage

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Abstract: In the present study, the effects of some silage additives (molasses, pre-fermented lactic acid juice and its combination) on silage quality of sugar beet pulp+wheat straw mixture which dry matter was increased to %25 with wheat straw addition. For this purpose, 4 groups, each consisting of 6 replicates, were formed; 1) sugar beet pulp+wheat straw mixture (Control), 2) sugar beet pulp+wheat straw mixture plus 2% molasses (M), 3) sugar beet pulp+wheat straw mixture plus pre-fermented lactic acid juice (PFJ, 44.07x107 cfu/ml-1 LAB) and, 4) sugar beet pulp+wheat straw mixture plus 2% molasses+ pre-fermented lactic acid juice (M+PFJ, 44.07x107 cfu/ml-1 LAB). The silages prepared in 1lt glass jars were opened in 60 days. While the amounts of dry matter, ash, and neutral detergent fiber of treated-silages were higher than those of the control group ($P < 0.05$), crude protein levels were not affected by treatment. pH, fleigh score, and lactic acid amounts did not affected by additives. However, the addition of molasses and PFJ decreased the NH3-N concentration of the silages compared to the control group ($P < 0.05$). The M+PFJ addition decreased the acetic and propionic acid concentrations of the silages compared to those of the control group ($P < 0.05$). As a result, the addition of 2% molasses and/or PFJ (44.07x107 cfu/ml-1 LAB) to the sugar beet pulp+wheat straw mixture reduced the dry matter losses of silages and did not affect the silage fermentation parameters and, in vitro digestibility of dry matter and organic matter of silages.

Keywords: Sugar beet pulp, wheat straw, molasses, pre-fermented lactic acid juice, silage

The Effects of Harvest Stages to Yiled and Silage Additives to Silage Quality at the Yemsoy Soybean Variety

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Abstract: This study was conducted to evaluate the effects of two different maturity stages to yield and the effects of silage additives applications to silage quality at the Yemsoy variety that grown as second crop conditions. Field experiment which was established to determine forage yield and quality had been conducted according to randomized block design with four replications. Molasses (4 lt / 100 kg), grain crush (4 kg / 100 kg) and inoculant (0.1 gr / 200 ml water) were used as the silage additive materials and the silages were left to fermentation for 60 days. Trial which was at the determination of silage fermantation characters had been conducted according to completely randomized design with four replications. Soybean green herbage and dry matter yields were 2848.2-49977 kg/da; 717.0-1267.8 kg/da at the R4 and R6 harvesting stages respectively. The plant height values varied between 141,2-186,7 cm, the highest plant height value was obtained from R6 harvest stage. The crude protein ratio varied between 10.6% and 14.2%. When the silage fermentation criteria were examined, the pH ranged from 4.13 to 5.47, the dry matter content varied from 22.2% to 33.5%, and the lactic acid content varied from 1.41% to 4.48%. The lowest pH value was obtained during R4 harvest stage and molasses application. The highest dry matter content was obtained from the R6 harvesting stage control application; the highest lactic acid was obtained from cereal application at the R6 harvesting stage.

Keywords: Harvesting stage, second crop, silage additive materials, silage quality, soybean

Studies on Production Fuctional Egg and Chicken Meat

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Abstract: Eggs take first place in biological availability when compared to other foodstuffs. Chicken meat has an gerat importance for human nutrition because of it is quite rich and cheap product and has high levels of biologically valuable proteins and important amino acids that can not be synthesized in human body. In developed countries, conscious consumers pay great attention to the quality of the consumed foods and they are evaluating the animal source food not only the nutritional composition and quantity, but also in terms of health and quality parameters of the product. With the increasing of consumer awareness, feed and feeding efforts towards functional food production have accelerated. The International Food Information Council yi (IFIC- The International Food Information Council) defines functional foods as foods that can provide health benefits beyond their basic nutritional properties. Feeding for Functional Food Production involves the introduction of feed additives with functional characteristics into the feed of the animal and and a feeding method that allows the deposition. There are a lot of studies aimed to enhance quality parameters of poultry products such as enrichment the color of poultry meat and egg, nutrient content, and increase the liking as a human being using feed additives. Functional feed additives that are prominent in the carried out studies and provided products transition are A and E vitamins, omega 3 fatty acids, conjugated linoleic acid, selenium, trace elements, vitamin precursors, essential amino acids and fatty acids. In this article will be focused on the studies aimed to provide animal food functionalities through nutrition.

Keywords: Meat, egg, functional food, omega 3

Effect of Fennel Seed (*Foeniculum vulgare*) Powder in Corn and Barley Grain Based Diets on Milk Production and Composition, Ruminal Fermentation and Some Blood Parameters in Mohabadi Dairy Goats Pre- and Post-partum

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Abstract: This experiment was carried out in order to study the effects of fennel seed powder (*Foeniculum vulgare*) supplementation with two types of diets (based on barley or corn). Twenty-four Mohabadi dairy goats were used in a completely randomized factorial design (2×2) and received 4 experimental diets including 2 levels of the fennel seed powder (0 and 10 gr/DMI) and two types of cereal grains (corn and barley). Animals were in experiment 30 days before to 30 days after the parturition and keep individually. Effects of dietary treatments on daily weight change, milk yield and dry matter intake were assessed as repeated measures data. The results of this study showed that fennel supplementation significantly increased dry matter intake and reduced body weight loss in early lactation ($p<0.05$), but the grain type did not show a significant effect. Also, milk yield significantly increased and milk fat percentage decreased ($p<0.05$) by the Fennel seed supplementation. Milk production efficiency as calculated based on milk yield per unit of dry matter intake, increased with fennel seed supplementation, may be due to estrogenic and prolactin enhancing effects of the fennel seeds. Acetate concentration decreased and butyrate and propionate molar proportions increased with Fennel seed supplementation ($p<0.05$). Dietary grain type could not exert a significant effect in ruminal fermentation parameters. Fennel seed powder significantly decreased the ammonia nitrogen concentration and protozoa population. In post-partum period, fennel seed powder supplementation significantly increased blood glucose concentration and decreased plasma urea, BHBA and NEFA ($p<0.05$).

Keywords: Negative energy balance, medicinal plants, anetol, limonen, fenchon

Effects of Heat Stress on Sheep Rumen Fermentation Parameters in Vitro and in Vivo

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Abstract: Effect of heat stress (HS) on sheep DMI, digestibility, VFA concentration, pH and protozoa and also on In Vitro methane emission, gas kinetic and parameters with different feed sources (formulated diet, Alfalfa hay and Orchard grass) were investigated. Five non-pregnant and non-lactating ewes used for In-vivo experiments and take the rumen fluid for in-vitro experiments. HS decreased DMI and increased the DM, OM and NDF digestibility ($p< 0.05$) but CP digestibility was not affected. Total VFA concentration of rumen was not affected by HS but propionate and acetate/propionate were increased and decreased by HS, respectively. Rumen ammonia nitrogen concentrations in HS ewes significantly lower than thermal neutral ewes. HS reduced the protozoa count of rumen content and pH of rumen fluid was affected by HS. In Vitro Methane emission in HS treat lower than thermal neutral treat but not affected by feed source. Gas production at different times was affected by HS and gas produced in stress treatment was significantly lower than that of thermal neutral. HS significantly reduced the B constant of gas production ($p< 0.05$) but C constant was not affected by HS. Metabolizable energy, short chain fatty acids, digestibility of organic matter, net energy lactation and microbial protein coordinate with gas production affected by HS and in all cases, heat stress has reduced the their amount. The results of this study showed that heat stress has the negative effects on performance and rumen functions of ewes and strategies should be used to reduce these negative effects.

Keywords: Heat stress, Rumen fermentation, Dry matter intake, Digestibility

Some Factors Affecting the Wool Mineral Content

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Abstract: Testing the wool mineral content to assess the animals' mineral status has a long history, but the results are controversial. In a series of experiments we have tested, that how the sampling site, growth phase of wool, breed and dietary mineral intake affect the mineral content of sheep wool and hair. Wool and hair samples was collected on the left side of the sheep from the region of wither, side and hind quarter. 5*5 cm area was cut as low as possible using bended scissors at the beginning of the trial. Sampling was carried out from the very same area 28 days later. Samples of wool and feed were analysed for calcium, phosphorus, magnesium, sodium, copper, sulphur, selenium and zinc content. Our results demonstrate that the region of origin does not alter the mineral content of sheep wool. However, breed differences exist in case of some minerals. Mineral content of long fleeces can be different compared to recently developed wool fibre. Mineral analyses of newly developed wool can be used to evaluate calcium, selenium and zinc status. However, the sensitivity in case of calcium is lower. In overall, further studies are needed to understand the mechanisms which have an effect on wool mineral deposition in order to establish proper standards.

Keywords: Sheep, wool, mineral content

Dietary Supplementation of Eggs with DHA Using Different Sources of Fatty Acids

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Abstract: Special interest for the nutritionists are the alimentary products rich in Ω-3 polyunsaturated fatty acids (PUFAs), first of all α-linolenic (ALA, C18:3), eicosapentaenoic (EPA, C20:5) and docosahexaenoic (DHA, C22:6) acids, which are necessary for the brain development, eye function, prophylaxis of cardiovascular diseases, etc. In most countries in the world, including Macedonia, Ω-3 fatty acids are deficient in the nutrition of the population. It is well known that the fatty acids' composition of animal products and especially of eggs can be modified by the diet. An experiment was conducted to investigate different sources of fatty acids' supplementation on the egg quality and DHA deposition in the egg yolk. To this end, laying hens were fed diets containing sunflower (2.5%), soybean (2.5%), fish oil (1.5 and 2.5 %) or marine algae (1.5 and 2.5 %) in a period of 45 days. There was a significant ($P<0.05$) influence of the fatty acids' sources on the total egg weight, albumen weight and yolk weight. Dietary marine algae and fish oil significantly ($P<0.01$) increased the deposition of docosahexaenoic acid in the egg's yolk.

Keywords: Fatty acids' sources, egg's structure, DHA deposition, yolk

Effect of in Ovo α-tokopherol Injection of Relative Fluctuating Asymmetry as a Stress Factor Indicator and Fear Behavior of Broiler Chicks at High Altitude

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Abstract: Lipid-soluble antioxidants transferred from mother to egg yolk can be more effective with in-ovo (IO) injection into egg than maternal diet. Increasing lipid-soluble antioxidants concentration in eggs via in ovo admnistration in embryo tissues may affect chick development. The aim of study was to evaluate effect of IO α-tocopherol injected to yolk sac at day 7 of incubation on asymmetry development and fear behaviour of broiler chicks at high altitude (HA). A total of 160 eggs, which were incubated under standart incubation conditions, obtained from Ross broiler breeder were divided into two groups as control (non-injection) and 37.5 mg α-tocopherol (α-tocopherol-injected: α-TOCH) injected into yolk sac of 80 eggs. Male and female chicks obtained from IO groups were reared for 7 days at HA. Chick length, head diameter, relative fluctuating asymmetry (RFA) of bilateral traits (face, middle toe and shank lengths) and tonic immobility (TI) duration as a indicator of fear behaviour were determined at hatch and day 7 of chick age. Head diameter, RFA of shank and middle toe lengths of α-TOCH chicks were lower than those of control chicks. IO administration did not affect chick length and RFA of face length. TI duration decreased in the α-TOCH chicks compared to control. There was a significant interaction between IO and sex on TI duration which indicated that α-TOCH female chicks had shorter TI duration than control female chicks. In conclusion, IO α-TOCH can be improved to stress-related parameters without effect chick quality during early post-hatch period at HA.

Keywords: α-tocopherol, in ovo injection, fluctuating asymmetry, tonic immobility, broiler

An Investigation of in Ovo α-tokopherol Injection to Different Embryonic Sacs on Lipid Antioxidants Concentration in the Yolk Sac at Internal Pipping and Hatch

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Abstract: Vitamin E has eight chemical forms (alpha-, beta-, gamma-, sigma-tocopherols and tocotrienols) with antioxidant activity. Alpha-tocopherol in embryonic tissues is the most active form and is represented more than 80% of vitamin E. This study aimed to investigate effect of in ovo α-tocopherol on retinol, carotenoids, vitamin E, alpha-, gamma- and sigma-tocopherols and alpha- tocotrienol concentrations in yolk sac of embryos/chicks. A total of 240 eggs obtained from Ross broiler breeder were divided into three groups as non-injected group (CONT) and injected groups: 37.5 mg α-tocopherol (α-T) which was injected into the yolk sac (α-TYS) and amnion sac (α-TAS) of the eggs followed by hours 168 and 420 of incubation, respectively. The concentrations of retinol, carotenoids, vitamin E, alpha-, gamma- and sigma-tocopherols and alpha-tocotrienol in yolk sac were determined at internal pipping (IP) and hatch. α-TYS group was lower yolk sac retinol concentration than CONT and α-TAS groups at IP and hatch. With increasing age, total carotenoids, vitamin E, alpha- and sigma-tocopherols concentrations increased whereas alpha-tocotrienol concentration decreased in yolk sac. There was interaction between IO and age for sigma-tocopherol and alpha-tocotrienol concentrations in yolk sac. The alpha-tocopherol concentration of yolk sac was the highest in α-TYS group at IP and was the lowest in α-TAS group compared to CONT at hatch. The alpha-tocotrienol concentration of yolk sac was higher in α-T injected groups than CONT at hatch. The results indicated that α-T in the embryonic sacs via in ovo injection may affect antioxidant-specific accumulation in yolk sac of embryo.

Keywords: α-tocopherol, in ovo injection, lipid-antioxidant, yolk sac, amnion sac

The Effects of Continuous and Cyclic Cold Manipulations on Incubation Performance Measures, Embryonic Mortality and Newly Hatched Chick Weight

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Abstract: The aim of this study was to determine the effects of different cold treatments applied in the last period of incubation on incubation performance measures, embryonic mortality and chick weight. For this purpose, a total of 900 fertilized eggs were obtained from Ross 308 broiler breeders flock. All eggs were numbered and individual egg weights were determined before being placed in the incubators. The weighed eggs were randomly placed in a total of 6 egg trays, which would be 150 eggs in each egg tray, and were incubated in 3 different incubators. For all incubators, standard incubation temperature (37.6°C) was applied for the first 16 days. On the 16th day of incubation, one of the incubator was assigned to control group which was continued to standard temperature applied until the end of incubation. The other 2 incubators were cold (34.6°C) applied for 3 days (between 16-18 days) as follows: 1) cyclic cold (4 hours per day cold temperature), 2) continuous cold. At the end of incubation, internal (IP)-external (EP) pipping times, a total incubation duration, fertility, hatchability, embryonic mortality and chick weight were determined. Continuous and cyclic cold manipulations extended IP, EP and incubation times, but embryonic mortality and chick weight were found to be similar to control. These results indicated that cyclic or continuous cold manipulations in the last period of the incubation had no negative effects on embryonic mortality and chick weight, as well as some delay in total incubation time in broiler chicks.

Keywords: Broiler chick, embryonic development, incubation temperature manipulation

Effect of Pistacia Terebinthus Seed Meal on the Performance, Serological and Oxidative Parameters in Laying Hens

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Abstract: The current study aimed to investigate the effect of Pistacia terebinthus seed meal on the performance, serological and oxidative parameters in laying hens. A total of 192 white Babcock (30 week old) laying hens were divided into 6 groups (n=32) with 4 subgroups having 8 hens in each. Treatment group's diets were supplemented with 0%, 1%, 2%, 3%, 4% and 5% of terebinth seed meal respectively during 8 weeks. The statistical analysis was performed with MedCalc software (MedCalc Software bvba, Oostend, Belgium, version 17.5). One-way ANOVA was used for group comparison followed by Tukey-Kramer for post-hoc. Repeated measures ANOVA was used for egg trait analysis over time within each group (start, mid-term and end analyses). When a significant difference was noted for paired samples, Bonferronni corrected pairwise comparisons were carried out to determine the source of the difference. Results revealed that egg yield and egg mass increased significantly ($P<0.05$) in 3% and 4% terebinth supplemented groups over control. Similarly egg weights also showed positive effect ($P<0.05$) in all treatment groups. However, feed consumption, feed conversion ratio, eggshell breaking strength, yolk colour and Haugh unit showed no effect ($P>0.05$) in treatment groups. Similarly no significant differences ($P>0.05$) were manifested between the treatment groups for serum glucose, total cholesterol, HDL, LDL, AST, ALT, total protein, phosphorus and calcium concentrations. Furthermore, no differences were observed ($P>0.05$) in total antioxidant capacity (TAC), total oxidant status (TOS) and oxidative stress index (OSI). It is concluded that dietary terebinth seed have positive effect on laying hens.

Keywords: Pistacia terebinthus, laying hen, antioxidant, performance, egg quality

Dietary Bee Products and Calorie Restriction Effects on Some Biochemical Blood Parameters and Hormones in Older Broiler Breeder Males

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Abstract: This study was conducted to investigate the effects of calorie restriction or dietary bee products (apilarnil plus royal jelly) supplementation on some biochemical properties of blood (blood lipids, glucose) and hormones (insulin, corticosterone, testosterone) in older broiler breeder males. Fifty-six weeks old commercial broiler breeder roosters were used in the study. Roosters were randomly allocated to four groups consisting of four replicates. Control group was fed on restricted feed as recommended by the breeder company throughout study; ad libitum group was fed ad libitum for a 4 week period; bee product group was fed similar to control group except that diet was supplemented with apilarnil and royal jelly for a 4 week period and in the last group calorie restriction (45% of standard diet) was applied for a 4 week period. Biochemical blood parameters and hormone analyzes were performed at 4th and 18th week of experiment. Roosters fed ad libitum had significantly increased triglyceride levels at 4th week of experiment. Calorie restriction reduced corticosterone levels compared the other groups. Testosterone levels in bee products group increased about three times at 4th week and five times at 18th week of experiment compared to the control group. These results indicate that dietary bee product supplementation or calorie restriction for a long term period can increase serum testosterone levels while not affecting blood lipids and glucose levels in older broiler breeder males.

Keywords: Broiler breeder males, bee products, calorie restriction, blood lipids, testosterone

Barn Structures of Dairy Cattle Farms in Muş Province

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Abstract: This study was conducted to evaluate the barn status of dairy cattle farms in Muş province and its districts. For this purpose, a cross-sectional questionnaire was applied to 346 farms using the random sampling method. The obtained data were cross-tabulated using SPSS package program and the relationships between factor-properties was determined by chi-square analysis. According to this, the average age, number of dairy farms, the number of individuals in the farms and the number of animals in farmers are 44.21, 21.22 years, 7.16 and 37.54 heads, respectively. Barns in the farms were made as independent and under house 85.8% and 37.5%, respectively. Farmers did barns by their own experience (58.6%), by the environment (36.3%) and by the project (5.1%). The estimated area of the barns in the farms is between 51-200 m2, while the rate of those who are greater than 200 m2 is 14.3%. In addition to the feed and stall, there are 44.7% of the feed path+calf department in the barns. The proportion of the farms in which all departments were found was determined as 2.8%. While animal manure cleaning is done by hand every day (90.3%), the obtained fertilizers are evaluated as burning (48.7%), fertilizer (19%) and selling (5%). In the 66.5% of the farms, the padding is used and the most commonly used padding is the straw with 55.6%, followed by the animal manure (23.4%). This research is important in terms of providing an important data base relating to dairy farming in Mus province.

Keywords: Structural and social status, dairy cattle farms, Mus province

Comparison of Different Calculation Methods to Determine Best Predictive Method of Actual Milk Yield of Dairy Buffaloes

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Abstract: In this study, different calculation methods (Swedish, Dutch I, Dutch II, Trapeze I, Trapez II and Vogel) which are used to determine lactation milk yield in dairy cattle were compared to estimating of dairy buffalo milk yield. Daily milk yield records from 45 dairy buffaloes reared at Sheep Breeding and Research Institute were used in the study. High correlations were found between actual milk yield and all of the calculation methods ($P < 0.01$). Differences within calculated mean milk yields (Swedish: 1550.94+57.645 L, Dutch I: 1563.39+62.640 l, Dutch II: 1546.14+57.730 l, Trapeze I: 1587.01+57.395 l, Trapeze II: 1636.87+58.075 l, Vogel: 1531.33+58.042 l) was statistically significant ($P < 0.01$), moreover, differences between all of the methods and actual mean milk yield (1473.62+54.868 l) was found at significant level ($P < 0.01$), as well. Although different at significant level from actual milk yield, it has been concluded that best predictive method for mean milk yield of the dairy buffaloes is the Vogel method. According to correlation coefficients results, all of these methods could be used to predict of the mean milk yield of dairy buffaloes, nevertheless, to get the most accurate prediction using any of these method in future studies, the study shold be repeat with higher number of dairy buffaloes.

Keywords: Dairy buffalo, lactation milk yield, estimating methods

The Effect of Slaughter Weights on Slaughter and Carcass Traits of Anatolian Buffaloes

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Abstract: The purposes of this research were to determine the effect of slaughter weights on slaughter and carcass traits of Anatolian Buffaloes. Data were collected from 20 Anatolian male calves, approximately live weight of 100 kg. In this research, the Anatolian buffalo calves 200 (GI; n=5), 250 (GII; n=5), 300 (GIII; n=5) and 350 kg (GIV; n=5) were distributed at the slaughter weight (SW) groups as random. Anatolian buffalo calves which have reached the target slaughter weight were slaughtered. Weights of non-carcass components, hot, cold carcass and carcass measurements is recorded after slaughter. Then carcass was divided into two equal parts along the vertebrae. The left halves of the carcasses was divided into ten parts. These named as, chuck, rib, short loin, sirloin, rump, round, flank, plate, brislet and shank. In this research, at the SW groups, hot dressing percentage were 49.25; 48,87; 52.37 and 53.56 % ($P<0.01$) and loin eye muscle areas were found as 52.33, 56.81, 68.99 ve 69.61 ($P<0,01$), respectively. With the increase of SW, cold carcass weight was increased ($P<0.01$).

Keywords: Anatolian buffaloes, slaughter weight, carcass traits

Acknowledgements: This study was supported by TUBITAK (Project Number: 114O710).

Determination of Morphometric Measurement in Cattle Carcass Using Image Analysis

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Abstract: The animal material of the research was total of 200 carcasse from Holstein Friesian cattle slaughtered in Tekirdağ. Twenty six morphometric measures were taken from each carcass. Photos were taken from internal, external and back of the carcasses for calculation of morphometric measurement. In the study, means of carcass area and lengths based on image process in female and male cattle carcasses were found significant for leg, dorsal shoulder circumferences, dorsal neck length, dorsal leg width ($P<0.01$), shoulder circumference, shoulder length and GMK width ($P<0.05$) but differences were unsignificant for other important parameters. Conformation scores for female and male carcasses were 5.6 ± 0.23 (O+) and 7.05 ± 0.13 (R-), respectively. Fatness status were 7.01 ± 0.22 (3-) and 8.67 ± 0.12 (3+) in female and male carcasses. As a result, female and male carcasses from Holsten Frieasin cattles slaughtered in Tekirdağ province were convenient for EUROP carcass classification system according to morphometric measures, conformation and fatness status.

Keywords: Image analysis, carcass morphometry, carcass classification, cattle carcass

Milk Production Performance of Holstein and Brown Swiss Cows under Robotic Milking Conditions

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Abstract: Robotic milking has gained acceptance, particularly in western parts of Turkey, as a way to reduce labor requirements on dairy farms and as a way to improve the lifestyle of dairy farm families operating dairies with 80 to 480 milking cows. At the end of 2017, 30 commercial dairy cattle farms are using robotic milking stalls to milk their cows. Robotic milking technology allow commercial dairy producers to collect detailed individual cow data on a daily basis, help to take wright decision related with herd management. The objective of this study was to obtain the variation for milking parameters such as daily milking number, milk production, milk yield per milking, milking speed, refusal-failing milking, box time per robot visit, milk fat, protein, lactosedatas from lactating Holstein and Brown Swiss cows. Data were obtained from the first commercial robotic dairy farm of Turkey via the T4C© herd management system.

Keywords: Robotic farm, robotic milking, Holstein, Brown Swiss

Grey Relational Analysis and Fuzzy System Theory Use in Livestock

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Abstract: Grey system theory is used when such assumptions as homogeneity of variances, normality of distribution and large sample size that are required to be met for the application of parametric statistical analysis methods are not valid. One of the subcomponents of grey system theory, grey relational analysis is a method that uses Gray Relation Coefficient (GRC) to grade, classify and make decisions on a data set. This study examined the effects of zeolite, organic acid and zeolite-organic acid on egg quality and performance. Study sample consists of 24 twenty-eight-week-old Lohmann white laying hens. Gray relational analysis, basic component analysis and fuzzy system theory methods were used depending on the quality and performance criteria of the eggs. The results of the analyses show that organic acid (P) -added groups (P6, P3, P1) in general are eggs of the highest quality. In control group K1, eggs of sample (Z+P)1, to which zeolite and organic acid were added together, are eggs of high quality. Eggs to which zeolite was added are of average quality while those in the control group and zeolite-organic acid group are of low quality.

Keywords: Grey relational analysis, fuzzy logic, principal component analysis

Generalized Linear Mixed Model versus Transformation on Bayesian Approach

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Abstract: Linear mixed effects models (LMM) have been widely used almost all analysis of animal breeding data. They are very powerful tool for the estimation of variance components and genetic parameters, and for the prediction of genetic merit of animals. These models can be used with some the assumptions such as normality and constant of variances need to be provided. However, if these assumptions are not provided, the data should be transformed and the statistical analysis is carried out with the transformed data. Generalized linear mixed-effect models (GLMM) provide a solution for this problem by satisfying normality assumptions without transformation. This allows differences among animals to be properly assessed properly using the data most appropriate to the researcher's theoretical context. The aim of this study is to estimate variance components and genetic parameter of birth weight (BW) and weaning weight (WW) which have economic values in animal breeding with LMM_t (with transformed data), LMM_ut (with untransformed data) and GLMM based on Bayesian approach. The present study also intended to compare the both models and the estimated parameters values obtained with LMM_t and GLMM. The data obtained from BW and WW of 4972 Awassi lambs were born between the years of 2012-2016. As a result, GLMM is the most suitable model for BW and LMM_t is the most suitable model for WW according to DIC. Although estimation of BW heritabilities does not change in all models, there are significant differences in estimation of WW heritabilities.

Keywords: Transformed data, GLMM, Bayesian approach

Reveal Association between Complex Traits and Omics Data Using Deep Learning Architectures

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Abstract: Diverse statistical models within frameworks of machine learning have been proposed for omics data such as genomics, transcriptomics, proteomics and metabolomics. However, many methods still have certain limitations. As a modification of nonlinear multilayer perceptron artificial neural network (MLP), deep Learning is a branch of machine learning and capable to leverage big data sets for finding hidden structure in omics and improve the predictive and generalizability performance of the models. This approach is a particularly powerful for learning complex patterns at multiple layers. Consequently, deep learning architectures train the network to optimize a tradeoff between model complexity and goodness of fit to the data. This learning procedure uses supervised learning method which considers both the set of input data and target (responses) and then pursues to build a predictor model that generates sensible predictions for the response to new data. Therefore, a set of example pairs (p,t), $p \in P$, $t \in T$ are given aim to discover a function $f: X \rightarrow T$. After training, we claim to *infer* the mapping provided by the data; the cost function is related to the discrepancy between our mapping and the data. This study aims to we provide a more comprehensive review of deep learning for omics data with different deep learning architectures such as deep neural networks, convolutional neural networks, recurrent neural networks, emergent architectures. An example from real field will be used to explain to provide insight the application of deep learning in omics studies.

Keywords: Deep learning, omics data, neural networks

Spaitial Distribution of Calf Giardiasis in Neonatal Diarrhea Comorbidity

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Abstract: In the present study, the aim was to determine the spatial distribution of giardiasis in neonatal diarrheoic calves to those of infection with E. coli. During summer 2015 to late winter 2017 a total of 109 diarrheoic samples were forwarded to laboratory. Out of those samples, 40 diarrheoic calves diagnosed with rapid test kits to those of naturally occuring E. coli infection. At the same time each microscopical and molecular examination for detection of giardia cysts revealed 12 positivity with an infection rate of 30%. The clinical, parasitological and laboratory signs of those infections were analyzed within this study. It should not be unwise to draw preliminary conclusion that comorbidity existed to those of neonatal calf diarrhea.

Keywords: Neonatal calves, diarhea, giardia

Meta-analysis of Heritability Estimates for Growth Trait in Different Sheep Breeds

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Abstract: The heritability of the traits play a crucial role in animal breeding and the estimated heritability are always specific for a trait. Reliable heritability estimate for economically important traits are essential to animal breeding programs. Over the past year, the heritability estimate has been published for several traits in sheep. However, these estimates have been derived from studies on sheep populations grown in different environmental conditions, at different stage of selection, with different sample size, and considering distinct effects in the model. The aim of this study is to scrutinize the overview of this heritability estimates, meta-analysis was conducted. For this research, data was collected from 57 available published scientific publications, especially focused on direct genetic effects and maternal genetic effects of birth weight and weaning weight from different sheep breeds. Row mean was used as an effective measurement and it was determined whether heterogeneity specification is important or not by using Q test statistics. Meta-analysis based on Random effects model and Mixed effects model is used to summarize the variability between divergent heritability estimates.

Keywords: Meta analysis, random/mixed effects model

The Relationship between Decline of Pollinator Bees and Use of Insecticides

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Abstract: Pollination that indispensable ecosystem service for food production and biodiversity is the transfer of pollen between plants by different vectors. Scientific evidences suggest that pollination significantly increases the both quantity and quality of yield for many agricultural crops. Insects are more important pollinators of many cultivated and wild plants. A large taxonomic group of insects is Hymenopterans including honeybees, bumblebees, solitary bees and stingless bees. It is clear that sustainable agriculture practices are strictly depend on bees especially honeybees and bumblebees. However, bees are adversely affected by changing land use practices, spread of pathogens and insecticide use. Especially, there is a scientific concerns about the effect of insecticides on pollinator bees. Neonicotinoid insecticides are commonly used in seed coatings to control herbivorous insect pests in a variety of crops such as corn, cereals and oilseed rape. On the other hand, many results about the sublethal effects of neonicotinoids on pollinators have been reported. Use of insecticide is known as one of the factors which cause to decline of bees. Therefore, protecting of pollinator bees from detrimental effects of agricultural insecticides has also vital importance for sustainable agriculture.

Keywords: Pollinator, bees, *Insecticide*, *Neonicotinoid*

The Outline and Proposal of Bumblebee Researches in Turkey

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Abstract: Bumblebees are economically and ecologically important insects. They are indispensable pollinators in greenhouse tomato production because of their pollination efficiency. Bumblebee pollination decreases the pollination labor costs and increase the quality and quantity of the crop. These bees are among the most abundant of insects visiting flowers in the Mediterranean, continental Europe, and several Atlantic islands. Bumblebees are also model organisms for physiological and behavioral studies in social insects. Because of these advantages, there is worldwide scientific interest in bumblebees. Worldwide, a large number of interested biologist, animal scientist and veterinary have studied bumblebee in the last half century. In Turkey, some researchers have focused on bumblebee research, conducted many scientific studies and published their results especially in the last two decades. Bumblebee researches in Turkey are concentrated on their pollination effectiveness in some crops, factors which affect the colony foundation success under controlled conditions, colony development traits and life cycle of different native populations, their some morphological - physiological - behavioral characteristics, genetic parameters for colony development traits and species distribution. Despite this, there is still a great deal that we do not know about bumblebees. Therefore, many issues such as pollination effectiveness of bumblebee in different crops, bumblebee behavior and physiology, invasion risks of commercially produced bumblebees, bumblebee pests and diseases need to be examined in future studies.

Keywords: Bumblebee, Pollination, Bumblebee research, Turkey

Assessment of Antibiotic, Naphthalene and Pesticide Residue Problems in Turkish Honeys

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Abstract: Honey as the only available natural sweetener, has been used by human beings since ancient times for many purposes mainly nutrition and health. Therefore, honey must be free of any chemical residues and safe for human consumption. However in order to improve productivity, the use of chemicals has increased significantly during the last decades both in plant production and in apiculture. The use of pesticides and antibiotics against honey bee pests and diseases has results in the presence of their residues in the honey and becomes a growing concern in recent years. Even though Turkey has great beekeeping potential having very rich flora, suitable ecology and more than 7 million honeybee colonies, the use of antibiotics against bacterial diseases and naphthalene against wax moth caused significant residue problems in honey in the past years and lead to decrease in honey exports. Currently to prevent residue in honey, intensive efforts are being made such as prohibition of the use of antibiotics and naphthalene in Turkey. Nevertheless, intensive use and misuse of pesticides sometimes result in high levels of residues in honey. For these reasons some practices such as the training of beekeepers, development of relatively quick and inexpensive residue analyse techniques and strict residue monitoring systems may be useful to solve this problem. In this review, antibiotic, naphthalene and pesticide residue problems in beekeeping sector of Turkey were described and some suggestions were proposed for sustainable beekeeping and public health.

Keywords: Honey, residue, pesticide, naphthalene, antibiotic

Detection of Polymorphism in ITGB6 Receptor Gene Associated with Foot-and-Mouth Disease of Raised Some Cattle Breeds in Turkey Using ARMS-PCR Method

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Abstract: Foot-and-mouth disease (FMD) is a highly contagious viral disease of affecting practically in cloven-hoofed livestock species such as goat, cattle and sheep. FMD is one of the economically important diseases because of vaccination and treatment cost for cattle breeding. Some candidate genes have been determined in relation to resistance or susceptibility to FMD disease. One of these genes is ITGB6 (integrin beta 6) gene on chromosome 2 and consists of 16 exons. The aims of the present study were to determine polymorphisms in the 5'untranslated region (5'UTR) of the bovine ITGB6 gene in four different cattle breed reared Turkey by using ARMS-PCR method. In total 207 samples were used from four different cattle breed [Holstein (HS, n=61), Anatolian Black (AB, n=54), Turkish Grey (TG, n=48) and East Anatolian Red (EAR, n=44)] reared in Turkey. In this study found ITGB gene to be polymorphic in all populations. GG genotype frequencies ranged from 0.063 (TG) to 0.213 (HS) while AA genotype frequencies varied in the range of 0.250 (EAR) and 0.500 (AB and TG). The AA genotype (resistance genotype to FMD disease) frequencies were found to be higher in TG and AB breeds than HS and EAR cattle breeds. According to applied chi-square test, no deviation from Hardy-Weinberg equilibrium was observed for ITGB6 receptor gene in all populations ($P < 0.05$).

Keywords: Cattle, ITGB6 receptor gene, polymorphism, ARMS-PCR

Mendelian Randomization Method for Omics Data using Association Statistics

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Abstract: Mendelian randomization is a statistical technique to addressing questions of causality. While Mendelian randomization studies can provide significant suggestive sign for causal relations between omics and phenotypes, they are dependent on certain assumptions. This opens the paradigm to integrate omics and phenotypes to create genetic prediction models for phenotypes. Several groups have applied this concept to examine genetically regulated "transcripts" for association. Many gene-based association methods such as Transcriptome-wide Association Study (TWAS), Summary Mendelian Randomization (SMR) and genetically regulated components of molecular traits on complex phenotypes using summary (MetaXcan) using genetically regulated expression (GReX) and traits from GWAS summary statistics have been proposed. Additionally, Dr Im's group have developed the PredictDB to generate tissue-specific genetic prediction models for transcriptome and the respective gene-based association methods using individual level genotypes (PrediXcan) or GWAS association summary statistics (MetaXcan). Regularized regression methods, such as ridge regression, LASSO and elastic net are used to generate the predicted GReX of the genetically determined expression of each omics component (for example, gene g). Here we present details on MetaXcan that greatly expands the applicability of the ideas behind PrediXcan by using only summary results the GReX association.

$$Z_g \approx \sum_{l \in Model_g} w_{lg} \frac{\hat{\sigma}_l}{\hat{\sigma}_g} \frac{\hat{\beta}_l}{se(\hat{\beta}_l)}$$

where Z_g is the z-score for gene g, w_{lg} is the weight of SNP l in the prediction of expression of gene g, $\hat{\beta}_l$ is the GWAS regression coefficient for SNP l, se($\hat{\beta}_l$) is the standard error of $\hat{\beta}_l$, $\hat{\sigma}_l$ is the estimated variance of SNP l, and $\hat{\sigma}_g$ is the estimated variance of the predicted expression of gene g.

Keywords: Mendelian randomization, omics data, summary statistics

Toll Like Receptor 1 (+1380 G/A) SNP is Associated with Paratuberculosis Susceptibility in Holstein and Indigenous Crossbred Cattle in Turkey

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Abstract: Paratuberculosis (Johne's disease) is an economically significant condition caused by Mycobacterium avium subsp. paratuberculosis (MAP). Paratuberculosis remains one of the most important diseases of cattle breeding. In cattle, the disease is debilitating and is characterized by weight loss and chronic diarrhea in the later stages of infection. Paratuberculosis infection susceptibility is suspected to be controlled by host genetics so selecting individuals according seroprevalence could help to obtain bovine populations that are increasingly resistant to MAP infection. The aim of the present work was to investigate association between Toll-like receptor 1 (TLR1 +1380 G/A and +1446 C/A), Toll-like receptor 4 (TLR4 +10 C/T), Toll-like receptor 9 (TLR9 +1310 G/A) and Solute Carrier Family 11 Member 1 (SLC11A1 +1066 C/G) SNPs and MAP infection status (case/control) in 813 cattle comprising East Anatolian Red crossbred (n=281), Anatolian Black crossbred (n=108) and Holstein breed (n=376). In order to detect MAP Idexx Paratuberculosis Screening ELISA kit was used. Data were analyzed using logistic regression model (breed and sex were tested as fix factors) and odds ratios (OR) with 95% CI were calculated. TLR1 (+1380 G/A) mutation showed an association with bovine MAP ($P < 0.05$). For TLR1 (+1380 G/A) locus, the odd ratios for AG and AA genotypes versus GG genotypes were 2.31 (1.24–4.30; 95 % CI) and <0.001 (< 0.001 to > 999.999; 95 % CI) which indicated that proportion of AG genotype was significantly higher in paratuberculosis affected animals as compared to control. Our results suggest selecting animals against TLR1 +1380 AG genotype may decrease risk of paratuberculosis in cattle belongs to Bos taurus species.

Keywords: Johne's disease; Bovine; Genetics; Disease risk; Anatolian indigenous cattle

Acknowledgements: This work was financially supported by the Turkish Research Council (TUBITAK) grant number 115O478.

Potential Influence of Candidate Genes in Marker Assisted Selection and Genetic Association Studies of Meat Colour

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Abstract: In recent years, the trend in beef production has gradually evolved from meat quantity to meat quality. A crucial point for the evaluation of meat quality is about its importance for commercial markets. Because meat quality is defined by the traits that consumer perceives meat as desirable. Among the quality parameters, meat colour influences the consumer's satisfaction directly about the quality of a piece of meat and determines the price accordingly. A number of factors have been identified potentially associated with meat colour such as breed of animal, slaughter age, pre- and post slaughter conditions, aging process, meat pH, amount of connective tissue and packaging method. Apart from environmental factors, there is much evidence to suggest that genetic structure influence beef colour directly through its effect on muscle metabolism and postmortem tenderization process. Several genes have been associated with beef colour in various cattle breeds. After identification of QTL a further step, the identification of the genes and causative mutations or polymorphisms, is normally required for practical use of this variation in selection and breeding programs including marker-assisted selection (MAS). The results of many studies give strong evidence for the potential for MAS for meat colour. The potential gain would be in terms of reduced costs for quality testing after slaughter and reduction in meat colour measurements as well as additional improvement of meat quality by early information from genetic markers. The primary objective of the current presentation is to discuss the effects of candidate markers on meat colour.

Keywords: Cattle, meat colour, marker-assisted selection, QTL

Effect of the Pappalysin 2 (PAPPA2) Gene Exon 2 Polymorphisms on Genetic Resistance to Natural Gastrointestinal Parasite Infestation in Four Native Turkish Sheep Breeds

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Abstract: In consequence of increasing drug resistance to gastrointestinal parasites, rearing genetically resistant animal to parasitic infestation may be alternative breeding strategy. Pappalysin 2 gene (PAPPA2) increases the bioavailability of insulin growth factor (IGF) which is related to immune response. Recently, a microarray experiment demonstrated that four SNP haplotype at the intronic regions of the PAPPA2 gene might related genetic resistance to experimental infestation of abomasal nematode in sheep. This study was designed to investigate whether any relationship PAPPA2 exonic polymorphism with genetic resistance to natural nematode infestation. 298 sheep, belonging to four native Turkish sheep breeds which have been reared at Sheep Breeding Research Institute were sampled for either peripheral whole blood or feces. Fecal samples were measured for total Trichostrongylidae spp. fecal egg count (FEC) by modified McMaster method. To test for any relation between total FEC and PAPPA2 exon 2 variants, sheep which have highest 20% and lowest 20% FEC were selected from each breeds (n=133) and subjected to Sanger sequencing. There were seven silent mutation at codons 372, 416, 424, 449, 473, 515 and 541. Furthermore, two missense mutations were detected and predicted amino acid replacement were D391H and L409R, respectively. Due to sampled sheep graze in the same pasture and reared same management condition, all of four breeds were evaluated together in statistical analysis. Regarding genetic association, no evidence was found from allelic, genotypic and haplotypic association analyses. This is a preliminary result and other functional regions of PAPPA2 gene are still being investigated.

Keywords: Pappalysin 2, genetic resistance, nematode, Turkish native sheep

Effects on Carcass Parameters and Meat Quality of L-Carnitine Supplementation at Different Levels in the Broilers Grown at High Altitude

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Abstract: The objective of this study was to investigate the effects of different levels L-carnitine supplementation on carcass parameters and meat quality in broilers. One-day-old 300 male broiler chicks (Ross 308) were used in the trial. The group without L-carnitine supplementation (0) was assigned as control and the groups that received 100, 150, 200 and 250 mg/l L-carnitine supplementation in water were assigned as treatment groups. The trial was completed in 35 days. L-carnitine supplementation did not have any significant effects on carcass yield and weights and percentage weights of abdominal fat, liver, proventriculus, gizzard and spleen ($P>0.05$). The difference between the groups in terms of heart weight was found statistically significant ($P <0.05$). The lowest heart weight was seen in the group receiving 13.10 g to 100 mg/l L-carnitine supplementation, while the highest heart weight was seen in the group receiving 16.24 g to 250 mg/l. As a result of the carcass analyses at the end of the experiment, L-carnitine suplementation was determined not to have a significant effect on pH, L*, a* b* C* in the breast meat, L*, a*, b*, C* and H0 in the thigh meat. Ho color value in the breast meat and pH value in the thigh meat were significantly affected by the L-carnitine suplementation ($P<0.05$). The lowest thigh pH values were determined in the 100 and 200 mg/l L-carnitine groups. It was concluded that low doses of L-carnitine supplementation to reduce heart weight may have positive effects in the broilers grown at high altitude.

Keywords: Broiler, L-carnitine, carcass parameters, meat quality, high altitude

The Effects of Adding Essential Oil Mixture to Drinking Waters and Age on Egg Quality Parameters in Quails

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Abstract: This study was conducted to define the effects of oregofarm (peppermint+thyme and anise oil) supplementation in the drinking water and age on egg quality. A total of 348 Japenese quail chick aged one day old were enrolled, under 3 different treatment drinking waters supplemented with 0, 1.0 and 1.5 ml/5l essential oils mixture, respectively. The experiment was lasted at 12 weeks. The eggs were collected daily from 9 to 12 weeks of age and the egg quality parameters were determined. The results indicated that, no differences were found in terms of egg external quality parameters (egg weight, shell weight, shell thickness and shell surface area) between treatment groups ($p>0.05$). In terms of internal egg quality, the highest yolk weight was determined in group 2 ($p<0.05$). In egg internal parameters, the highest yolk weight was found in the second experimental groups ($p<0.05$). Haugh Unit was calculated as 95.20 in the second trial group, 93.89 in the first trial group and 93.68 in the control group and the differences between the groups was found statistically significant ($P <0.05$). Also, egg internal and external parameter characteristics of control and experimental groups were calculated separately for 9th, 10th and 11th week ages. The highest egg weight and shell weight were found at 11 weeks ($p <0.05$). Haugh Unit was found at the lowest 10th week ($p <0.05$). It is concluded that essential oil mixture and age have positive effects on internal egg parameters and have no negative effect on egg external quality in quails

Keywords: Essential oil, age, egg quality, quails

Effects of Maternal Antioxidant Feeding on Feed Consumption and Hatchability in Japanese Quails

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Abstract: Chick embryos received all the nutrients which they need during incubation, from egg whites and yolks. Nutrients in breeder's maternal diet are effectively transferred from maternal diet to egg. The effects of maternal antioxidant nutrition (vitamin E, methionine, taurine, selenium, carnitine) on maternal feed intake and hatchability in japanese quails (Coturnix japonica) were investigated in this study. Quail breeders (N=432) were randomly allocated to six groups, 3 replications for each. Control was fed with basal diet (standard quail breeder diet) and 0.35 mg/kg selenium, 250 mg/kg vitamin E, 50 mg/kg DL-methionine, 40 mg/kg L-carnitine and 10 mg/kg taurine were supplemented basal diet respectively for treatments. All treatments were fed for four weeks. At the end of feeding period, 200 eggs were incubated per treatments. The incubation temperature and relative humidity were at 37.5 °C and 60% respectively. After 15 d of incubation, the eggs were candled, and those with living embryos were transferred to the hatcher baskets at a temperature of 37.0 °C and 70% relative humidity. There were significant differences in hatchability between carnitine and taurine groups. The highest level of hatchability was recorded in carnitine as a 92.5%, whereas the lowest was recorded in taurine treatment as 84.7%. However, there were no significant differences among all the other groups. Average daily feed intake was significant among carnitine (27.30 g), selenium (26.42 g) and taurine (26.31 g) groups. In conclusion, supplemental L-carnitine in basal diet increased both feed intake and hatchability compare to taurine antioxidant supplemented treatments.

Keywords: Japanese quail, antioxidant feeding, hatchability, feed consumption

The Effects of Boron (Orthoboric Acid) Supplementation into Diets of Hens During Late Laying Period on Performance and Some Serum Parameters

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Abstract: This study was carried out to determine the effects of boron (orthoboric acid) addition into the diets of hens in the late laying period on performance and some serum parameters. Two hundred eighty eight Lohman commercial laying hens which are 62 weeks old were fed with 0, 50, 75, and 150 mg/kg of B for 12 weeks. The research was carried out in 18 replicates, and four laying hens were used for each replicate. During the research, 16-hour lighting was applied and feed and water were given as ad-libitum. Additional B did not alter the live weight change and average egg weight from performance characteristics, but egg production increased and also feed efficiency and daily feed intake reduced ($P < 0.01$). Serum glucose, cholesterol, triglycerides, creatinine, total and direct bilirubin values were not affected by additional B. While addition of B into the diets of laying hens did not affected the outcomes of serum ALP, AST and GGT enzyme activities ($P > 0.05$), alanin amino transaminase (ALT) was affected by B. the proteins being at different molecular weights at different levels. It is concluded that in order to have a positive effect on comfort, health, performance of laying hens in the late laying period, 50 mg/kg B supplementation is adequate and may be suggested.

Keywords: Laying hen, Boron, performance, blood serum parameters

The Effect of Different Levels of Thyme (Oregano Onites) on Egg Quality Traits during Different Storage Time in Laying Hens

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Abstract: The current study was designed to investigate the effects of dietary supplementation of different levels of thyme leaves (Oregano onites) on egg quality traits during different storage time in laying hens. A total of 36 Babcock white laying hens were divided into 3 groups with 4 subgroups in each and fed diets containing 0%, 5% and 10% thyme (Oregano onites) to each group for 30 days. At the end of the study, 8 eggs from each group were analyzed on the same day without storage and remaining eggs were stored at +4°C. Then after 10th, 20th and 30th days of storage, 8 eggs from each group were analysed for internal egg quality parameters. Results revealed that thyme has shown no effect on eggshell breaking strength. However, Haugh units and egg weight values were higher in %5 inclusion group ($p<0.05$) over %10 inclusion and control group. Yolk colour of both treatment groups (%5 and %10) was lighter than control ($p<0.05$). There was no effect on total oxidant status for all groups however total antioxidant capacity was increased in both %5 and %10 inclusion rate at 20th day of storage but no different were observed at fresh and 10 days stored eggs. Moreover at 30th day of storage, total antioxidant capacity value was still higher at %10 thyme group ($p<0.05$) according to %5 thyme and control groups. It is concluded that dietary thyme leave could be used to extend storage time of eggs.

Keywords: Oregano onites, egg storage quality, laying hens, Haugh units, Yolk color

Comparison of Different Lactation Curve Models in Saanen Goats

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Abstract: Expressing the yields in animal husbandry with mathematical models enables the estimation of the yields of animals for a certain yield season or a lifetime. Knowing the shape of the lactation curve is important for dairy production and economic factors. It is also recommended to identify lactation curve types and to exclude animals from breeding that do not have the appropriate type of curve. Many models have been developed to describe the lactation curves. These models, which are generally developed for dairy cattle, are also applied to lactation data of dairy sheep. Saanen goats are Swiss-originated breeding for dairy production and they are known for their high fertility rate. One of the most important features of these goats are their ability to comply with different climatic and environmental conditions. In the study, it was aimed to determine the suitable mathematical models for the lactation curves in Saanen goats using different mathematical models. Two-week control milk yields obtained from 38 Saanen goats were used for the study. Lactation milk yields was examined with three different mathematical models. These models are Gamma function, Exponential function and Parabolic function. Mean absolute percentage error (MAPE), mean squared errors, and coefficient of determination statistics were used to determine the accuracy of estimated models and to compare models.

Keywords: Lactation curve, Saanen goat, daily milk yield

Growth and Future Estimates of Turkey Production in Bingöl Province

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Abstract: In this study, the effects of the turkey's presence in between year 1990-2017 in Bingöl on the turkey breeding in 2018-2025 was estimated by using different Exponential Smoothing methods (Holt, Brown and Damped methods). The source of data of study was the Turkey Statistical Institute (TSI). In 1990-2017 period, Dickey-Fuller Unit Root test was applied to the numbers of turkeys of Bingöl province and it was determined that the series was stationary. Due to the stability of the series, a time series model of the number of turkeys was made. Holt, Brown and Damped exponential smoothing methods were applied to estimate the number of future of turkeys and the results obtained were compared with each other. The Bayesian Information Criterion (BIC) statistics of the Holt, Brown and Damped methods were 18.167, 18.143 and 18.327, respectively. According to the criteria of Goodness Fit Criterion, Brown exponential smoothing method was defined as the most appropriate method to model and estimate the number of turkeys. The parameter value of Brown exponential smoothing model was α=0.369. It is estimated that the presence of 32792 turkeys in 2017 will rise to 45999 in 2025 in Bingöl province. In other words, it was determined that the number of turkeys in the province of Bingöl would increase by 39.67% in the mentioned period (Between 2018 and 2025). It is thought that the results obtained this study will be useful in determining the policies to be followed and the studies to be carried out.

Keywords: Bingöl, number of turkeys, exponential smoothing

Integrate Association Evidence from Correlated Phenotypes using GWAS Summary Statistics

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Abstract: Genome-wide association studies (GWAS) have been a most important strategy to determine the genetic variants for complex traits and have provided a success insight to understand the etiology of many diseases and traits in human, animal and plants. However, most of published analyses on GWAS are based on univariate, considering each phenotype independently, even though multiple phenotypes (correlated or uncorrelated) from independent studies or cohorts are available on each individual. A common approach was to implement a meta-analysis by getting together the effect size and variance estimates from as several independent studies for the same phenotypes. It has been suggested that univariate analysis can suffer inappropriate statistical power compared with multivariate approach. However, in a sign that this may change in the future, recently have seen a few of papers related to correlated multi-trait association testing. Some recent evaluations validated that exploiting multivariate phenotype statistical power and leads better insight for the association tests compared to the univariate analysis. However, most of these techniques require both phenotypes and genomics individual level data that assuming multivariate normal distribution of phenotypes. To our knowledge, there are only 3 studies with different limitations on each has been worked. These are Meta canonical analysis: metaCCA, cross phenotype association: CPASSOC and multi-trait sum of powered score: MTaSPU. The objective of this paper is to compare these three methods to evaluate the extent of sharing for phenotype-associated SNPs while correcting for the observed correlational structure between the phenotypes.

Keywords: Association statistics, correlated traits, GWAS

Usage of Multivariate Adaptive Regression Splines for Predicting Continuous Responses in Animal and Plant Sciences

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Abstract: Multivariate Adaptive Regression Splines (MARS) is a powerful data mining approach that describes the relationship between sets of responses and predictors for predictive modeling. The mentioned algorithm which is not required for distributional assumptions of the predictors to be evaluated is a remarkable alternative to ordinary least squares (OLS), response surface method (RSM), ridge regression method (RRM), use of factor analysis's scores for OLS, use of principle component analysis's scores for OLS, as well as other data mining algorithms i.e. CART, CHAID, Exhaustive CHAID. The goal of the present study was to display how to specify the MARS in R free software. The MARS algorithm was introduced for various penalty values (-1, 2, 3 and 4) and order of interaction effects and compared with other algorithms in the predictive performance based on goodness of fit criteria. R commands of the package earth of the MARS were indicated for further studies. To statistically assess the studied algorithms, a sample regarding animal and plant sciences were employed. As a result, it is hoped that the current work will submit baseline information about MARS algorithm to investigators who will want to develop similar prediction models for continuous responses.

Keywords: MARS, predictive modeling, data mining, non-linear regression

A Comparison of Partial Least Squares Regression with Ridge Regression

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Abstract: Multicollinearity is an important problem in multiple linear regression analysis. When the regression analysis based on Ordinary Least Square (OLS) method is performed, unreliable results are obtained for regression coefficients. There are various methods in literature to overcome the problem. Partial Linear Regression (PLS), a biased regression, is one of the methods. Another biased technique is Ridge Regression. In this study PLS and Ridge regression were introduced and then analyzed the data consisted of 30 eggs of quails in order to estimate egg albumen weight (EAW) from some external egg quality characteristics. The statistical analyses were performed by using reg and pls procedure in SAS. Results showed that PLS regression extracted two factors and its root mean square error (RMSE) was about 42.92% and its coefficient of determination was 78.95%, while Ridge regression was 42.42% and 79.44%, respectively. This study suggests that Ridge regression provides a better approach for the EAW estimation.

Keywords: Multicollinearity, biased regression, ridge regression

Acknowledgements: This work was financially supported by the Yüzüncü Yıl University Scientific Research Projects Directorate (project no. FYL-2018-6972).

Morphology and Molecular Phylogeny of a New *Colpodidium sp*. (Ciliophora, Nassulia) from Van, Turkey

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Abstract: Genus *Colpodidium* was established by Wibert in 1988, and up to date, five species belonging to this genus were identified and described. In this study, performed on soil samples collected from the garden of Agricultural Faculty of Yüzüncü Yıl University, we observed a different population of the genus *Colpodidium*. The samples of the *Colpodidium* were investigated both live and silver impregnation techniques. The 18S rDNA gene was amplified, sequenced and compared with related species. Phylogenetic trees were obtained by the Maximum likelihood (ML) and Bayesian Inference (BI) analyses. *Colpodidium* sp. is 45-55 x 15-25 µmsized, elongate reniform with horn shaped-vestibulum in slightly below of mid-body, 20-25 ciliary rows, 20 paroral dikinetids. With some minor differences, our population was morphologically very similar to *Colpodidium caudatum* previously described. However, in the both phylogenetic trees (BI and ML) based on the 18S rDNA sequence, our population was found to be located away from *Colpodidium caudatum*. Many of the microorganisms do not have as much morphological character to distinguish them from each other. Thus, it is difficult to separate similar microorganisms solely based on morphological examination, and other methods such as molecular identification are necessary for to distinguish species each other. Considering that molecular phylogenetic studies reveal that there are many sibling species morphologically difficult to distinguish from each other, our population is likely to be a new species.

Keywords: *Colpodidium*, morphology, phylogeny, 18S rDNA, Van

Effect of Dietary Omega-3 Poli Unsaturated Fatty Acids during the Flushing Period on Reproductive Performance of Karayaka Ewes

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Abstract: An experiment was conducted to investigate the effects of supplemented omega-3(UFAC, UK) polyunsaturated fatty acids on fertility of Karayaka sheep during the flushing period. This trial was arranged that, 3-4 aged, 55 ± 0,5 kg live weight, 80 head Karayaka sheep divided into 4 groups as 20 animals in each group with Completely Randomize Design. Estrus synchronization was performed in the three groups of sheep outside the control group. Experimental groups were pasture (control), pasture (Estrus synchronization), barley (supplementary feeding) and Omega-3 (UFAC, UK). Progeny yields were determined as 80 % in the control, 125 % in the pasture, 116 % in the barley and 135% in the omega-3 groups. While highest number of lambs were obtained from omega-3 group. The least lamb was born in the control group. The difference among the research groups were statistically significant in terms of the number of born lambs ($p<0.05$). According to these results, it was determined that, addition of omega-3 polyunsaturated fatty acids to supplemental feeds in the flushing period increased fertility of Karayaka sheep.

Keywords: Karayaka ewes, flushing period, omega-3 fatty acids, reproductive performance

Comparisons of Some Physiological Parameters of Kangal Shepherd Dogs with and without Ankyloglossia in Different Environmental Temperatures

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Abstract: The aim is to compare some physiological parameters of Kangal dogs in three different (18-23-28ºC) environmental temperatures. Study was included 24 healthy Kangal dogs from Sivas of which 11 were with and 13 were without the ankyloglossia. Pulse, ventilation, and bodily temperatures were measured both during resting and at ends of 5-10-15 minutes exercises. Statistics of groups in same temperature, in different temperatures and for intergroups were analyzed by Mann-Whitney U, Kruskall Wallis, Wilcoxon tests, respectively. Conclusions provided no significant intergroup changes for physiological parameters in resting and for exercises in all environmental temperatures. Differences in some parameters were observed for different exercise durations in groups. While no significant changes in parameters were present during resting period for groups in different temperatures, significant heart rate changes were observed in all exercise durations in all temperatures. Also, significant changes were observed between groups for 5 and 10 minutes of exercise and ventilation counts and for all exercises and bodily temperatures at both 23 and 28ºC. Again, significant changes were observed between groups for 10 minutes of exercise and ventilation counts, and for 10-15 minutes of exercise and bodily temperatures at 18ºC. In conclusion, bodily temperatures of groups were rapidly increased during the start of exercise from resting, and lowered, then fixed as exercise continues. This situation was observed in ankyloglossia as rapid increase in ventilation during the start of exercise followed by steady decrease, while in normal dogs as continuous increase in pulses with start of the exercise.

Keywords: Ankyloglossia, environmental temperature, Kangal dog, pulse, ventilation, body temperature

A Research on Longevity, Culling Reasons and Lactation Milk Yield in Between Holstein and Simental Cows

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Abstract: The current study was to carried out to investigate longevity, reason of culling and lactation milk yield on Holstein (183) and Simental (97) cows that culled from herd (Bursa – Karacabey - TİGEM) in two years (2015-2016). Research is planned to be carried out in a single herd to minimize the influence of environmental factors such as feeding, breeding. The data such as lactation length, lactation milk yield and 305 day milk yields related to the milk yield characteristics and reasons of culling were taken from the herd records and from the database of the Bursa Cattle Breeders Association. The longevity of each animal was calculated as the difference in days between its date of calving and its date of culling from the herd. Data were analyzed using SPSS. In order to determine the relationship between resaons of culling and breeds, x^2 test was used. Longevity was found 33,68 month for Holstein cows and 33,71 month for Simental cows. Average lactation milk yield and 305 days milk yield were found respectively 8515.6±196.51 – 7518.0±148.29 kg for Holstein, 6079.8±163.13 – 5525.7±117.93 kg for Simental cows. While longevity and reason of culling were not found statistically important in between two breed, lactation milk yields was found important ($P < 0.01$). As a conclusion, it can be said that it is more accurate to prefer Holstein instead of Simental for breeders in their milk production investments.

Keywords: Longevity, milk yield, Holstein, Simental

Interdigital Fibroma in A Cattle

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Abstract: The material of the study was a 2 year-old cattle brought to the animal clinic of Van Yüzüncü Yıl University Veterinary Faculty. In interdigital area, there were reddish tumoral lesions with nodules caused by (290 gr weight and 13x7x5cm dimensions). It was originated from interdigital skin tissue and it was extending to base and top of the hoof. Animal was sedated and IVRA (intravenous regional anesthesia) was administered before the operation. The mass was totally extirpated. It was histopathologically examined in Van Yüzüncü Yıl University Veterinary Faculty Pathology Department. As a result of the investigations, it was observed microscopically that the neoplastic proliferation fibroblasts and the collagen thread bundles had a characteristic structure consisting of interwoven folds. Neoplastic proliferation of fibroblasts was also observed. It was thought that medical treatment should be applied immediately and the mass should be taken before became bigger.

Keywords: Cattle, fibrom, extirpation

Effects of Some Environmental Factors on the Early Growth Characteristics of Blackheaded Merino (German Blackheaded Mutton x Karacabey Merino B_1) Sheep

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Abstract: This research is carried out to determine the early growth performance of the lambs of the Blackheaded Merino (German Blackheaded Mutton x Karacabey Merino B1) sheep wherehave been reared in the Bandırma Sheep Breeding Research Institute. The animal material of the research was composed of 214 heads of Blackheaded Merino sheep and 315 heads of male and female lambs. Average birth weights and weaning weights (90 days) of the lambs are find 4.11 ± 0.054 kg and 28.28 ± 0.380 kg, respectively. Birth weight is significantly affected by year, maternal age and birth type, and weaning weight is significantly affected by year, birth type and sex factors ($P<0.05$). The average daily weight gain of lambs of Blackheaded Merinosheep are found 267.82 ± 4.02 g from birth to weaning weight, moreoveritis significantly affected by the year, type of birth and sex factors ($P <0.05$). These results show that environmental factors are significantly determining lamb's capacities.

Keywords: Crossbreed, lamb, birth weight, growth, weaning weight

The Occupational Health and Safety in Animal Production

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Abstract: In this article, it has been discussed the hazards and the risks related to occupational health and safety in livestock production. It was also aimed to provide suggestions for occupational health and safety that increase production in animal breeding. Animal production has an important place in agricultural activities. The livestock activities in Turkey have been characterized by the different regional applications. There are many factors which limit the economic efficiency for production. One of them is production losses due to the workplace accidents and the occupational illness. The issue of occupational health and safety in animal production is very important as it is in many other areas. Occupational diseases and accidents that can be encountered by workers at business have caused the losses of very serious economic and the qualify person in animal production. In addition, the sustainability of production is negatively affected. The most common hazards at the animal production in Turkey are the zoonotic diseases, the ergonomics, the noise, the air conditioning, the chemicals, the animal attacks, the bites, the injuries, the accidents in transport, the psychological stress and, the skin-borne diseases etc. Especially, the animal hitting and the zoonotic diseases are very important in animal husbandry. Therefore, the precautions related to the occupational health and safety must be taken for the workers at the livestock enterprises, the field and, the factories such as the feed, the skin and the meat. In Turkey, preventive measures have started to be taken on occupational health and safety in livestock production.

Keywords: Hazard, livestock business, occupational safety, production

Providing Red Meat Need in Turkey

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Abstract: Abstract: In the past years, Turkey is known as the agricultural country and exports meat but it is now inadequate in meat production. If red meat imports continue, milk imports will also be inevitable. Livestock population migrated to cities and came to the point of leaving production. Consideration of the production of meat and milk together, the increase of meat production in each region of the country, especially the increase in the number of small ruminants, and accordingly, the weight of carcasses per animal should be raised. For beef production; the import of butchery animal must be abandoned. For breeding material, cross breeds of domestic races and combined breeds should be used. The organization should urgently be made for the production and the marketing in the sector. Also, employees should be under social security. In small and medium sized enterprises, state economic institutions and state support are essential for input, production and marketing. Red meat consumption habits should be determined on a regional basis. This will also change the production habits. In the forming of agricultural policies, it is important that all the breeders and units concerned are actively involved.

Keywords: Consumption habits, beef, mutton, Turkey

The Effect of Meat Texture and Sensory Properties of Different Feeding Systems on Hair Goat and Saanen x Hair Goat (G_1) Crossbred Kids

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Abstract: In this study was aimed to crossbred male kids of the Hair goat and Saanen x Hair kids (G1) compare their textured and sensory properties for intensive, semi-intensive and extensive conditions. In the research, 30 Hair goat and 30 Saanen x Hair goat (G1) crossbred single male kids were used. When the results of the study were evaluated, the effect of all of these factors on the mean values of the sensory properties in the meats of the hair goat and Saanen x Hair goat (G1) hybrids was found to be not significant. When the obtained Texture Profile Analysis results are examined, it is seen that the differences between groups are statistically significant as the genotype and fattening method affect the quality of meat, meat hardness, cohesiveness, gumminess, chewiness and resilience values.

Keywords: Hair goat, Saanen x Hair Goat (G1), fattening, sensory properties, texture profile analysis

Current Situation of Beekeeping Activities in Erzincan Province

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Abstract: The purpose of this study is to present the general status and problems of beekeeping in Erzincan province and to suggest the solutions to some problems. The data of the study consisted of statistical data and a survey study conducted in Erzincan province. The statistical data were obtained from Turkish Statistical Institute and Ministry of Agriculture and Rural Affairs of Erzincan province. According to the statistical data of 2016, there were 91486 honey bee colonies managed in a total of 1401 beekeeping farms. The amount of honey and beeswax produced were 1451.44 tons, 24.47 tons, respectively. The honey yield per colony was 15.87 kg. The beekeeping farms in Erzincan owned 1.16% of the total number of honey bee colonies in Turkey and the share of these farms in total honey production was 1.37%. Erzincan is 14th place in honey production in Turkey. While 5.96% of the 967 enterprises are women, 81.86% of these enterprises are men. Erzincan was able to use only 73.28% of the existing bee colonies in 2017. Erzincan, whose economy is based on agriculture and animal husbandry, has the proper flora and climate in terms of beekeeping. However, the city is not at the desired level in terms of production and productivity. To have a better beekeeping in Erzincan, it is necessary to use efficient and local adapted races, increase the effectiveness of the fight against bee diseases and veterinary medicine services, to resolve the lack of qualified personnel, give importace to solving queen bee problems, expand the beekeeping product range and conduct training and information activities for beekeepers.

Keywords: Erzincan, beekeeping, honey

Effect of Management System on Meat Quality in Broiler Production

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Abstract: There have been significant developments in the poultry sector for the last of half century. It aimed higher quality and achieve a greater amount of product in a shorter time which made for this purpose in research. Today, consumer demand has begun to come to foreground and consumers has become questioned the quality of the meat that receive. Accordingly, production methods which is important factor affecting quality systems have begun to develop and various studies have been made on this issue. In this study, including the effects of meat quality on production methods combined the results of scientific studies and production methods were examined to respond to wishes of consumers who demand quality product.

Keywords: Management system, broiler, meat quality

The Effect of Estradiol-17β on Follicle-Stimulating Hormone and Serum Mineral Concentrations of Japanese Quail

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Abstract: The aim of this study was to measure the effect of estradiol-17β (E2) injection on Follicle Stimulating Hormone (FSH) and serum mineral concentrations of Japanese quail. Female Japanese quail were housed in cages, fed ad libitum and randomly assigned to three groups, that is, one control and two other test groups. The control group was subcutaneously injected 0.2 ml sesame oil–ethanol mixture, whereas the test groups were injected with 0.2ml sesame oil–ethanol mixture containing 0.1 or 0.2 mg E2, twice in a week for three weeks. On the last day of the experiment, the birds were injected and 3 h later blood samples (2 ml/bird) were collected for the measurements of serum concentrations of E2, FSH, and minerals. Serum E2 concentrations were measured by using a immunodiagnostic kit. Serum FSH concentrations were measured by using sandwich ELISA. Serum mineral concentrations were measured by VITROS chemistry products slides (Ca and P) and also by HNO3 digestion method. Estradiol injection caused a non-significant reduction in serum FSH concentration. Serum Ca and P concentrations did not significantly changed, while, serum boron concentrations significantly increased over the control due to the E2 injection. Different breeds of animal and birds respond differently to E2 administration. The increase in serum boron concentration indicates the effect of E2 on bone mineralization and feed conversion ratio.

Keywords: Estradiol, mineral, quail, reproduction, serum

Early Growth Characteristics of Colored Angora Goat

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Abstract: The purpose of this study was to examine the growth characteristics of Colored Angora Goat (CAG). The study was carried out under farmer condition by the leadership of the GAP International Agricultural Research and Training Center between 2013 and 2016. The study was carried out in 32 flocks in Siirt province and live weight records of 13694 kids from birth to 120 days of age were used in the analysis. The mean birth (BW0), 30th day (BW30), 60th day (BW60), 90th day (BW90) and 120th day (BW120) weights and average daily weight gain from birth to 90 days of age (ADWG90) and their standard errors were found as 2.09±0.004, 6.34±0.031, 8.33±0.021, 10.82±0.023, 11.94±0.034 kg and 97.08±0.260 g, respectively. It was observed that flock, sex and season of birth significantly affected the live weights in all periods ($P<0.01$). The effect of type of birth had significant effect only on BW0 and BW30 ($P<0.01$). It was also observed that BW0, as covariate, was effective ($P<0.01$) on BW30 and BW60. The least square means of BW0, BW90 and BW120 in 2013 and 2016 were 2.13 and 2.13 kg, 9.98 and 10.21 kg, 10.91 and 10.92 kg, respectively. Findings from the study indicate that the breeding program applied did not have significant effect on early growth traits of Colored Angora Goat within the 4 years. On the other hand, survival rate until weaning was improved from %81.5 in 2013 to %95.0 in 2016.

Keywords: Colored Angora goat, growth characteristics, survival rate

Determination of Milk Yield and Composition Traits of Honamlı Goats in Rural Conditions

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Abstract: This study was carried out to investigation of the milk yield and milk component traits in two Honamlı goat flocks that raised in Antalya and Isparta Provinces of Turkey in 2017. The material of the study was formed from a total of 70 Honamlı goats that were between 2 and 5 years old during the lactation period. The milk yield traits of the Honamlı goats were determined by using the Fleischmann method. Statistical analysis was made using the JMP 11 computer program. Average lactation lengths, average lactation milk yields and daily average milk yields of Honamlı goats were 198 day, 104.3 kg and 0.523 kg respectively. Average contents of the milk fat, protein, lactose, total solids, density, pH, freezing point, conductivity of Honamlı goats were 3.90%, 3.99%, 5.73%, 10.29%, 14.20%, 1036 g/cm3, 6.63, -0.672 ºC and 5.70 µS/cm respectively. The effect of maternal age on lactation period ($P<0.05$) and lactation milk yield ($P<0.05$) were significant. The effect of farms on fat, lactose, total solids ($P<0.01$), solids-non-fat and conductivity ($P<0.05$) were significant while the effect of maternal age on fat ($P<0.05$) and total solids ($P<0.01$) were significant.

Keywords: Honamlı, fat, protein, freezing point, pH

Acknowledgement: This research is a part of project supported by the General Directorate of Agricultural Researches and Policy (GDARP) within the scope of the insitu Conservation of Domestic Animal Genetic Resources Project.

Nomadic Small Ruminant Activities in Hakkari Province of Eastern Anatolia

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Abstract: In this survey, the nomadic life culture and the nomadic small ruminant husbandry in Hakkari province of the Eastern Anatolia Region were discussed. Also, detailed information about nomadic families in Hakkari province dealing with stockbreeding activities was given. Stockbreeding activities of nomadic and semi-nomadic tribes were examined. Both quantitative and qualitative techniques were used in this survey. On the other hand, the survey was based on field activities consisting of observations and interviews. The migrants are mostly from Şırnak, Batman and Siirt provinces to the Hakkari highlands. These migrants make as pedestrian their arrival and return to the plateau. Migrants do not use cars during migrations. In the winter months, the immigrants in Hakkari migrate to Şırnak and its surroundings and they use cars during migrations. Shepherds in their family are responsible for maintenance and feeding of animals on the plateau. Total number of small ruminants coming to Hakkari province is approximately 52.634 head. The number of small ruminants coming to plateau is 45.027 head of sheep and 7.607 head of goats. Sheep breeds mostly consist of Akkaraman, Hamdani and their crossbreds. Approximately 4-5 tribes migrate to Hakkari province. Each tribe consists of at least 3 families. One of the most important issues to be taken into account for sustainable small ruminant husbandry in this region is no doubt the nomadic life culture. The results indicated that solving the problems of nomadic and semi-nomadic families is very important to sustain stockbreeding of sheep and goats, and to benefit Hakkari province economically.

Keywords: Nomadic life, small ruminant activities, Transhumance, Hakkari province

Small Ruminant Activities and Its Geographical Distribution in Hakkâri Province

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Abstract: Eastern Anatolia Region is a region with low population density. However, besides its weak but wide range of pasture lands, due to its climate, socio-economic structure and production habits of the people, it shows a structure suitable for livestock activities especially for sheepand goat breeding. Even within the region, The sheep and goat breeding activity in the region is an activity integrated with life. Small ruminant breeding is the main source of income for people living in villages and rural areas. On the other hand, there has been a significant decrease in both the number of breeders and the number of sheep and goats due to economic, social and technical reasons in recent years. Particularly in recent years, unemployment and thus a problem of poverty have arisen due to migration from rural to urban areas. In recent years, the migration and plateau sheep, which have been important in the region, have started to reduce gradually with the decrease of the available pasture areas and have become impossible in many parts of the region. The presence of local genotypes of sheep and goat species used in the region can be mentioned. It is crucial to know the geographical distribution of these gene sources and their breeding systems. In this research, the existence of the small animal ranch, topographical conditions, distribution of the genotypes of small ruminants, problems and suggestions for solution of Hakkâri province and its surroundings were analyzed. Thus, the potential for regional animal husbandry, especially in Hakkari province, will be evaluated.

Keywords: Sheep and goat breeding, decrease, structural features, Hakkâri

Poultry Industry of Turkey

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Abstract: Poultry industry is contributing an increasing amount of the supply of affordable animal protein in the world and has a special importance in human nutrition. Turkish poultry sector is accepted as an industry together with modern facilities, production methods, thanks to international standards and international markets in close proximity, such as benefits, has advantages and can compete with the whole world. Broiler meat production of the world will be reached the largest meat production in 2030. It has been foreseen that the population of world will be increased one third and 69% percent of consume protein will be supplied from poultry industry in 2050. Broiler meat production in Turkey generally increased regularly, and broiler meat production increased by 12.9 percent on a year-over-year basis in 2017. Moreover, egg production, consumption and export in Turkey has been developing gradually, and production of egg was about 252 eggs/per capita in 2017. As a result of improvement works carried out, domestic layer breeder lines (known as ATABEY, ATAK and ATAK-S) have been developed and new project was started about development of meat type breeders (ANADOLU-T) in Turkey. Social media are monitored and significant improvements are reported in order to reduce media-related problems and information pollutions, improve communication and inform the public and press. There were some problems of Turkish poultry sector such as expensive feed and genetic materials, bio-security legislations, cost of energy supplies, struggles of poultry diseases, and sales&marketing issues.

Keywords: Poultry industry, meat production, egg production, consumption, breeding

Usability for Biometric Identification in Organic Livestock

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Abstract: According to the International Committee for Animal Recording (ICAR), which develops standards and guidelines for the identification of animals, traditional identification and identification methods used in livestock are now being replaced by systems such as the electronic and the biometric identification. These methods facilitate the process and provide advantages over the previous ones. These new methods are type of identification methods that are easy to use and integrate with software that can work with and provide software that enables the use of electronic devices and equipment. It is desirable that the requirement of ecological animal husbandry is to show all the natural behaviors of livestock and that the animal welfare should be at a high level. For this reason, the use of biometric identification in ecological animal husbandry may be appropriate in terms of animal welfare. Also, biometric identification in organic stockbreeding will give a different dimension to the habit of keeping records. In the study, biometric identification methods can be evaluated in terms of their usability in ecological animal husbandry and methods.

Keywords: Animal welfare, biometric identification, organic stockbreeding

The Effect of Non-Genetic Factors on the Linear Type Traits in Brown Swiss Cows

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Abstract: The study was carried out to investigate the magnitude of non-genetic factors affecting linear type traits in Brown Swiss cattle. 474 observations for the 16 linear type traits on 135 were made. Statistical model used in this research included fixed effects of herd, parity, scorer, stage of lactation, season at classification. The age at classification was included as linear and quadratic covariates. Average linear scores for chest width, body depth, angularity, foot angle, rear leg (side view), rear leg (rear view), rump angle, rump width, fore udder attachment, rear udder attachment width, rear udder attachment height, teat placement (rear view), teat placement (side view), teat length, udder sport (central ligament) and udder depth were 5.5±0.1, 6.1±0.1, 5.2±0.1, 4.7±0.1, 4.4±0.1, 4.4±0.1, 5.6±0.1, 5.0±0.1, 5.8±0.1, 5.4±0.1, 6.1±0.1, 5.1±0.1, 4.1±0.1, 5.8±0.1, 5.8±0.1, 6.6±0.1 respectively. Scorers did not have significant effect on all type traits except for the body depth and rear udder attachment width ($P<0.01$). Herd, parity, stage of lactation as well as season at classification affected most of the linear traits. The linear and quadratic effects of age at classification on the most of linear traits were also significant. Phenotypic correlations among the linear type traits were in low to medium range.

Keywords: Non-genetic factors, linear type traits, Brown Swiss cows

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I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

The Effects on Malondialdehyde and Some Antioxidants of Different Levels of Iron Added to the Ration of Freshwater Crayfish (*Astacus leptodactylus* Esch. 1823) in Moulting Period

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Abstract: In the present study, it was investigated the effects on lipid peroxidation (MDA) and antioxidants (superoxide dismutase (SOD), glutathione peroxidase (GSH-Px), reduced glutathione (GSH)) in hepatopancreas (HT) and muscle (MT) of male freshwater crayfish (Astacus leptodactylus) of different levels of iron (Fe) added to the ration. The study was carried out at four different periods; period when the crayfish was adapted to ambient conditions (AD), the period when the body formation gastrolith (GD), the period when crayfish left their shells (YD) and the period when the shells of the crayfish hardened. For this aim, a control (K) and four treatment (F1, F2, F3, F4) rations were prepared. The control ration constituted 28,00 mg/kg Fe. 22,00 mg kg-1, 72,00 mg kg-1, 172,00 mg kg-1 ve 372,00 mg kg-1 iron sülphate were added to the control ration in order to prepare the treatment rations F1, F2, F3, F4 respectively. The parameters analysed in the study were higher in hepatopancreas than muscle. In this study, the level of MDA in tissues was higher in GD and YD periods according to AD and KD periods, but it was lower the levels of SOD and GSH-Px. However, there was not much change between the periods in GSH level. It was determined that the addition of 172,00 mg kg-1 Fe to the diet of crayfish in culture breeding of A. leptodactylus species crayfish was effective in fight with the stress generated during the moulting period

Keywords: Astacus leptodactylus; Iron; MDA; Antioxidant

A Solution Suggestion for the DNA Purity Problem in DNA Isolation from Anticoagulated Blood Samples in Rainbow Trout (*Oncorhynchus mykiss*)

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Abstract: Blood is frequently used for DNA isolation in rainbow trout. Because erythrocytes in fish have nuclei like leukocytes. The short clotting time in fish blood causes problems in DNA isolation. This causes re-setup of the trial, cost labor and time lost. The study was done to find a solution to this problem seen in DNA isolation. Blood samples from 30 different rainbow trout broodstocks were used in the study. Total genomic DNA were isolated by commercial kit. Purity ratios of DNA were measured at 260/280 nm absorbance. In 11 blood samples (37%), 260/280 nm absorbance was high (2.5 ± 0.62) and the other sample was in normal limits (1,8-2). DNA isolation was repeated by diluting with EDTA solution. Blood samples were diluted with 0.1M EDTA solutions in different ratios. Blood quantities were kept constant in all groups. The EDTA solution was not used in the control group. In other groups, the EDTA ratio was 1, 2, 3, 4 and 5 times. The absorbance values of the 5 times diluted EDTA solution group were between 1.8 and 2, while the absorbance values of the other groups were not within the appropriate range. As a result, the coagulation problem was solved by diluting the blood with 5 times EDTA solutions. We suggest to researchers, for solving coagulation problem, the blood samples must be diluted with 0.1M EDTA solution, until the problem is solved.

Keywords: Blood, DNA Purity, EDTA Solution, Rainbow Trout

Effect of Cholesterol-loaded Cyclodextrin on Cryosurvival and Fertility of Cryopreserved Carp (*Cyprinus carpio*) Sperm

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Abstract: Addition of cholesterol-loaded cyclodextrin (CLC) to the diluents of mammalian semen increased stability and rigidity of phospholipid hydrocarbon chains of plasma membrane during sperm cryopreservation process. CLC has been tested successfully as cryoprotectant in various livestock sperm cryopreservation protocols but its efficacy for cryopreserving of fish sperm has not previously been tested. In the present study, different cholesterol loaded cyclodextrin concentrations were evaluated for the cryopreservation of carp (Cyprinus carpio) sperm. Sexually mature fish were induced to spermiation and ovulation with Ovopel. The extenders were prepared by using 300 mM glucose and 10% DMSO supplemented with different concentrations of CLC (0.5, 1.0, 1.5, 2.0, 2.5, and 3.0mg per 120x106 spermatozoa) and without CLC (control). The pooled semen was diluted separately at a ratio of 1:3 (v/v) by using CLC extenders. Diluted semen placed into 0.25ml straws were equilibrated at 4°C for 15min and frozen in liquid nitrogen vapor. Fertilization was conducted using a ratio of 1x105 spermatozoa/egg. Supplementation of 1.5 mg CLC to the extender showed the best cryoprotective effect for sperm motility, duration of motility, and viability against freezing damage in comparison to extenders containing 2.5mg, 3.0mg CLC, and control group ($p<0.05$). Cryopreserved sperm containing 1.5 mg CLC provided greater result in term of fertilization success when compared to other extenders containing 0.5, 2.5, and 3.0mg CLC or control ($p<0.05$). It is concluded that treatment of cholesterol-loaded cyclodextrin for carp sperm cryopreservation significantly improves cell cryosurvival and fertilization.

Keywords: Cryopreservation, Cholesterol, Cyclodextrin, Carp, Sperm

Influence of Herbicide on Non-Target Organism in Agricultural Land

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Abstract: In this study; it is aimed to determine the toxic responses of the highly preferred glyphosate-containing herbicide on non-target organisms. As is known, many pesticides used to have reached a wide range of underground waters and wider water reserves in a variety of ways. The crayfish (Astacus leptodactylus) selected as non-target organism was exposed to Roundup® herbicide in commercial form with glyphosate active ingredient for 96 hours at the determined concentrations. Crayfish were provided by crayfish hunters in Keban Dam Lake Ağın Region. The glyphosate-containing herbicide is available as Roundup® from local pesticide sellers. Astacus leptodactylus was exposed to glyphosate at different concentrations. At the end of this period malondialdehyde (MDA), glutathione (GSH) and oxidized glutathione (GSSG) levels were investigated in hepatopancreas and abdominal meat in crayfish. MDA level was determined by Niehaus and Smuelson (1968), GSH level was determined by HPLC on Elman (1959) and Akerboom and Sies (1981). Changes in the levels of GSH, GSSG and MDA are more prominent in organisms exposed to glyphosate at increasing concentrations. The biochemical responses that occur as the concentration increases indicate that the organisms also started the process of death. Analyzed biomarker responses support the literature. Because the herbicide applied is thought to cause a change in the biochemical parameters of the non-target organisms, different biochemical assays are also recommended for more detailed monitoring of the risk assessment.

Keywords: Glyphosate, Non-Target Organisms, Herbicides

Acute Toxicity of Diazinon on the Common Carp (*Cyprinus carpio L.*) Embryos and Larvae

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Abstract: Diazinon, an organophosphorus pesticide contaminating aquatic ecosystems as a pollutant, was investigated in the present study for toxic effects on embryos and larvae of common carp (Cyprinus carpio) as a model. For this aim, one control and six test groups were used. The experiments were carried out with 5 replicates for each treatment. The water temperature in the experimental units was kept at 24±1 oC. Data obtained from the diazinon acute toxicity tests were evaluated using the Probit Analysis Statistical Method. The number of dead embryos significantly increased in response to diazinon concentrations 0.25, 0.5, 1, 2, 4 and 8 mg/L ($P<0.05$). The 48 h LC50 value (with 95% confidence limits) of diazinon for common carp embryos was estimated at 0.999 (0.698-1.427) mg/L. Dose-response decreases in hatching success were recorded as 84.6, 75.2, 54.1, 31, 6, and 0%, respectively ($P<0.05$). The number of dead larvae significantly increased with the increasing diazinon concentrations exposed for 24-96 h ($P<0.05$). The 24, 48, 72 and 96 h LC50 values (with 95% confidence limits) of diazinon for common carp larvae were estimated at 3.688 (2.464-8.495) mg/L, 2.903 (2.019-5.433) mg/L, 2.358 (1.672-4.005) mg/L and 1.530 (1.009-3.948) mg/L, respectively. There were significant differences in the LC50 values obtained at different exposure times ($P<0.05$). The results of the study suggest that low levels (0.25 mg/L) of diazinon in the aquatic environment may have a significantly adverse effect on the reproduction and development of carp.

Keywords: Acute toxicity; Common carp; Diazinon; Embryo; Larvae

The Effects of N-Butanol on Enzyme Activities and Lipid Peroxidation of Zebra Fish (*Danio rerio*)

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Abstract: It is thought that n-butanol, an alcohol type widely used in the world in recent years, could cause serious toxic effects on living things by its use in food and industrial areas. The purpose of this study is to determine the toxicity of n-butanol to human and other organisms by using a zebra fish larva as a model organism. In thşs research; measurements were made by the spectrophotometric method to determine the effects of antioxidant enzymes and lipid peroxidation levels in larvae at different concentrations (50, 250, 500, 750 and 1000 mg / L) of n-butanol starting from the 4th hour after fertilization. As a result, it was determined that n-butanol causes decrease in antioxidant enzyme activity and increase in lipid peroxidation level due to the dose of doze after chronic administration in zebra fish larvae.

Keywords: N-butanol, zebra fish, toxicology, enzyme

Seasonal Distribution of Psikrofilosis in Some Rainbow Trout Farms in Elazığ Province

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Abstract: In this study, it was aimed to determine the seasonal distribution of Psikrofilosis (Oncorhynchus mykiss) in four rainbow trout farms located in Keban District of Elazığ Province. For this purpose, fry and water samples were collected in between the dates of December 2008 and July 2009. After the isolation of Flavobacterium psychrophilum from the samples, the bacteria were incubated on Tryptone Yeast Extract Salt Agar (TYES-A) and Tryptone Yeast Extract Fetal Bovine Serum (TYFBS) agars at 15 oC for 5-7 days. Subsequently, the pathogen was identified with the characteristic pure yellow color of its colonies. In addition to the pathogenic content, the water values of four rainbow trout farms of Keban were also examined separately. This examination revealed that the organic matter levels in the farms were between 3,2 and 12,7 mg/L water whereas pH values varied from 6,4 to 8,9, oxygen levels from 6 to 13,8 mg/L and the temperature ranged between 7 and 14,5 °C. Through the bacteriological evaluation of the farms, a total number of 160 colonies was obtained, of which 4 pcs were obtained in July and 10 pcs in June, 24 pcs in May, 30 pcs in April, 22 pcs in March, 19 pcs in February, 20 pcs in January and 31 pcs in December. With the clear demonstration of the result, it has been realized that when the temperature in four rainbow trout farms increased, the number of bacteria in the water decreased accordingly.

Keywords: Oncorhynchus mykiss, Flavobacterium psychrophilum, Psikrofilosis

Effects of Octylphenol on Antioxidant and DNA Damage in Van Fish Primary Hepatocyte Culture

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Abstract: Introduction: Alkylphenols, one of the non-ionic surface-active agent groups, and their degradation side products, nonylphenol (NP) and octylphenol (OP), are important endocrine disrupting chemicals. The environmental concentrations of NPs and OPs with comprehensive use in many fields have been found to reach dangerous levels in recent studies. In this study, the dose- and time-dependent effects of OPs were investigated in the primary hepatocyte culture of Van Fish (Alburnus tarichi, Güldenstadt 1814). Materials and Methods: The erythrocytes were observed in culture after the process of isolation. At the end of the culture, OP (1x10-6, 1x10-5 and 1x10-4M) were added to the medium and solvent only was added to the control group. The effects of the chemicals used on superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GSH-Px), malondialdehyde (MDA) and DNA damage (8-hydroxy-2'-deoxyguanosine (8-OHdG)) were investigated in hepatocyte culture. Results and Discussion: The antioxidants SOD and CAT were observed to increase in all groups in the primary hepatocyte cultures with OP administration, whereas the GSH-Px level was observed to increase ($P<0.05$). The MDA level was observed to reach its highest value, and the 8-OHdG level was observed to increase towards the end of the follow-up time, compared to the control group ($P<0.05$).

Keywords: Antioxidants, Van fish, Oxidative stress, MDA, DNA damage

Acknowledgement: This study was supported by the project of Van Yuzuncu Yil University, Scientific Research Projects with 2014-FEN-B084 project.

An Alternative Strategy to Limit Chemical Deterioration of Fish Fillets Using Nanoencapsulated *Lactobacillus rhamnosus*

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Abstract: In this study, a probiotic lactic acid bacteria (Lactobacillus rhamnosus) nanoencapsulated with electrospun nanofibers fabricated from polyvinyl alcohol/sodium alginate mixture were used as a natural agent to limit chemical deterioration of rainbow trout fillets. The electrospun nanofibers were characterized in terms of morphological properties. The effectiveness of the fabricated nanofibers were revealed by measuring total volatile basic nitrogen (TVBN) and thiobarbituricacid (TBA) values during cold storage (at 4 ± 1°C). The scanning electron microscopy (SEM) images revealed cylindrical, smooth and homogenous structure of the nanofibers, confirming nanoencapsulation of Lactobacillus rhamnosus within the nanofibers based on increase in average diameter of the nanofibers. The chemical stability analyses showed that the probiotic bacteria nanoencapsulated in nanofibers were effective in limitation of chemical deterioration, exhibiting almost 30 % and 50 decrease in TVBN and TBA values, respectively as compared to control group fish fillets. These results revealed the effectiveness of nanoencapsulation process to increase functionality of Lactobacillus rhamnosus, suggesting that the use of nanoencapsulated probiotic bacteria in nanofibers might offer an alternative way to limit chemical deterioration of fish fillets during prolonged storage.

Keywords: Electrospinning, nanofiber, fish fillets, lactic acid bacteria, chemical deterioration

Problems and Recommendations in Lake Van Pearl Mullet Fisheries Management

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Abstract: This study was carried out with face to face interviews with 148 fishermen between 2016 and 2017 in order to determine the problems and recommendations in the Fisheries Management of Lake Van Pearl Mullet Stocks. According to the research result, the most important problems in fisheries managements are; illegal fishing in the breeding season, habitat degradation in rivers, lack of current stock estimates, insufficient control at landing points. To Minimize these identified problems, effective implementation of controls for illegal fishing, avoiding deterioration of river habitats and regular measurements at landing points will be beneficial for fisheries management.

Keywords: Pear mullet, Fisheries Mangement, Lake Van, İllegal fishing

Pearl Mullet Fishing in Lake Van

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Abstract: This study has been conducted with 65 survey studies for the determination of, the characteristics of fishing gear and fishing boats and amount of fishing pearl mullet in Lake Van between April 2016 and December 2017. According to the results, it has been identified that only trammel nets is used by fisherman on pearl mullet catching in the region. Technical plans of trammel nets were defined by the FAO standards and it has been found that a fishing boat uses an average of 6000 m of trammel net in the Lake Van. It was identified that the fishing boats using in pearl mullet catching had average engine power of 85.36 ± 34.71 HP and average of boats length was 13 ± 1.57 m. Furthermore, 8000 kg pearl mullet is catching in an annual average for Lake Van. Finally, it is tried to determine the Lake Van fishing capacity with the help of obtained results.

Keywords: Lake Van, Pearl Mullet, Trammel Nets, Fisheries

Mortalities and Exploitation Rate of European Anchovy (*Engraulis encrasicolus* L.) in the Central Black Sea

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Abstract: This study provides some actual information about length, weight, age and mortality rates of anchovy population in the central Black Sea in order to detect whether fishing pressure or not. A total of 847 anchovy specimens were monthly collected from commercial purse-seiners, which especially landed to Sinop fishing port between September 2016 and April 2017. A total of 124 otoliths were used for age reading. Total length and weight of anchovy specimens were ranged from 6.7 cm to 15.2 cm (average: 11.7 ±0.03 cm) and 1.6 g to 28.7 g (average: 9.3 ±0.07 g). The samples were grouped densely between 10 and 12 cm and almost of all samples in this study are within the legal size. Length-weight relationship was calculated as $W = 0.016 \times TL2.5749$ ($r = 0.91$). Age groups of anchovy were ranged from 0 to III. Mean lengths according to age groups were 8.1 ±0.09, 10.7 ±0.13, 12.5 ±0.04 and 13.5 ±0.08, respectively. Also, von Bertalanffy Growth Parameters were $L\infty = 15.35$ cm, $K = 0.46$ year-1, $t0 = -1.59$. Mortalities (M, F and Z) and exploitation rate (E) of anchovy from the Black Sea were 0.696 year-1, 0.95 year-1, 1.646 year-1 and 0.58 year-1, respectively. The estimate of fishing mortality is higher than natural mortality, and according to exploitation rate, anchovy fishery tends to go overfishing. The authors suggested that fishing effort of the fleets have to determine and quota system on anchovy must considered for sustainable anchovy fishery.

Keywords: Anchovy, Engraulis encrasicolus, exploitation, Black Sea

Gas Bubble Disease Seen in Rainbow Trout (*Oncorhynchus mykiss*) Broodstocks And Larvae in a Rainbow Trout (*Oncorhynchus mykiss*) Hatchery

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Abstract: In this study, the cause of the death in broodstocks and larvae were investigated in a rainbow trout hatchery (Van). Necropsy was done in broodstocks and larvae. The causative agents and symptoms were evaluated. It has been determined that the disease is not an infectious disease but a non-contagious, environmental gas bubble disease (broodstock morbidity 25%, mortality rate 10%, larval morbidity 5%, mortality rate 100%). Total O2 saturation in the pool is very high (inlets, 165±2,51%, outlets, 147±4,16). The CO2 concentration in the pool was measured as 13.1±0.24 mg/l at the inlets and 14.15±0.21 mg/l at the outlets in the pools. At skin and gill, eye edges, fins of broodstock were seen embolus. Around the yolk sac of the larvae were determined the gas bubbles. It was also observed that larvae could not consume the yolk sac and larval posture was abnormal (reverse) opposite faces at water surface. As a result, the cause of the disease is high gas saturation in the water. Although the amount of CO2 in the pool inlets is not high enough to cause the Bohr effect, it increases the total gas saturation. NH3 and NO3 values were high and NH3 was found to be at the threshold level, but not toxic. Because water temperature and pH are low and water is hard. For the solution, it was recomended to use the saturation column at the water inlets, aeration of the water and use of different water source for broodstock and larvae.

Keywords: Broodstock, Gas Bubble Disease, Larva, Rainbow Trout

Distribution of Aeromonas Species in the Aegean Sea (Güllük Bay)-Turkey

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Abstract: In this study, the distribution of Aeromonas species was investigated in the Güllük Bay (Aegean Sea, Turkey) in the period between May 2011 and February 2013. The seawater samples were collected from the surface (0-30 cm), middle point (25-33 m) and depth (max 66 m), from 12 stations. The isolated bacterial strains were identified using automated micro identification system VITEK2 Compact30). Aeromonas species belong to Aeromonadaceae family and they were determined as the second largest bacterial family after Enterobacteriaceae in the Güllük Bay. Four different species were identified as Aeromonas hydrophila, Aeromonas salmonicida, Aeromonas sobria and Aeromonas veronii in the area. A. hydrophila A. caviae and A. sobria were also reported from the ships' ballast water, coming from different regions of the world to the Sea of Marmara. These species were reported as opportunistic pathogens to humans and animals. A. salmonicida is considered as the primary pathogen in Salmonid and other fish species which cause bacterial septicemia called furunculosis. A. hydrophila, A. sobria and A. veronii are associated with gastroenteritis, food poisoning, wound infections, septicemia, and meningitis which cause diarrhea and other infections. On the other hand, it has been reported that some Aeromonas species have biotechnological potential on bioremediation and detoxification of wastewater, biosensoring, decolorization of dyes, α-amylase (AmyASS), lipase, protease, chitinase and polyhydroxyalkanoates production. Therefore, it is highly recommended to study Aeromonas species intensively for public health and possible uses for biotechnological applications.

Keywords: Aeromonas, Aeromonadaceae, Aegean Sea, Güllük Bay, Turkey

Acknowledgement: This study supported by TUBITAK (The Scientific and Technical Research Council of Turkey-Project number:110Y243)

Acute Toxicity of Synthetic Pyrethroid Cypermethrin on the Common Carp (*Cyprinus carpio* L.) Embryos and Larvae

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Abstract: In this study, the toxic effects on the embryos and larvae of the common carp were used as a model to investigate the synthetic pyrethroid pesticide, cypermethrin, which contaminates aquatic ecosystems. Data obtained from the cypermethrin acute toxicity tests were evaluated using the Probit Analysis Statistical Method. The control and eight test experiments were repeated five times. The number of dead embryos significantly increased in response to cypermethrin concentrations 0.0001, 0.001, 0.01, 0.1, 1, 2, 4 and 8 µg/L ($P<0.05$ for each case). The 48-h LC50 value (with 95% confidence limits) of cypermethrin for common carp embryos was estimated at 0.909 (0.256-5.074) µg/L. Dose-response decreases in hatching success were recorded as 87.4, 85, 80.2, 71.4, 56.3, 48.6, 38.8 and 23.5%, respectively. The lowest concentration of cypermethrin (0.0001 µg/L) produced a significant increase in the number of dead larvae compared to the control group ($P<0.05$). The number of dead larvae significantly increased with the increasing cypermethrin concentrations exposed for 1-96 h ($P<0.05$). The highest concentration (8 µg/L) showed the highest larvae mortality. The 96-h LC50 value (with 95% confidence limits) of cypermethrin for common carp larvae was estimated at 0.809 (0.530-1.308) µg/L. The results of the study suggest that low levels of cypermethrin in the aquatic environment may have a significant effect on the reproduction and development of carp.

Keywords: Acute toxicity, Common carp, Cypermethrin, Embryo, Larvae

The Investigation of *Neoechinorhynchus rutili* (Müller, 1780) (Acanthocephala) in Some Cyprinids from Murat River (Genç-Bingöl)

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Abstract: Aim: One of the parasitic species that in fect this fish is Neoechinorhynchus rutili (Acanthocephala). N. rutili also causes fish deaths, as well as harmful effects such as growth retardation and reproductiv eproblems on fish. In this study, it was aimed to determine the distribution, mean density, mean abundance and prevalence of parasite numbers of N. rutili seen in cyprinids hunted from the Murat river. Materials and Methods: In this study, 310 cyprinids hunted from the Murat River were brought to the laboratory live. These fish were killed by anesthesia. Then it was examined parasitologically. Results 11 different cyprinid fish species were caught in the Murat River. N.rutili were encountered in 109 infested fish (35.16%). Ingeneral, prevalence of N. rutili was higher in L. cephalus, C. trutta, C. umbla and A. Marmid (69.56%, 43.95%, 43.66% and18.64% respectively) while mean intensity was higher in C. trutta, C. regium and C. umbla (8.05, 7.75 and 7.42 parasite/fish, respectively) while C. carpio, Mastacembelus sp., Glyptothorax sp. and A. mossulensis were not recorded N.rutili. Conclusion: In this study, N. rutili was widely detected in the intestines of some cyprinids. This parasite is a threat to freshwater fish and must be seriously investigated.

Keywords: Cyprinid, Murat river, Neoechinorhynchus rutili

Acute toxicity of Organophosphorous Pesticide Diazinon and Its Effects on Behavior and Some Hematological Parameters of Fingerling European Catfish (*Silurus glanis* L.)

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Abstract: Diazinon is commonly used for pest control in the agricultural fields surrounding freshwater reservoirs. So this study was conducted to determine the acute toxicity of this organophosphorous pesticide, contaminating aquatic ecosystems as a pollutant, and its effects on behavior, and some hematological parameters of figerling European catfish, Silurus glanis. Diazinon was applied at concentrations of 1, 2, 4, 8, 16, 32 and 64 mgL-1. The water temperature in the experimental units was kept at 16±1 °C. The number of dead fishes significantly increased in response to diazinon concentrations 2–64 mgL-1 ($p<0.05$). With increasing diazinon concentrations, the fishes exposed duration 1-96 h significantly increased the number of dead fishes ($p<0.05$ for each cases). The 1, 24, 48, 72 and 96 h LC50 values (with 95% confidence limits) of diazinon for fingerling European catfish were estimated as 14.597 (12.985-16.340), 12.487 (11.079-14.471), 8.932 (7.907-10.348), 6.326 (no data because of $p>0.05$) and 4.142 (no data because of $p>0.05$) mgL-1, respectively. Compared to the control specimens, fish after an acute exposure to diazinon was significantly lower erythrocyte, leukocyte, hemoglobin, hematocrit, MCV, MCH, and MCHC values ($p<0.05$). In addition, it was also showed a significantly negative correlation between these hematological parameters and exposure times of diazinon ($p<0.01$).

Keywords: Silurus glanis, Diazinon, Acute toxicity, Behavior, Hematology

Endemic Fish Species of Van Lake Basin

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Abstract: The Van Lake Basin is a closed basin that has many water sources. This differentiation in the water resources shows on endemic fish species. All species of fish showing natural distribution in basin consist of endemic fish species. Alburnus tarichi, Alburnus timarensis, Barbus ercisianus, Capoeta kosswigi, and Oxynoemacheilus ercisianus are endemic fish species in this basin. It is important to know the ecological characteristics of these endemic fish species in order to ensure their continuity in water resources. Present study, it is aimed to give some information about the ecological and biological properties of endemic fish species that shown naturally spreading in the basin.

Keywords: Van Lake Basin, endemic fishes, fish systematic, water resources

The Ecological Risks of the Eastern Mosquito Fish (*Gambusia holbrooki* Girard, 1859) Added to the Reeds of Van

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Abstract: The eastern mosquito fish (Gambusia holbrooki Girard, 1859), is an invasive fish species and has a widespread because of biological struggle against mosquitoes in many water sources. However, it has negative impacts on competition with native fishes. Gambusia holbrooki predator on native fish larvae, eggs and their own larvae (cannibalism). This invasive fish species has a negative impact on the endemic tarek (Alburnus tarichi, Guldenstaedt 1814) and other fish species in the region. It is crucial for this invasive extent from Van Reeds to other water sources in the basin to ensure the continuity of native fish species found in these water sources. It is forbidden by the relevant institutions to transport and adding to other water resources of this species that spread in many water sources in our country. Here, it is aimed to evaluate ecological and biological properties and the negative effects on other species of Gambusia holbrooki spread in Turkey and the World.

Keywords: Biological struggle, eastern mosquitofish, Gambusia holbrooki, invasive fish species, Van Reeds

Effects of Bisphenol A on Primary Gill Cell Culture of Van Fish

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Abstract: Lake Van is largest lake in Turkey. The lake, limits life due to its high pH and brackish water. For this reason, only a single species of fish is living in the lake which has adaptation to these conditions. In the present study, we investigated the total oxidant status, total antioxidant status, malondialdehyde level and DNA damage effect of Bisphenol A (10-7, 10-6, and 10-5 M) on primary gill cell culture of Van Fish for 24h and 48h of incubation periods. Total antioxidant status level were not changed when compared to control group but total oxidant status levels were decreased both in 24 and 48h. The lipid peroxidation increased only at the highest dose at the end of 12 and 24 hours ($P<0.05$). DNA damage increased only at the 10-5 M dose after 48 hours. At the end of the experiment, BPA exposure caused lipid peroxidation and genotoxic effect. These results indicate that high levels of BPA exposure induced oxidative stress and DNA damage by time and dose dependent fashion in gill cell culture of Van Fish.

Keywords: Bisphenol A, cell culture, Oxidative stress, Van fish

Alterations in 8-Hydroxy-2-deoxyguanosine and Histopathology in Rainbow trout (*Oncorhynchus mykiss*) Exposed to Different Concentrations of Diazinon

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Abstract: This study was done to investigate alterations in 8-hydroxy-2-deoxyguanosine and histopathology in rainbow trout (Oncorhynchus mykiss) exposed to different concentrations of diazinon. 15 rainbow trout (for each group) were subjected to 0.15mg/L and 0.30 mg/L concentrations of Diazinon. The liver tissues of fish were compared histopathologically with the control group. While 0.15 mg/l dose of diazinon led to steatosis in hepatocytes, degeneration in hepatocytes, necrosis in hepatocytes and hyperemia, 0.30 mg/l dose of diazinon was detected severe fatty vacuoles and hydropic degeneration in the liver hepatocytes, coagulation necrosis in hepatocytes and hyperemia in vessels. The liver tissues of fish subjected to different concentrations of diazinon are evaluated immunohistochemically. While 8 OHdG expression of diazinon (0.15 mg/L) was moderate level in hepatocytes, 8 OHdG expression of diazinon (0.30 mg/L) was found to be severe level in hepatocytes. Consequently, diazinon caused significant changes in the histopathology and 8 OHdG levels of rainbow trout.

Keywords: Rainbow trout, diazinon, histopathology, 8-OHdG

Alterations in Metabolic Levels and Oxidative Stress Parameters of the Rainbow trout (*Oncorhynchus mykiss*) Exposed to Different Concentrations of Diazinon

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Abstract: This study was done to investigate alterations in metabolites levels and antioxidant enzymes of the rainbow trout (Oncorhynchus mykiss) exposed to different concentrations of diazinon. 15 rainbow trout (for each group) were subjected to 0.15mg/L and 0.30 mg/L concentrations of Diazinon. In this study, plasma aspartate aminotransferase (AST), alanine aminotransferase (ALT), lactate dehydrogenase (LDH), alkaline phosphatase (ALP), total protein, albumin and acetylcholinesterase (AChE) activity, total antioxidant capacity (TA), superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and glutathione reductase (GR) levels in liver tissues was analysed. Our results showed that 0.15 and 0.30 mg/L concentrations significantly increased in SOD, CAT, GPx and GR levels ($p<0.05$). However, total antioxidant capacity, AChE activity, total protein and albumin levels were significantly decreased at both concentrations ($p<0.05$). While the level of LDH was significantly reduced in fish exposed to 0.15 mg/L diazinon concentration, 0.30 mg/L of diazinon caused a significant increase in the AST and ALT levels ($p<0.05$). As a results, diazinon caused changes in the antioxidant enzymes as well as plasma AChE activity and metabolites of rainbow trout.

Keywords: Rainbow trout, diazinon, antioxidant enzymes, AChE activity, plasma metabolites

Examination of Some Growth Characteristics and Meat Yield of the Scaly Carp (*Cyprinus carpio* Linnaeus, 1758) Inhabiting Gölova Dam Lake

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Abstract: In this study, some growth characteristics and meat yeald of 82 scaly carp (Cyprinus carpio, Linnaeus, 1758) caught in Gölova Dam Lake between July 2017 and February 2018 were investigated by gender and age groups. 32,93 % of the samples were female and 67,07 % were male individuals. Female and male individuals were determined between the ages of II-V. Mean total height and weight in females were 40,99±5,56 cm and 1001,27±431,14 g; 37,27±3,07 cm and 734,34±227,58 g in males and 38,49±4,39 cm and 822,23±331,85 g were found in all individuals. For all the samples, age-length relation y=3,4002x+27,422 (R^2=0,426), age-weight relation y=262,16x-31,374 (R^2=0,444), height-weight relation W=0,0151TL2,9743 (R^2=0,8796) and the average condition factor was determined as 1,385±0,166. When the relationship between meat productivity and various body parts of C. carpio is examined, the average meat yields of fillet and carcass weights were 47,59±3,70 % and 59,19±4,26 % in the females and 49,80 ±2,39 % and 60,67 % ±2,54 % in males and 49,07±3,05 % and 60,18±3,26 % were found in all the individuals. The average ratios of internal organ, head, fin, skin and bone weights of body weight from unutilized body parts to body weight were 12,98±3,50 %, 22,32±2,09 %, 4,51±0,71 % , 8,49±2,26 % and 2,63±0,37 % respectively.

Keywords: Cyprinus carpio, Growth characteristics, Meat yield, Gölova Dam Lake

Production of *Spirulina platensis* with Çankırı Geothermal Water

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Abstract: Geothermal energy is a renewable energy source is located and Turkey has rich geothermal resources. The use of geothermal resources and natural mineral waters has been determined by Law no. 5686 dated 03.06.2007. The aim of the Law No. 5686 is to regulate the principles and principles that include the search for, exploration, development, production and protection of geothermal and natural mineral water resources efficiently. Above the average temperature in the region, water, vapors and gases that are released or extracted naturally, containing more dissolved matter and gas than surrounding water, are defined as geothermal resources. In this research, carried out with geothermal water through the production of Spirulina to increase the widespread and effective use of geothermal waters in Turkey is aiming to gain a new perspective. Spirulina platensis is a microalgae that allows the sustainable use of land that is unfit for soil cultivation. Turkey in order to provide an innovative contribution to agricultural policy has been investigated culturebility with Çankırı geothermal water of Spirulina platensis. In this research, Çankırı geothermal water was used to replace of Schlösser Spirulina nutrient medium, which is widely used commercially. Experiments were carried out with three repetitions with a lighting of 1000 lux at 30°C. It has been determined that Spirulina platensis can be produced by the addition of Çankırı geothermal water.

Keywords: Spirulina platensis, Çankırı geothermal water

Acknowledgement: Thanks to Mr. Ömer Faruk Erdem for his contribution to the reach of Çankırı geothermal water to Algae Production Unit of Yalova University.

Swimming Performance of Tarek (*Alburnus tarichi*, Güldenstädt, 1814) in Different Aquatic Environments and Different Water Temperatures

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Abstract: In this study, the swimming performance of Tarek (Alburnus tarichi), which is the unique fish species that can survive naturally in Lake Van and performs compulsory reproduction migration to freshwater, has been investigated taking into consideration the effects of various factors. The swimming performances of Tarek individuals were investigated in the swimming performance test contrivance, which has composed with the same characteristics as Lake Van and the freshwater environments. It was possible to determine critical swimming speeds (Ucrit) at different water temperatures (5-10-15-20 °C) and in environments with different chemical structures. It has been found that the critical swimming speeds of fish swimming in freshwater environment is higher than that swimming in Van Lake water environment for every temperature value. Statistically the relative critical swimming speed (rUcrit) value of males were found to be higher than females (5.16 Total length.s-1 – 4.66 Total length.s-1; $P<0.05$) although Ucrit values were not different (107.17 cm.s-1 – 103.68 cm.s-1; $P>0.05$). The mean Ucrit and rUcrit values were calculated for the water temperatures of 5-10-15 20 °C respectively as 71.29 cm.s-1 – 3.29 TL.s-1, 92.65 cm.s-1 – 4.23 TL.s-1, 113.046 cm.s-1 – 5.35 TL.s-1 and 119.138 cm.s-1 – 5.56 TL.s-1 (mean: 99.03 cm.s-1 – 4.61 TL.s-1) in Van Lake water environment and 86.58 cm.s-1 – 4.072 TL.s-1, 105.8 cm.s-1 – 4.88 TL.s-1, 121.86 cm.s-1 – 5.6 TL.s-1 and 131.88 cm.s-1 – 6.15 TL.s-1 (mean: 111.53 cm.s-1 – 5.17 TL.s-1) in freshwater environment.

Keywords: Alburnus tarichi, swimming performance, Lake Van, spawning migration, water quality

Acknowledgement: This study supported by TUBITAK (project number 214O589).

The Role and Importance of Fisheries Cooperatives in the Fisheries Trade: Example of Istanbul and Turkey

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Abstract: It is inevitable to have a high number of fisheries cooperatives in Istanbul, one of the main centers for fisheries. Depending on the 2017 data, with 48 cooperatives and a cooperative society fishermen around 4.000, Istanbul is in the first place in Turkey. The main material of the study is the data collected from the managers of 48 fisheries cooperatives of Istanbul with the survey studies according to the exact count method. The aim of this study is the determination of the contribution of cooperatives to the fisheries sector and trade and economy of Istanbul. Depending on the results obtained, it was determined that 48 fisheries cooperatives are present in 21 counties of Istanbul, a city with shores on the Sea of Marmara, Black Sea and Bosporus strait. There are 3.716 fishermen as the cooperative society and 2.643 fishing vessels are present in these cooperatives. 57.8% of these fishermen are active and 42.2% of them are doing fisheries as a side job. When the distribution of cooperatives by counties is analyzed, it was determined that Sarıyer county takes the first place with 7 cooperatives and a population of 781 fishermen. Of the 48 cooperatives, 87,5% of them have office and social facilities, 33,3% have fish selling stands and 65,3% of them have boat yards. In conclusion, Istanbul fisheries cooperatives make a great trade contribution to the fisheries sector.

Keywords: Fisheries, Istanbul, Cooperation, Trade, Fisheries Cooperatives

Analysis of the Water Quality of Dereköy Pond (Havza-Samsun)

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Abstract: The objectives of this study, which was carried out in Dereköy Pond located in Havza district of Samsun city, were to observe the monthly and annual changes in water samples through physicochemical methods, to determine the water quality properties, to reveal the pollution problems, to determine the suitability level in terms of aquatic life, and to classify the quality of water in accordance with the SWQMR criteria. The study was started in February 2017, and water samples were taken from 4 stations for 12 months. Among the water quality parameters; temperature, pH, dissolved oxygen, salinity and electrical conductivity parameters were measured in-place via land-type measurement. Among other parameters determining water quality; total alkalinity, total hardness, ammonium nitrogen (NH4), nitrite, nitrate, suspended solid matter (SSM), calcium and magnesium, analyses of water samples were conducted in laboratory and the samples were analyzed in the same day. As a result of performed analyses. it was found that, the water quality is suitable for aquatic animals and aquatic life in Dereköy Pond. it is very important to maintain the water quality and sustain the ecological balance for irrigating the near agricultural lands. Considering this importance, the unconscious use of agricultural pesticides in near orchards should be prevented. The leakage of domestic and animal wastes into the ponds through precipitation and/or snow waters should be eliminated, and the required measurements should be taken regularly in order to protect and improve the actual water quality level (Class I SWQMR) of Dereköy Pond.

Keywords: Water quality, Water pollution, Samsun, Dereköy Pond

Diversity of Ichthyoplankton in Saros Bay

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Abstract: This study was conducted at 28 pre-designated stations in Saros Bay between June2013-May2014. 57 mouth cm. diameter, 500µ eye interval WP-2 Type Plankton net was used during sampling horizontally and vertically on monthly basis. Total of 61572 eggs and 6862 larvae were sampled during the period of investigation. Species diversity was determined to be high in the outer parts and low in the inner parts. Diversity analysis of ichthyoplankton communities was carried out with the Shannon index (H '). In the study, 15 Order, 89 different species of bony fish belonging to 43 Family were identified. The season with the highest degree of diversity is summer and the lowest season is winter. The predominant species in terms of ichthyoplankton is Sardina pilchardus. The families with the most species are Sparidae (8 species), Labridae (6 species), Scombridae (5 species).

Keywords: Ichthyoplankton, Diversity, Teleost Fishes, Aegean Sea, Saros Bay

Acknowledgement: This work was supported by "The Scıentıfıc And Technologıcal Research Council Of Turkey" (TÜBİTAK) and represents a part of the scientific project "Research for Distrubution and Abundance of Ichthyoplankton in Saros Bay" (Project Number: 112Y289).

Evaluation of Multipurpose Water Uses for Aygır Lake, Bitlis, Turkey

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Abstract: This study was carried out to determine and evaluate the usages of Aygir Lake. In this context, the Aygir Lake was evaluated in the light of the literature on the subject, the provisions contained in some national and international legislation and the observations obtained from our studies. The Aygir lake is used for irrigation, tourism, recreation, aquaculture and fisheries. Aygir Lake is a maar lake located in the Van Lake basin. Alburnus tarichi, Capoeta kosswigi, Cyprinus carpio, Oncorhynchus mykiss and a species of mussel in the lake play important biological and economic roles. Aygir Lake Village, located on the shore of Aygir Lake, is a source of domestic pollution. There is no industrial pollution around it because of not industry. In order to obtain irrigation water from the lake, during an excavation was carried out by the government at a depth of 27-28 meters, water pipes from the Urartian Kingdom were found. Recreationally Aygir Lake Trout Plant attracts visitors throughout the year. As a result, an integrated management system should be improve for the development of the locals without damage to ecology. A priority order for using should be determined in the water resources like Aygir Lake, that contain multiple uses. The right to use and benefit from water resources should be established considering water amount, water quality, region characteristics, essential needs and conditions.

Keywords: Water Resources, Water Uses, Aygır Lake, Van Lake Basin, Bitlis

Population Dynamics Parameters of Sea Cucumber *Holothuria tubolosa* in East of Marmara Sea

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Abstract: In the recent years, sea cucumbers had an important role in Turkey's export. Commercial species of sea cucumbers were collected from the Aegean Sea and from the west of the Sea of Marmara. In this study, sea cucumbers' population in Karamürsel Coast which is located in the east of the Sea of Marmara was investigated. Holothuria tubolosa species was found in the research area. The study was carried out on a monthly basis from July 2017 until October 2017. Sea cucumber samples were collected by multiple dives each month from the depths of 5, 10 and 15 meters. Gonads were found in animals observed in July and August. The length and weight of the sea cucumbers were measured both with and without internal organs. The maximum length measured was 26.30 cm in August. The minimum length measured was 6.80 cm in October. As for the weight; the maximum weight measured was 93.18 g in July and the minimum weight measured was 7.15 g in October.

Keywords: Sea cucumber, lenght, weight, East of Marmara sea

Comparison of the Histological Changes in the Digestive Tract of Lake Van Fish (*Alburnus tarichi* Güldenstädt, 1814) During Reproductive Migration

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Abstract: Van fish is an endemic cyprinid fish in Lake Van. In the present study, the histological structure of the digestive tract of Van Fish in the lake and the freshwater environment was investigated. It was observed that the digestive tract was composed of a short oesophagus, a stomach-like structure, anterior intestine and posterior intestine, respectively. Digestive tracts were observed that it consisted of mucosa, submucosa, muscularis and serous layers. Muscularis mucosa layer was not observed in this species. It was determined that the mucosa layer consisted of simple columnar epithelial cells, connective tissue and blood vessels of the submucosa layer, muscularis layer along the digestive tract, both transverse and longitudinal smooth muscle cells, and the serous layer were composed of thin connective tissue. Goblet cell sizes, number, and distribution in the mucosa layer were changed according to the parts of the digestive tract. It was observed that the Na+,K+,ATPase containing cells were densely in the posterior intestine and rectum of the samples taken from the lake adapted fish. It was determined that the digestive tract of Van Fish showed similarity to the family of Cyprinidae.

Keywords: Alburnus tarichi, digestive tract, histology, Na+, K+, ATPase

Investigation of Heavy Metal Inhibitions of Some Antioxidant Enzyme Activities in Rainbow Trout Farms Belong to Bayburt Province

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Abstract: The fish health depends on water quality, nutrition, mineral and vitamin's amount. Heavy metals that are often be found in aquatic environments can increase by the influence of natural or external factors. As a result, fish are heavily influenced by heavy metals. In this study, heavy metal levels in the water, levels of GR, CAT, GST, GPX and SOD enzyme activities in tissues and total mineral contents of farms were determined. Six fish samples were taken from fish farms. Water samples were taken from the pools. In the water samples, sulfide, nitrate, phosphate ions and free chlorine amounts were determined as well as metals such as Zn, Fe, Cu, Mn, Co, Ni, As and Hg. In heart tissues; GR, CAT, GST and GPX activities were highest in the first farm and SOD level was the highest in the third farm. In liver tissues; GR, CAT and GPX enzyme activities were found to be highest in the 4th farm. SOD activity in 1th farm and GST activity in 2th farm was determined highest level. In the gill tissues; SOD and GPX in 1st, GR in 5th, CAT in 4th and GST in 3rd farm were measured highest level. General mineral levels of 3(0,522), 4(0,441) and 5(0,569) farms were found more higher than 1(0,181) and 2(0,242) farms. Enzyme activities were found to be higher in the 1st farm with lower general mineral level. In the other farms with high general mineral level were found to be low Enzyme activities.

Keywords: Rainbow trout, Fish diseases, Enzyme activity, Heavy metal, Mineral

Acknowledgement: This work was supported by Bayburt University /BAP. Project number: 2017/01-69001-15.

Biochemical and Histopathological Investigation of Changes in *Capoeta trutta* (Heckel, 1843) Infected with *Neoechinorhynchus rutili* (Acanthocephala)

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Abstract: Aim: Capoeta trutta is the dominant a fish species of the Murat River where one of the most important water source of Bingöl. One of the parasitic species that infect this fish is Neoechinorhynchus rutili (Acanthocephala). N. rutili also causes fish deaths, as well as harmful effects such as growth retardation and reproductive problems on fish. Materials and Methods: Capoeta trutta hunted from the Murat River were brought to the laboratory live. In order to examine the changes resulting from N. rutili, the intestines were removed under trichain methane sulphonate anesthesia. After the intestines have been cleaned from the dirt, they are divided into three groups. Group I (Control): healthy group with no parasites, Group II (Low parasite): fish with less than 30 parasites, Group III (High parasite): fish with more than 30 parasites. Then, biochemical and histopathological analyzes were performed on the intestines. Results: The intestine tissue malondialdehyde level was increased in the Group II compared to Group I and Group III ($p<0.05$). Superoxide dismutase, catalase and glutathione peroxidase activities decreased in the Group II compared to the Group I and Group III ($p<0.05$). Glutathione levels decreased in the Group I compared to the Group II and Group III ($p<0.05$). Histopathological examination revealed an inflammatory reaction in the intestines of infected fish. Conclusion: N. rutili was widely detected in the intestines of C. trutta. Furthermore, it was determined that biochemical and histopathological changes in C. trutta caused by the density of N. rutili.

Keywords: Biochemical and histopathological changes, Capoeta trutta, Neoechinorhynchus rutili, Oxidative stress

Effects of 4-Chlorophenoxy Acetic Acid on Oxidative Stress and Antioxidant Enzymes of Primer Hepatocyte Culture in Van Fish (*Alburnus tarichi* Güldenstadt 1814)

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Abstract: The rapid growth of the world's population causes the destruction of efficient arable land. Increasing population's food requirement can be met by getting more crops from unit area of crop production. Synthetic plant regulators are used extensively and uncontrollably in order to increase agricultural production. The 4-chlorophenoxyacetic acid (4-CPA) used for this purpose is contaminating soil and water with leaving residues on the products. Therefore, it can not be ruled out that there may be adverse effects on non-target organisms and especially on human health. In this study, effects of oxidative stress and antioxidant enzymes were investigated in primary hepatocyte culture of Van beet (Alburnus tarichi, Güldenstadt 1814) exposed to 4-CPA.Statistically significant reductions in superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GSH-Px), glutathione-S-transferase (GST) enzyme activities and reduced glutathione (GSH) levels were observed in comparison with the obtained findings control group. There was also a significant increase in the level of MDA, a product of lipid peroxidation.

Keywords: Alburnus tarichi, 4-CPA, Oxidative stress, Antioxidant enzyme, Van fish

The Investigation of Some Heavy Metal Accumulation in Water, Sediment and Different Species of Fish in Razzaza Lake, Irak

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Abstract: In this study, water, sediment and different species of fish tissues in the Razzaza lake were investigated for heavy metal deposits. Material and Methods: 10 water samples taken from Razzaza lake were filtered and acidified with 5 ml concentrated nitric acid. Sediment samples taken from different regions of Razzaza lake pond and samples of liver, muscle and gill of 15 carp (Cyprinus carpio), shabut (Barbus grypus) and grass carp (Ctenopharyngodon idella) species living in Razzaza lake were dissolved in the microwave. Analyzes of heavy metals (Al, Cd, Pb, Zn, Cu, As, Ni, Hg) were done by ICP-MS. The heavy metal levels to be detected in the Razzaza surface water were below the acceptable levels of heavy metals in the aquatic environment. According to Sedimanter quality guidelines the Razzaza lake sediment has the lowest effective concentration for As, Cu, Pb, Hg and Zn, high concentration for Cd and Ni. In all tissues Pb and only in the gills Ni of grass carp fish taken from the Razzaza lake was determined above the acceptable values in fish tissues. However, heavy metal levels detected in carp and shabut fish were below acceptable values. In the Razzaza lake, heavy metal accumulation order has been identified as sediment> fish (liver> gill> muscle tissue)> lake water. Heavy metal accumulation did not appear to be serious in Razzaza lake. However, the restriction of the consumption of grass and the continuous analysis of heavy metal in this fish species are necessary for human health.

Keywords: Razzaza Lake, Water, Sediment, Fish, Heavy metal

The Effect of the Geothermal Water on Protein Content of Spirulina in Greenhouse Condition

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Abstract: Spirulina contains many beneficial substances (phycocyanin) with high biological activity in their cells (60% protein) and contains a high added-value additive. Spirulina production is a profitable and innovative area for the Turkey economy. To reduce Spirulina's production cost; geothermal water resources can be used as nutrients. In this study, Spirulina platensis was grown in various nutrient media prepared by geothermal water addition and with Armutlu geothermal water of 25% to 75% replace of Schlösser medium in volume of 500 liters in a policarbonate greenhouse at summer period. The highest protein content was determined to be 59%. The nutrient medium containing geothermal water was found to provide suitable conditions for spirulina production. Spirulina, which grows in geothermal water, can provide cheap protein support to farms. A nutrient medium based on geothermal water is potentially capable of increasing the accumulation of bioactive components by reducing the cost of mineral salts. Another potential advantage of using geothermal water in Spirulina growing is that it allows the temperature of the culture environment to remain constant throughout the year.

Keywords: Spirulina, geothermal water, protein

Acknowledgement: This study was funded by the Republic of Turkey Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Research and Policies with the Project Number 16/R&D/22.

FIELD CROPS



I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

Medicinal and Aromatic Plants of Derecik Town (ŞEMDİNLİ / HAKKARİ) – Turkey

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Abstract: This study was carried out between the years of 2013 and 2017 in and surroundings of Derecik Town (Şemdinli / Hakkari). By this research, the plants, which were used by the local people of Derecik Town for medicinal and aromatic purposes, have been determined and their usage have been exhibited. As a result of this research, 157 taxa with medicinal and aromatic purposes were determined in the boundaries of Derecik Town and surroundings. Six of those taxa were idaentified as endemic. With this study, ethnobotanical uses of considered taxa have been recorded and presented.

Keywords: Aromatic and Medicinal Plants, Derecik, Ethnobotanic, Hakkari, Şemdinli

Performance of Alfalfa under Different Intercropping Treatments

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Abstract: This study was aimed to investigate the yield and quality pattern of alfalfa stand under different intercropping treatments. Alfalfa was intercropped with sorghum-sudangrass hybrid, soybean, cowpea, and buckwheat at seed ratio of 100%:100%, 100%:80%: 100%:60% and, 100% alfalfa was used as control. The experiment was arranged in randomized block design with three replications and conducted at the research field of Bozok University located in inner Anatolia, Yozgat-Turkey. Alfalfa and companion crops were sown as binary mixtures with 70 cm row distance in the spring of 2015. All the data was collected in the establishment year and the first production year (2016). Hay yield, protein yield, ADF (acid detergent fiber), NDF (neutral detergent fiber), Ca, Mg, P and K content were investigated in all the treatments. Alfalfa intercropped sorghum-sudangrass hybrid at 100%:60% seed ratio produced the highest hay yield both in the establishment year (18.25 t/ha) and the first production year (17.91 t/ha). This study showed that intercropping increased hay and protein yield of alfalfa stand compare to sole alfalfa with the significant effect of companion crop and seed ratio.

Keywords: Alfalfa, intercropping, sorghum, buckwheat, hay yield

The Role of Physiological and Agronomic Traits in Selecting of Water Deficit Tolerant Rapeseed (Brassica napus L.) Genotypes

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Abstract: This study was conducted to introduce physiological and agronomic traits and factor analysis method for screening drought tolerant rapeseed genotypes. Eighteen rapeseed genotypes were evaluated under non-stressed and water deficit stress conditions from flowering and seed filling stages to seed maturity for two years (2012-2014) at the Agricultural and Natural Resources Research and Education Center of East Azarbaijan, Iran. Occurring drought from flowering stage, significantly decreased pod length, plant height, pod numbers per plant, seeds in a pod, seed yield and stomatal conductance. Also drought stress from seed filling stage, significantly decreased 1000-seeds weight, seed oil, seed yield and increased canopy temperature. Occurring drought stress from flowering and seed filling stages, decreased the mean seed yield by 1426 and 696 Kg h-1, respectively. Rapeseed genotypes were more sensitive to water deficit stress from flowering stage than seed filling stage. Thus, under water limiting conditions, irrigation at flowering stage, could be quite effective to support seed and oil yields. According to the results of factor analysis, genotypes 'HW101' and 'L183' with having higher yields, were recognized as the promising ones for non-stressed and water deficit stress conditions. Correlations among canopy temperature, stomatal conductance, pod length, pod numbers per plant, seed and oil yields, were significant. Therefore, these agronomic and physiologic traits and factor analysis method can be suggested to screen water deficit tolerant rapeseed genotypes.

Keywords: Canopy temperature, factor analysis, pod numbers per plant, stomatal conductance, water deficit

The Effect of Different Humic Acid Rates on Yield and Yield Components of Sunflower (Helianthus annuus L.) Varieties under Irrigable Conditions of SULAYMANIYAH – IRAQ

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Abstract: In closing the oil import deficit of Iraq, sunflower is gaining importance as an oil-seed plant. On the bases of this point, this research was carried out during the successive seasons in 2015 to determine the effects of different humic acid (HA) doses (HA1: 0 kg HA da-1, HA2: 15 kg HA da-1, HA3: 30 kg HA da-1 and HA4: 45 kg HA da-1) on yield and yield components of sunflower (Helianthus annuus L.) varieties under farmers' conditions in Sulaymaniyah (Rania) district, Iraq. The study was conducted as split plot in randomized complete block design arrangement with three replications. The main plots of each replication were contained two varieties and sub-plots were contained four HA doses. HA doses had significant effects on all parameters except physiological maturity, harvest moisture and protein ratio of varieties. The interaction of HA doses and variety had significant effects on plant height, harvest index and seed yield. results, flowering time was 71.00-74.50 day, physiological maturity was 105.33-106.50 day, plant height was 155.57-164.23 cm, head diameter 19.98-23.17 cm, number of nodes 28.52-33.10 number plant-1, harvest moisture 16.03-18.04 %, harvest index 27.88-30.68 %, number of seed per head 1145.10-1282.43 number head-1, seed yield per plant 126.05-154.58 g plant-1, husk ratio 68.03-69.01 %, 1000 seed weight 68.58-71.91 g, seed yield 501.25-552.12 kg da-1, oil ratio 38.20-40.33 % and protein ratio was 14.77-16.49 %. The maximum yield and oil ratio were obtained from Flame and Sirena varieties which interacted with HA3, as 555.63 kg da-1 and 41.45%, respectively.

Keywords: Sunflower, humic acid, yield and yield components

Influence of Different Nutritional Systems on Seed Oil and Yield of Marigold

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Abstract: It is a great challenge to search for sustainable strategies to alleviate detrimental effects of intensive farming practices. Our goal must be a modern form of agriculture that takes account of traditional knowledge and is oriented to optimized production. Marigold has a long history of medical usage with numerous healing properties. Furthermore, organic and low-input production systems are increasingly of interest in medicinal plants production. Therefore, a two-year field study was conducted to evaluate the effects of bio organic fertilizers on marigold cultivars. Co-inoculation of two plant growth promoting rhizobacteria, humic acid, vermicompost and combinations of these fertilizers were evaluated. Seed yield was assessed by sequential hand harvesting and seed oil was extracted using soxhlet extractor. Based on the combined analysis of variance over years, significant effects of fertilizers and cultivars on 1000 seed weight, seed yield, seed oil content and seed oil yield were detected. According to the results, seed yield and quality were increased in treated plants. The present results indicate that fertilizers used in this study can effect crop development parameters in marigold cultivars. Hence, bio organic production technology as a suitable and sustainable strategy can be adopted for marigold to maintain the quality and safety of its production.

Keywords: Biofertilizer, Humic acid, Seed oil, Seed yield, Vermicompost

The Genotype x Environment Interactions in Wild Sunflower Species (Helianthus L. spp.)

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Abstract: The field trials were conducted for four years (2014 and 2017) to determine the genotype x environment interactions in some wild sunflower species in terms of morphologic and phenologic characters at the Research and Training Centre of the Agricultural Faculty, Uludağ University, Bursa, Turkey. The 26 wild sunflower genotypes supplied from different sources (USDA-America; Germany, Canada) were used in the study. One month seedlings germinated with mechanical drawing application in a 1:1 portion soil and peat mixture violin were grown in field conditions. Some of the morphologic (plant height, head diameter, number of leaves per plant, stem thickness, number of branches) and phenologic (ray flower color, head angle, head shape, uniformity of flowering, uniformity of maturity, bract shape, pollen fertility, pubescence at general appearance, disk flower color, petiole position, branching, type of branching) characters were observed and measured during four years. The majority of the morphologic characters influenced by genotype year and genotype x year interactions while there was no clear difference within observed phenologic characters.

Keywords: Wild type sunflower, genotype, phenologic and morphologic characters

Effects of Different Tillage and Soil Residual Nitrogen on Chickpea Yield under Wheat-Chickpea Rotation System in Central Anatolia Condition

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Abstract: The aims of the study were to determine, the effects of tillage system and soil residual nitrogen on chickpea plant height, first pod height, biological yield and grain yield in rotation with wheat under dry land condition of Central Anatolia Region. In this study, two tillage methods (conventional and reduced tillage), three crop rotations (wheat-wheat; wheat-fallow; wheat-chickpea) and four N levels (0, 50, 100, 150 kg ha-1) were evaluated 4 years duration (2012-2015). Soil tillage methods were placed in to main plots, crop rotation in to subplots and N levels in to sub-sub plots. Only chickpea in continuous rotation with wheat was examined in this study. There was no statistically significant difference in investigated properties between the two soil tillage methods for chickpea but chickpea grain yield was higher for CT than RT. Residual fertilizer N was significant affected chickpea grain yield and some investigated properties. 100 and 150 kg N ha-1 were increased grain yield in chickpea. Results also indicated that; conventional tillage may be more appropriate for chickpea in rotation with wheat. Fertilizer N applied to wheat influences the following chickpea grain yield.

Keywords: Chickpea, Tillage, Nitrogen, Crop rotation, Rainfed conditions

Determination of Yield and Quality Performances of Some Spring Bread Wheat (Triticum aestivum L.) Genotypes in Southeastern Anatolia Conditions

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Abstract: This study was conducted in randomized complete block design with 4 replications and 2 locations (Ceylanpınar and Hazro) under rainfall conditions during 2013-2014 growing season. The purpose of the study is to determine genotypes with high yield, large adaptation ability and high quality. 20 advensed bread wheat lines and 5 check were evaluated. According to result of analysis of variance, significant differences were determined for, test weight (TW), thousand grain weight (TGW) and grain yield at the level of 1%, wet gluten content, zeleny sedimentation and protein content at the level of 5%. Grain yields of genotypes ranged from 299.9-408.3 kg da-1, TW; 78.2-83.7 kg hl-1, TGW; 28.1-39.1 g, protein content; 15.1-17.5%, zeleny sedimentation; 40.0-54.4 ml and wet gluten content; 36.7-45.0. Biplot analysis method was performed to evaluated relation between traits, genotyp-traits and environments-traits. According to GGE-biplot results significant and positive correlations were determined between TW and moisture, also between protein content, wet gluten content, zeleny sedimentation and TGW. It has also been determined that there is a significant and negative relationship between grain yield and protein content, zeleny sedimentation and wet gluten. When the variance and Biplot analysis results were evaluated together; the lines G7, G11, G12, G16 and G23 could be candidate varieties and these lines should be evaluated in breeding programs.

Keywords: Bread wheat, yield, quality, GGE-biplot

Potential of Endemic Hedysarum Species in Turkey

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Abstract: Scarcity and improvement of problematic lands are main principles for agriculture over the world. Basic components of scarcity may be summarized by; natural resources, breeders, land and focus. The mentioned criteria are consequences of global climate change, decrease in natural resources, and pressure of adaptation which are important for sustainable agricultural practices. Global warming caused to more extreme climate conditions and threats to biodiversity and genetic resources as well. Forages which are the main food source of animals should be intensively produced by sustainable systems. Turkey is similar to a small continent (Asia Minor) owing to plant biodiversity where the country is located on 3 phyto-geographic regions. Hedysarum L. is consisted from 154 species, originating from western Mediterranean region and North Africa while primary origin is Central Asia. According to A Check list of The Flora of Turkey, Hedysarum is represented with 22 taxa and The genera has very important potential in terms of forage, particularly in perennial taxa. Among the targeted Turkish endemics, H. nitidum Willd and H. pestalozzae Boiss. are taken place together with a widespread species, H. varium Willd. Hedysarum L. called as "Sulla" and referred as Sulla flexuosa in some literature is a pasture forage plant from Fabaceae family, while the second group for human nutrition fallowing to cereals, and higher protein-nutritional content in addition to symbiotic nitrogen fixation mechanism. They are standing and bi- or perennial plant by 65 cm length, increases to fodder production and nutritional value and so practical solution for livestock systems.

Keywords: Endemic plants, forage legume, genetic resources, soil improvement, sustainable agriculture

Effect of irrigated and Non-irrigated Conditions on Leaf Area Index and Nutrient Element Change in Cotton (Gossypium hirsutum L.)

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Abstract: This study was conducted to determine the effects of irrigation levels on leaf area index and leaf's nutrient element contents of eight new cotton lines at 2016 year in Kahramanmaras. Trials were performed according to randomized blocks test pattern with split plot design in three replications, and two irrigation models (S0 and S100) were investigated. Data set of cotton growth parameters taken throughout growth period showed differences by irrigation levels. The result of this study, it was found that deficiency of irrigation water had adverse effects on nutrient element content and leaf area index of leaf samples which were taken in flowering and harvest periods. While the contents of Copper, Manganese, Phosphorus, Zinc, Calcium, Sodium, Magnesium, Potassium content of leaves decreased in non-irrigated genotypes, the content of the Ferrous and Nitrogen were increased. Moreover, the leaf area of non-irrigated genotypes was found to be 47.85% and 45.29% less than that of the same genotypes irrigated in both flowering and harvesting periods, respectively.

Keywords: Cotton, deficit irrigation, plant nutrients, leaf area index

Determination of Effects the Different Storage Period on Some Quality Traits of Safflower Seeds (Carthamus tinctorius L.)

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Abstract: In this study, effects of the storage periods (6, 18, 30, 42 months) on some quality traits of different safflower (Carthamus tinctorius L.) cultivars (Dinçer, Balcı, Yenice and Remzibey), one of the alternative raw materials in the vegetable oil industry, have been investigated. For this purpose, seeds from the 2014, 2015, 2016 and 2017 growing season were stored at + 4 °C. In the study oil content, protein content, linoleic and oleic acid content were investigated. According to the study result, oil content ($P<0.01$) and protein content ($P<0.05$) was found to be significant and fatty acid content was not found to be significant ($P>0.05$) in terms of storage period. Balcı cultivar has showed the highest oil content (% 34.543) 6 months of storage period. It was determined that as the storage period increased, the protein content in the seed decreased and the highest protein content was obtained from the 6 months storage period (% 14.091). When this study is examined as a whole, it is conclusioned that safflower seeds must be processed in a short time after the harvest; otherwise, there will be losses in quality of seeds as the storage period increases.

Keywords: Safflower, Carthamus tinctorius L., storage period, quality

Antioxidant activities of Hypericum perforatum L. and Hypericum heterophyllum Vent.

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Abstract: The genus Hypericum L. is a member of Clusiaceae (Hypericaceae) family and is consists of approximately 500 species, described of 36 taxonomic sections. This genus consists of 96 species in Turkish flora, 43 of which are endemic. This genus is widely distributed in Europe, Asia, Africa and America and has a long history of use in traditional European herbal medicine. In this study, stem, leaf and flower parts of both plants were extracted with methanol. Total phenolic and total flavonoid contents of these extracts were investigated. In addition, DPPH• and ABTS•+ scavenging effects of each part of both plants were evaluated. The highest amount of extract was obtained from leaf (19.79%) of Hypericum heterophyllum and flower (18.62%) of Hypericum perforatum. The highest total phenolic and flavonoid contents were obtained from the stem of H. perforatum. (572.3 ± 0,93 mg GAE/g extract) and 256.1 ± 0,80 mg QE/g extract, respectively). The stem of H. perforatum displayed the most ABTS•+ and DPPH• scavenging activities with the values of 70.6 and 55.6 (IC50) respectively.

Keywords: Hypericum heterophyllum, Hypericum perforatum, antioxidant activity

Determination of Yield and Quality Characteristics of Different Cotton Varieties (Gossypium hirsitum L.) in Igdir Conditions

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Abstract: In order to determine the yield and quality characteristics of 10 cotton varieties, the study was carried out in the land of Kazim Karabekir Agriculture Administration in Aralık / Iğdır in 2016. It has been determined in the study; Sowing-emerging time, The first flowering period, The first boll formation period, Plant height, Number of monopodia, Number of sympodia, Number of poll per plant, Seed cotton yield, Fiber yield, Poll weight, Poll seed cotton weight, Ginning efficiency were determined as yield and yield components. Spinnability index, Micronaire index (um), Maturity Fiber length (mm), Uniformity index (%), Short fiber content (%), Fiber strength (gr/tex), Elasticity (%), Radiance, Yellowness grade, Trash grade were determined as for quality characteristics. The highest seed cotton yield was obtained from FLASH variety as 349,17 kg / da, This was followed by BA 119 with 314,93 kg / da yield The lowest order was PG 2018 with 198,89 kg / da seed cotton yield. The highest fiber yield was obtained from FLASH variety as 153,63 kg/da this was followed LODOS with 151,62 kg/da. The lowest fiber yield was obtained from BA 525 variety as 85,3 kg/da. In terms of fiber quality properties, the FLASH variety is at the forefront. In terms of fiber length, the longest fiber average of 31.38 mm was obtained from the FLASH variety with the highest value of 164 in terms of the spinnability index. The highest value for fiber endurance was 33.1 gr / tex and the highest value for uniformity index was obtained from FLASH variety with the highest value of 86.13%.

Keywords: Cotton, cultivar, yield, quality

Acknowledgements: This study was supported by the BAP Coordination Unit of Igdir University as the Research Project No. 2016-FBE-L03. Thank you to the BAP Coordination Unit of Igdir University

The Effects of Different Sowing Times on Seed Yield and Quality of Coriander (Coriandrum sativum L.) under Kahramanmaraş Ecological Conditions

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Abstract: In this study carried out in 2013-14 growing season under Kahramanmaras conditions it was aimed at investigation of the effects of different sowing times on the seed yield and quality of coriander (Coriandrum sativum L.). Four coriander cultivars (Gamze, Erbaa, Pelmus and Kudret-K) were sown on 13.11.2013 and 07.03.2014 according to factorial randomized block design with 3 replications. Plant height (cm), branch number per plant, umbrella number per plant, fruit number per umbrella, seed yield per plant (g), seed yield per decar (kg), thousand seed weight (g), seed protein ratio (%), seed oil ratio (%), oleic acid (%), linoleic acid (%) and palmitic acid (%) were investigated. The highest seed yield per plant, seed yield per decar and thousand seed weight were taken from cv. Gamze (respectively 4.7 g/plant, 227.9 kg/da and 9.9 g). As a result, seed yield per plant, seed yield per decar and thousand seed weight in autumn sowing were higher than ones in spring sowing. Oleic acid, linoleic acid and palmitic acid ratios of cultivars ranged 70.7-82.3 %, 10.4-14.4 % and 2.9-10 % respectively.

Keywords: Coriander, Coriandrum sativum L. sowing times, seed yield, protein ratio

Determination of Yield and Quality Components of Some Barley (Hordeum vulgare L.) Cultivars

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Abstract: This study was conducted at the field of Siirt under ecological conditions in 2014-15 ve 2015-16 years. The experimental design was a randomized complete block with three replication and five barley cultivars (Altıkat, Samyeli, Önder, Lignee and Tokak 157/37) were used in the experiment. In the research, plant height, spike length, spike length, number of seeds, total yield, grain yield, biological yield, 1000 grain weight, crude protein ratio, crude protein yield and harvest index values were determined. According to the two year results obtained at the end of the study; grain yield of barley varieties varied between 435-720 kg / da and the protein ratio varied between 11.75% and 15.2%. The highest grain yield was obtained from Lignee 131, Tokak 157/37 and Leader, the highest protein ratio from Lignee 131 and Samyeli barley varieties.

Keywords: Barley, varieties, yield and yield components.

The Effects of Sowing Frequency on Seed Yield Components in Winter Grown Green Lentil (Lens culinaris Medic.)

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Abstract: Turkey ranks third in the world lentil production with 365 thousand tons. Only 5.5 % of the lentils produced in Turkey are green lentils. Yozgat is in the first place in our country with 4.3 thousand tons of green lentils production. This study was carried out for 2 years during the 2014-2015 and 2015-2016 growing season to determine the effect of 4 different sowing frequency (150-225-300-375 seed/m2), 5 registered (Pul 11, Ceren, AnkaraYeşili, Yusufhan ve Kayı 91) and 4 local lentil varieties in the Yozgat ecological conditions. The experiments set up with a split-plot design in the form of randomized complete blocks with three replications, genotypes took place at main plots and sowing frequency at sub plots. As the average of the years, plant height of the varieties varied between 38.5(AnkaraYesili)-49.3(Local-3) cm, the first pod height between 15.8(Ceren)-21.3(Local-3) cm, numbers of pods per plant between 18.6(Yerel-4)-28.3(Ceren) no, numbers of empty pods per between 3.0(Kayı 91)-7.0(Local-2), thousand grain weights between 31.3(Ceren)-55.3(Local-2) g, hectoliter weight between 77.5(Local-1)-83.5(Ceren) kg, seed yield between 135.2(Local-2) to 231.1(AnkaraYeşili) kg da-1. Regression analyses were done for number pods per plant, number empty pods per plant, thousand grain weight, hectoliter weight and seed yield. The second-degree polynomial regression were founded the statistically significant for hectoliter weight, and only linear effect for pods per plant, number empty pods per plant, thousand grain weight, and seed yield. The highest seed yield was obtained from Ankara Yesili (231.1 kg/da), Ceren (215.9 kg/da), Pul 11 (206.9 kg/da) and Yusufhan (202.1 kg/da) cultivars.

Keywords: Green lentil, seed yield, Yozgat, cultivar

Investigation of the Effects on Different Storage Conditions on Mitotic Cells after Irradiation in Barley Seeds

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Abstract: Various spectrophotometric methods are available used to detect the effect of environmental toxins on living organisms, including radiation. These are expensive methods and give reducible results. Alternatively, by the biological monitoring system the entire biological effect of the environmental toxin on chromosomes can be determined. Our work has been done from this point. The effect of ionizing radiation on living tissue is lethal for mitotic activity. In plants exposed to radiation, these effects can be detected as a chromosome fragment in the anaphase stage of mitosis division in the appropriate tissue samples taken, or as a micro-nuclear interface after cell division. If the cell contains a fragment, it can be split one or two times more, and the cell goes to death. There is a definite correlation between the number of fragments observed in mitosis and the ability of the cell to colonize the cell. Based on this basic approach, barley seeds were exposed to gamma rays at six different doses ranging between 0-500 Gy absorbed doses by 60Co. One set of irradiated seeds was stored in a refrigerator (+ 4 ^{o}C), and another was at room conditions (20-22 ^{o}C) after irradiation for one year. A set of irradiated barley seeds was germinated after irradiation to determine effects on chromosomal abnormalities, the correlation between doses by calculating mitotic index. The same process was also done for other storage sets, was found that the ionization process during the post-irradiation period the damage caused by the ionizing radiation were increased.

Keywords: Barley, irradiation, post-irradiationperiod, mitotic index

Determination of Yield and Quality Characteristics of Some Chickpeas (Cicer arietinum L.) Varieties Grown in Limy and Alkali Soil

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Abstract: The research was carried out to determine the yield and technological properties of some chickpea cultivars grown in limy and alkaline soil. The study was carried out in 2017 on a land belonging to Van Yüzüncü Yıl University Faculty of Agriculture by using a randomized complete block registered by 12 chickpea varieties according to the experimental design in Turkey. In the study, yield characteristics such as plant height, number of branches in plant, number of beans per plant, yield per unit area, number of seeds per plant, weight of seeds per 100 seeds, wet weight, water intake index, ash ratio, wet volume, sieve test and baking time. According to the results of the research; plant height 31.70-39.50 cm, number of branches 4.10-9.76 in the plant, number of beans in the plant 12.26-19.56, biological yield 319.30-466.06 kg / da, first bean height 15.33-20.70 cm, number of grains 10.43-21.43 plants per plant, wet weight 67.10-84.76 g, 100 grain weight 31.66-38.96 g, water uptake capacity 0.26-0.46 g / kg, water uptake index 0.73-1.20%, ash content 3.83-6.00%, protein 18.16-23.00, wet volume 157.33- 174.66 ml, sieving test 5.06-8.10 mm and cooking time 61.33-73.00 min. It was also found that the majority of the properties examined were significantly influenced by the properties of the varieties. The highest grain yield was obtained from the Hasanbey variety with 162.83 kg / da and the lowest grain yield was obtained from the Azkan variety with 111.73 kg / da.

Keywords: Quality criteria, Chickpea, Yield, Yield elements

Sowing Dates Effect on Reflectance (Rd), Yellowness (+b) and Color Grade (CG) of Fiber in Cotton (Gossypium hirsutum L.)

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Abstract: The color grade is very important trade standard on cotton (Gossypium hirsutum L.) which is determined non-linear relation degree of reflectance (Rd) and yellowness (+b), and determines fiber prices of cotton. This study was conducted for determine the effect of planting date on color grade (CG) via reflectance (Rd) and yellowness (+b) of cotton in 2011 year in Kahramanmaraş condition. Six cotton cultivars (earlier: Beli İzvor 432 and Primera, semi earlier: Stoneville 468 and Adana 98, late: Carmen and Furkan) were used as plant materials, and sown in 26 th April, 16 th May and 4 th June 2011 with three replication on randomized complete block design. According to results of study, sowing date is affected reflectance in sowing time-I, and yellowness x sowing dates interaction was found important. While Stoneville 468 and Carmen cultivars showed most favorable reflectance and yellowness in three sowing dates, Beli İzvor 432 cultivar was showed differences in terms of reflectance and yellowness in first and three sowing date. Moreover, while Stoneville 468, Adana 98 and Carmen cultivars attract attention in sowing date-I, Primera, Stoneville 468, Adana 98, Carmen and Furkan cultivars were attracted attention in sowing date II. Furthermore, Beliizvor 432, Primera, Stoneville 468, Carmen cultivars attracted attention for sowing dates-III, and it can be said that Stoneville 468 and Carmen varieties are important in the region for fiber color grade.

Keywords: Kahramanmaraş, Cotton (Gossypium hirsutum L.), sowing date, fiber reflectance (Rd) and yellowness (+b), color grade (CG)

Determination of Yield and Quality Characteristics of Mentha Piperita L. Clon and Varieties Cultivated in Isparta Conditions

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Abstract: Mentha piperita L. belonging to the family Lamiaceae is a valuable mint species. Yield and quality characteristics of clone and cultivars of M. piperita L. in Isparta ecological conditions were investigated in this study. Four variety with one clone were used in the study. Cutting were rooted in the greenhouse environment and field studies were carried out according to the design of randomized blocks design in Isparta ecological conditions Plant height, yields (fresh herb, dried herb, dried leaves) with essential oil contents and composition were studied. The essential oil was distilled by Clevenger, essential oil composition was determined by GC/MS and GC/FID. In this study, plants were harvested twice in both years. The yields of first harvests were higher than that of second harvests. The highest yield is obtained from Multimentha cultivar. Total yields obtained by the combination of the harvests were 16.12-34.52 t/ha in fresh herbage, 4.30-9.49 t/ha in drug herbage, 3.03-5.57 t/ha in drug leaf yield, in essential oil 54.0-144.0 L/ha. Essential oil contents were between 1.7-2,8%. The essential oil of menthol, menthone and methyl acetate ranged from 34.0-50.3%, 17.8-47.3%, 3.4-14.0%, respectively. The highest menthol rate is obtained from Citaro with 50.3%, the highest menthone is obtained from Multimentha with 47.3%, the highest menthyl acetate is obtained from Chocolate kind with 14.0%. At the result of the study, mint cultivation can be done successfully and specially Multimentha and Citaro varieties, which have high essential oil rate and yield, can be grown for species and cosmetic.

Keywords: Mint, Mentha, yield, essential oil, menthol, Isparta

Soybean Breeding Researches at the Cukurova Conditions as a Double Crop.

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Abstract: Soybean, is an important and valuable field crop and mainly is grown as a double crop after small grain harvest in the Mediterranean region of Turkey called Cukurova. Cukurova soybean breeding researches were conducted in Eastern Mediterranean Agricultural Research Institute, between 2004-2016 years in Adana. The objective of this breeding program was to develop high yielding soybean varieties for Cukurova conditions as a double crop growing season. Pedigree breeding method was used to develop varieties from breeding populations. In the pedigree method, superior plants were selfed and selected in successive generations from F2 to F5. In 2004, 176 F1 pods were obtained by crossing. 110 single plants were selected in F2, 44 single plants were selected at F3 and 15 genotypes were selected in F4. Regional field trials were performed in a randomized complete block design with three replications at Adana and Şanlıurfa in 2015. According to the means of the combined two years days to %50 flowers, days to maturity, plant height, pod number per plant, height of first pod, 1000 seed weight and seed yield were changed between28.7-24.7, 103.8-95.6, 113.3-83.6, 82.1-44.5,9.93-4.37, 224.3-179.5, respectively. Results showed that CU04-07 were higher seed yield (480kg/da) than other lines and control varieties in 2015. At the end of the experiments CU04-07 was determined as a variety candidate as a second crop growing season.

Keywords: Soybean, high yielding, second crop, breeding

Investigation of the Response of Turkish Basil (Ocimum bacilicum L.) to Different Temperatures and CO_2 Concentrations

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Abstract: The environment is rapidly polluted with the increase of industrialization and greenhouse gas. Particularly, CO_2, which is an important share, in the greenhouse gases and in the global warming, and the increasing temperature due to this, also reveals some positive and negative features in plants. Medicinal and aromatic plants, Turkish basil (Ocimum bacilicum L.) has an important role in human health. Studies was carried out in a fully automated greenhouse in order to determine the response of Turkish basil to different CO_2 concentrations and different temperatures. Experiments were conducted at different temperatures (26 ^{0}C / 16 ^{0}C, 29 ^{0}C / 19 ^{0}C, 32 ^{0}C / 22 ^{0}C) and concentrations of CO_2 (400 ppm, 600 ppm, 800 ppm, 1000 ppm) in randomized parcels with 4 replications. The highest germination in the experiment was taken from 95% to 26 ^{0}C/16 ^{0}C temperature and 400 ppm CO_2 concentration. The lowest germination was obtained from 40% to 26 ^{0}C / 16 ^{0}C temperature and 400 ppm CO_2 concentration. As a result of the study, temperature increase caused increase in plant wet weight, plant dry weight, plant height, root wet weight and root length except root dry weight. Increase in CO_2 concentration only increased plant height and root length.

Keywords: Turkish basil, temperature, carbone dioxide, germination, plant development

The Effect of Silage Additives on the Silage Quality and Different Harvesting Stages on the Herbage Yield at Soybean Cultivars Grown as Second Crop in Cukurova Conditions

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Abstract: In this study, our objective was to determine the effect of three different harvesting stages on the forage yield and silage additives applications on the silage quality of soybean cultivars grown as second crop conditions. Adasoy, Derry and Yesilsoy soybean varieties were used as a materialin this study. Field experiment which was established to determine forage yield and quality had been conducted according to split plot design with four replications. Experimental design to determine silage fermantation traits was randomized complete block with four replications and silage additives were molasses, cereal and inoculant. Plant height was ranged between 106,5-203,5 cm. Green herbage of cultivars ranged between 1904,2-6035,0 kg/da while the yield highest obtained from Derry at the R4 and R6 harvesting stages. Crude protein contents ranged between 8,0-22,6 % and Adasoy and Yesilsoy had the highest crude protein content. pH, dry matter content and lactic acid were ranged between 3,12-5,62 %, 18,15-34,87 % and 1,17- 4,82 % respectively. The lowest pH was obtained from Derry at R6 harvesting stage and from molasses aplication. The highest lactic acid was obtained from R6 harvesting stage and the molasses and cereal additive applications from Derry variety. According to this results Derry has the highest forage yield, Yesilsoy and Adasoy has the good silage quality. This study reveals that approprate harvesting stage was R6 with molasses or cereal additive application to obtain good quality soybean silage.

Keywords: Harvesting stage, Second crop, Silage additive materials, Silage quality, Soybean

Acknowledgements: This work was financially supported by the Yüzüncü Yıl University Scientific Research Projects Directorate (project no. 2015-FBE-D218).

Effects of Different Row Spacing and Different Dose Fertilizers on the Seed Yield and Some Agronomic Properties in Tall Fescue

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Abstract: This study was carried out in the Sakarya/Pamukova ecological conditions between November 2013 - November 2016 to determine seed yield and some agronomic characteristics of tall fescue (Festuca arundinacea Schreb.) sown at different row spacings and given different doses of fertilizer. The experiment was set up with 3 replicates in randomized blocks trial design using 2 different row spacing (20 and 40 cm) and 4 different dose fertilizers (0, 10, 20 and 30 gr m^{-2}). In the study; plant height (cm), vegetative stalk number (dm2), dry matter content (%), dry herbage-stem yield, seed yield, biological yield (g m-2), harvest index (%), germination rate (%), and winter endurance (1-9 points). The data were analized statisticaly and row spacing, fertilizer dose, and row spacing x fertilizer dose interactions were evaluated. When the highest plant height (146.2 cm), seed yield (185.8 g m-2), dry matter content (29.61%), germination rate (92.5%), and winter endurance (8.8 points) were obtained from 40 cm row spacing and 30 g m-2 fertilizer dose, the highest other properties data were obtained at 20 cm row spacing and 30 g m-2 fertilizer dose compare to control.

Keywords: Tall fescue, row spacing, fertilizer dose, plant height, seed yield

Evaluation of Some Common Vetch (Vicia sativa L.) Line and Cultivars in Terms of Seed Yield, Straw Yield and Straw Quality in Bingöl Conditions

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Abstract: This study was conducted to determine the seed yield, straw yield and quality of common vetch lines and cultivars for two years between 2014 and 2015 in Bingöl conditions. In the research; 21 different common vetch lines and cultivars were used as material. The study was carried out according to the randomized block design. In the study; seed yield, straw yield, thousand grain weight, crude ash, crude protein, crude protein yield, acid detergent fiber (ADF), neutral detergent fiber (NDF), digestible dry matter (DDM), dry matter intake (DMI) and relative feed value (RFV) characteristics were investigated. In the results of research; seed yield, straw yield, thousand grain weight, crude ash, crude protein, crude protein yield, ADF, NDF, DDM, DMI and RFV values ranged from 38.8-94.8 kg da-1, 105.7-289.8 kg da-1, 37.9-56.3 g, 9.4-15.3%, 8.1-12.4%, 12.1-31.1 kg da-1, 29.5-37.3%, 42.0-51.4%, 59.8-65.9%, 2.37-2.89% and 111.2-147.1 respectively. In terms of the examined parameters; the Hat-1, GAP-2604, GAP-61721, Soner and Alper genotypes were found to be superior over the others in Bingöl ecological conditions.

Keywords: Common vetch, straw yield, straw quality, correlation

A Research on Performance of an Artificial Field Established in Arid Conditions of Van Region

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Abstract: This study was carried out at on an artificial pasture. The grazing capacity of the pasture, plant covered area, botanical composition, green and hay yield and herbage quality were searched. The results of the study showed that the degree of cover was 63.5% ; cover ratio of grasses was 27.7%, 15.9% for sainfoin, 10.3% for burnet and 13.7%, was determined for the other plants. In the examination of botanical composition, in which 12.8% of grasses, 50.5% of sainfoin, 7.3% of burnet and 29.8% of other plants were determined. On average, 9091.0 kg / ha green and 3850.0 kg/ha hay yield obtained in the study. The raw protein rate was high and the crude protein yield was low due to the high legume ratio. According to Pasture Status Skill, pasture quality grade was determined to be 5.9 and pasture status was graded as very good pasture status (6.1-8). According to realized green yield, grazing capacity is 63.4 ha in 5 months for native Number of Cattle per Hectare/day. The fact that the results got from pasture capacity determined by quality grade and precipitation range of mixture species were close to the ones got from the pasture capacity determined by herbage yield will contribute to the prediction of artificial pasture establishment. Due to the fact that it is the first artificial pasture established in our province, it is essential to perform qualitative and quantitative studies for a longer time in the same area so as to obtain more reliable results.

Keywords: Botanical composition, Quality, Mixture, Artificial pasture, Yield

Determination of Changes Occurring Annual Nutrient Content of Thorny Saltwort (Noaea mucronata)

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Abstract: This study has been carried out in order to determine the changes in nutrient content of thorny saltwort (Noaea mucronata) growing in arid and saline conditions according to months. The research was established in randomized blocks experiment design with three replications. The samples were collected from leaf + thin shoot parts of 5 plants in each block and a total of 15 samples in every month between April to October 2016, when the plant was actively growing. The analysis results showed that the examined nutrient contents were different significantly by months. The content of DM, CP, NDF, ADF, ADL, DE, ME, DMD, DMI and RFV changed between 21.66 to 66.66%, 7.07 to 24.89%), 26.73 to 60.58%, 13.51 to 39.28%, 5.15 to 11.60%, 2.76 to 3.62 Mcal kg-1, 2.27 to 2.97 Mcal kg-1, 58.29 to 78.37%, 1.99 to 4.50% and 90.18 to 274.07, respectively. As per the obtained data, DM showed an increase from April until July, and a little reduction is observed from July until October. NDF, ADL, ADF ratios showed a continuous increase as from the April. On the other hand, there was a steady decrease in the CP, DE, ME, DMD, DMI, RFV ratios from April when it first began to develop, until October when the plant was dormant. Consequently, nutrient contents of Noaea mucronata can be significantly contribute to the feeding of the animals in the spring. In addition to animals should be given feeds with high nutrient content during summer and autumn.

Keywords: Thorny Saltwort, Nutrient Content, months, Noaea mucronata

Monitoring of Stem Rot Resistance in Groundnut Genotypes under Artificial Inoculation of Sclerotium rolfsii

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Abstract: roundnut (Arachis hypogaea L.) is an important oil and protein crop grown about 100 countries especially in equatorial belt. Fungal diseases are the most important stress factors for all the grown areas of groundnut. Stem rot caused by Sclerotium rolfsii is an economically important fungal disease and highly affects about 500 different plant species in warm and moist climate areas. It easily infects groundnut plant because crop canopy provides hot and moist environment for pathogen growing and spreading. Disease affected plants primarily show yellowing and followed by the fading. At further stages, especially the leaves, branches and capsule stalks turn into dark brown color and generally resulting plant death. In the present investigation selected 121 groundnut genotypes from different subspecies and botanical varieties were screened to select stem rot resistant genotypes under field conditions in Antalya, Turkey. In the first stage of study, inoculums of S. rolfsii were grown in soaked cereal seeds and later used to infest groundnut. The plants were inoculated on 40 days after planting and each genotype were scored with 1-5 scale. Yield losses were also recorded with the comparison of controls. Results showed that the collection includes stem rot resistant genotypes from different sub species and botanical varieties. Up to 50% yield losses were also observed in the genotypes which were scored ≥3. Resistant genotypes identified in this study should be used as a genetic resource to develop superior commercial genotypes that have stem rot resistance.

Keywords: Fungal diseases, peanut, resistance, selection

Acknowledgements: This study was supported by tthe Scientific Research Projects Coordination Unit of Akdeniz University, Turkey (FYL-2017-2663).

Morphogenetic, Ontogenetic and Diurnal Variability in Antioxidant Activity, Total Phenol and Flavonoids of Foeniculum vulgare Miller var. vulgare Volatile Oils and Extracts

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Abstract: Bioactive compounds, appearing at varying quantities and constituents in medicinal and aromatic plants, act as naturally occurring antioxidants. The purpose of this study was to monitor morphogenetic, ontogenetic and diurnal variability in antioxidant activity, total phenol and flavonoids of bitter fennel extracts. Morphogenetic variability was assessed using leaf and root-bulb-stalk samples of pre-, full- and post-flowering stages, flower samples of full flowering and seed samples of seed set and harvest maturity. To monitor diurnal (3 times a day) and ontogenetic variability, whole plant samples were taken at pre-, full- and post-flowering. To evaluate antioxidant activitiy, DPPH radical scavenging effect of plant extracts were determined spectrophotometrically. The seed and root-bulb-stalk samples produced the lowest and the highest total phenol of 9.52 and 87.35 mg g–1, respectively. In whole plant samples, total phenol increased from 28.35 mg g–1 at pre-flowering to 52.01 mg g–1 at full-flowering and to 59.73 mg g–1 at post-flowering. The flavonoid content of root-bulb-stalk samples was two times greater than that of leaf samples. In the whole plant samples, the highest total flavonoid was obtained at post-flowering. The highest radical scavenging effect with IC50 = 24.17 µg ml –1 was observed from seed samples. Daily harvesting time caused no effect on antioxidant activity, total phenols and flavonoids. Antioxidant activity of bitter fennel plant extracts significantly differed according to plant organs and growing stages. This study suggests that fennel plant extracts, particularly those of seed and flower, possess potential health benefits by virtue of their antioxidant activity.

Keywords: Essential oil, Phenolic compounds, Radical scavenging activity, Turkish bitter fennel

Effects of Different Nitrogen Forms on Yield and Yield Components of Potato

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Abstract: Improvement of nitrogen (N) uptake efficiency of fertilizer applications at different growth stages of potato plants is critical to develop management recommendations that enhance fertilizer use by minimizing N losses. The objective of this study was to determine the effects of different nitrogen forms on potato growth, yield and yield components. Commonly grown potato varieties namely Granola and Marfona were used in the experiment. Four different nitrogen forms [urea (U), ammonium nitrate (AN), diammonium phosphate (DAP), and amonnium sulphate (AS)] were applied on two successive years of 2004 and 2005 at the Experimental Station of Eastern Anatolia Agricultural Research Institute, Pasinler, Erzurum. All treatments received a total of 20 kg da-1 of N throughout the growing season, split into two applications of 10 kg da-1 as applied at pre-plant and plant emergence. The experimental design was factorial based on randomized complete block design with four replications. Observations taken were the number and height of stems, the number and yield of tubers per plant, marketable and non-marketable of tuber yield and specific gravity of tubers. Application of different N sources significantly affected yield and yield components of potato cultivars. Mean tuber yields of 1st year and 2nd were 4326 kg da-1 and 2655 kg da-1, cvs. Marfona and Granola were 3554 kg da-1 and 3427 kg da-1, respectively. The highest yield of two years from N applications were obtained from Urea (3948 kg da-1), and followed by AN (3482 kg da-1), DAP (3400 kg da-1), AS (3132 kg da-1) applications.

Keywords: Nitrogen, ammonium, nitrate, urea, potato

The Chemical Composition of Helichrysum plicatum Dc. subsp. plicatum Species Spreading in Van Region

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Abstract: Helichrysum species belong to the family Asteracea, which has a large distribution area in the world with more than 1240 species and 185 genus. Helichrysum species have anti-inflammatory, antibacterial, antioxidant and antimicrobial effects used in the treatment of wounds, burns, stomach diseases, kidney failure and stones diuretic, cough and diabetes. Helichrysum plicatum species, which has a perennial herbaceous development form, has shown spreading at high altitudes of East and South East Anatolia in our country. It is called as mantuvar, ölmez çiçek, kudama, kalisar çiçeği, savran, bozoğlan, yayla çiçeği or altın otu" in Turkey. In the study, it is aimed to determine some nutrients and mineral substance contents of Helichrysum plicatum DC. subsp. plicatum which is naturally grown around the Van lake in the Eastern Anatolia Region.. Some nutrients and mineral contents such as total ash, crude protein, pH, crude cellulose and N, Na, Mg, K, Ca, P, S, Mn, Fe, Cu, Zn, Cd, Co have been investigated in the plant samples. As a result of the research; it has been determined as crude protein ratio 9.44%, pH 7.18, total nitrogen content 1.51%, crude ash content 8.0% and crude cellulose content 32.38%. In addition, while some mineral substance contents were determined as K 9.95 g/kg, Ca 17.03 g/kg, P 1.17 g/kg, Mn 72.30 mg/kg, Fe 262.91 mg/kg and Zn 19.99 mg/kg, heavy metal contents was determined as Cr 0.65 mg/kg, Cd 0.16 mg/kg, Co 1.53 mg/kg and Pb 0.25 mg/kg.

Keywords: Helichrysum plicatum DC. subsp. plicatum, Eastern Anatolia, Heavy Metal, Medicinal Plants

Determination of Relationships of Grain Yield and Quality Parameters with Physiological Parameters in Barley (Hordeum vulgare L.) Genotypes

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Abstract: This present study was carried out to determine the relationships between grain yield and some quality traits with some physiological parameters which measured at the heading stage. In this study, six barley genotypes were grown under rainfed conditions according to randomized complete block design with four replications during the 2016-2017 growing seasons in Sirnak ecological conditions. The traits of leaf area index (LAI), normalized difference vegetation index (NDVI), chlorophyll reading (SPAD), canopy temperature (CT), grain yield, thousand kernel weight, test weight, protein content, starch content, wet gluten content and zeleny sedimantation were investigated. According to the findings of research, differences between genotyps were found significant for all investigated traits except protein content. The values ranged in genotypes were between 195.8-309.3 kg da-1 in grain yield, 32.55-46.27 g in thousand kernel weight, 66.35-73.40 kg hL-1 test weight, 8.1-9.1% in protein content, 63.13-66.49% in starch. Positive and significant correlation was obtained between CT and grain yield according to correlation analysis.

Keywords: Barley, canopy temperature, LAI, SPAD, grain yield

Effect of Farmyard Manure Doses on Quality and Yield of Chickpea (Cicer Arietinum L.)

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Abstract: Unconscious and uncontrolled use of synthetic chemicals deteriorates natural balance and creates serious threats to environment and human health. Organic fertilizers should be used to prevent this deterioration, obtain healthy nutrients without polluting natural resources, and increase yield and quality. In this study, effects of farmyard manure on yield and some quality characteristics of chickpea were investigated. For this purpose, experiments were carried out in 2015 and 2016 using Sezenbey chickpea variety. In the study, six treatments were carried out including control (0), four doses of farmyard manure (750, 1500, 2250 and 3000 kg da-1) and chemical fertilizer (4 kg N-1). The experiment was performed in randomized complete-block experimental design with three replications. According to combined variance analysis of years, statistically significant differences were determined in protein ratio, number of pods per plant and seed yield per plant. Regression analyzes were done on properties of protein ratio and seed yield per plant for farmyard manure applications. The protein ratio, number of pods per plant and seed yield per plant changed between 16.6-24.3 %, 30.23-45.9, 12.26-19.25 g, respectively. It was determined that in all manure applications protein ratio and number of pods per plant were different from control and chemical fertilizer application gave the highest value in seed yield.

Keywords: Farmyard manure, Chickpea, Quality and yield characteristics

The Status of Disease Sensitivities of Some Advanced Lines of Barley in Sanlıurfa Province

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Abstract: Among Cool Climate Grains, barley covers around 49.7 milions ha in the world with 144.7 millions tonnes productions. In Turkey, it is produced around in 2.7 millions ha area and has 7.5 million tonnes of yearly production amount after wheat. In GAP region 1.2 million tonnes barley is produced in 420.000 ha area, 573000 tonnes of which is obtained from Sanlıurfa province in 230000 ha lands. Barley (Hordeum vulgare) grown as forage and malting is grown mostly as forage in Turkey and it follows wheat among grains. The country needs barley in good quality in order to meet need of interior malt industry and export abroad. For this reason, new barley varieties that are in good quality and resistant to diseases should be developed. Common diseases of barley in GAP region causing lossess in quality and yields are Ryncosporium secalis, Septoria tritici and Erysiphe graminis f.sp. hordei. In this study, 224 advanced lines of barley obtained from ICARDA were tested as barley breeding materials under field conditions with natural inoculation. Between 2014 and 2016 years, an seperate experimental design was developed in 6 m2 dimensions in GAPTAEM Tatlıca Research Station for each breeding materials. It was determined that 18 genotypes were sensitive to R. secalis disease between 70-100S, and 8 genotypes were resistant in TR level, 16 genotypes were resistant in 5-20R level, and 6 genotypes were resistant in 10-30MR level. Some genotypes found to be resistant at TR levels were sensitive to powdery mildew and yellow rust disease respectively.

Keywords: Barley, Ryncosporium secalis, Resistance, Leaf Diseases, Plant breeding

Acknowledgements: This study was financially supported by ICARDA (International Center for Agricultural Research in the Dry Areas) and TAGEM (General Directorate of Agricultural Research and Policies).

Effects of Nitrogen Doses on Yield, Seed Yield and Nutrient Content of Feeding Oats (Avena fatua L. var. SAIA) under the Irrigated Conditions

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Abstract: A field experiment under the irrigated conditions was carried out to investigate the effects of different nitrogen levels (0, 3, 6, 9 and 12 kg/da) on the yield, seed yield and nutritional content of fodder oat (Avena fatua var. SAIA) at the experimental stations of Faculty of Agriculture of Igdir University, in 2016. The experiment was laid out in randomized complete block design with 3 replications. Nitrogen doses significantly affected other characteristics of the oat except NDF (Neutral Detergent Fiber), DMC (dry matter consumption) and NFV (Relative Feed Value) values. The lowest and highest plant height (84.5-106.9 cm), green herbage yield (1605.5-3111.1 kg/da) and CP (Crude Protein, 7.57-10.0 % with 0 and 12 kg/da N, respectively), ADF (Acid Detergent Fiber) 32.57-36.50 %, DMD (Dry Matter Digestibility) 60.47-63.50 %, DE (Digestible Energies) 2.80-3.00 Mcal kg-1, ME (Metabolic Energy) 2.36-2.83 Mcal kg-1, stem yield (763.0-1204.5 kg/da), seed yield (280.3-377.3 kg/da) biological yield (1043.4-1581.9 kg/da). The highest plant height, herbage yield, seed yield and biological yield were obtained from 6, 9 and 12 kg N applications. However, depending on nitrogen applications, the values of ADF, KMS, SE and ME were affected at different grades and showed irregularity. Consequentyl, it was concluded that it would be ideal to apply 6 kg/da nitrogen (N) dose to the oat cultivation, owing the fact that the effects on the yield components of 6, 9 and 12 kg/da nitrogen applications were similar in the irrigated conditions.

Keywords: Avena fatua L., nitrogen doses, yield and nutrient contents

Silage Values of Some Vegetable Field Wastes

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Abstract: This study was conducted with the aim of determining the nutrient contents, field waste amounts (kg/da) and ensilage characteristics of harvest wastes (stem, branch and leaves) of tomato (T), bean (B), capia pepper (CAP), green pepper (GP), white cabbage (WC) and red cabbage (RC) In this study, the amounts (kg/da) and dry matter (DM) contents of field wastes and also the pH values and nutrient contents, organic acid contents (AA, BA and LA) and relative feed values (RFV) of ensilaged material were determined. Furthermore, organoleptic characteristics (colour, smell and structure) and presence of mold and ammonia were determined in the ensilaged materials. Corn silage was used as comparing material in the study. The crude ash, ADF and NDF contents in WC and RD silages were found lower than those in other silages ($P<0,05$). The crude protein contents in T and B silages (15,03 and 15,85%, respectively) were found higher compared to WC and RC silages (13,32 and 13,34 %, respectively) ($P<0.05$). According to the Flieg scores determined by organic acid contents, the silages were ranked as: RC-Excellent (Class 1) , CAP and GP-Good (Class 2), T and WC-Satisfactory (Class 3) and B-Medium (Class 4). The ranking in terms of RFV was as follows: WC and RC- Excellent, GP and B-Very good and T and CAP-Good. All the silage materials were consumed by the cows. These findings showed that the field residues of T, FB, CAP, PP, WC and RC can be used as silage material in ruminant rations.

Keywords: Vegetable, waste, yield, silage, organic acid

Plant and Soil Characteristics of Rangelands Improved with Different Methods

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Abstract: Annual plant species and thorny shrubs like Christ's thorn (Paliurus spina-cristi) are common in Mediterranean rangelands because of climate and heavy grazing. Mediterranean rangelands (Biga-Çanakkale/Turkey) with invasive Christ's thorn (CT) populations improved with various practices through removing shrubs from the rangelands and seeding the places with forage crops. Improvement practices were as follows; (C): Control treatment, (E): CT's were removed 15 years ago, rangelands were seeded with forage crops; (H): CT's shrubs were treated with herbicides; (M): CT's shrubs were removed through grubbing with dozers and rippers; (F): The rangelands were used as agricultural field and reseeded to create a rangeland. All treatment plots were seeded with perennial ryegrass, orchard grass and alfalfa. Effects of these improvement practices on soil and plant nutrients and some soil characteristics were investigated. Soil pH; decreased in herbicide-treated rangelands. The electrical conductivity of the soil did not change in the first year but changes have been occurred among the applications in second year of the study work. The amount of soil nitrogen varied with the applications, while there was no change in the amount of plant nitrogen. Treatments resulted in significant changes in soil and plant macro (K, Ca, Mg) and micro (Fe, Cu, Zn) nutrients and only the phosphorus (P) contents were not significant. The applied improvement methods in rangelands have brought certain changes the nutrients of soil and plant, but these variations did not mean to any negativity. The application which is more economic and sustainable in the eradication of Christ's thorn.

Keywords: Paliurus spina-cristi, rangeland improvement, soil, herbage

Usage Potential in Alternative Agricultural Activities of Pirreşit Mountain (Muradiye-Van) and Environmental Plants

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Abstract: In recent times, it has become more and more common for the alternative natural floral elements to be preferred in agricultural activities as well as traditional agricultural activities. In our study, Pirreşit Mountain, located in the North East of Van Province, which we have shown its floristic structure in 2007, has been investigated with its potential to be used in alternative agricultural activities. With the assessment of 820 plant taxa detected in the area; plants used mainly for food, construction works, ornamental and home decoration, oil production, cheese making, fuel etc were determined. These plants are transferred to the fields in Turkey to take on the breeding and culture of the world and focused on growing opportunities in the field. With this study, our research area which includes a large part of the Muradiye District has been tried to put forward the potential of alternative agricultural activities.

Keywords: Alternative Agriculture, Plant Existence, Van, Muradiye

Effects of Wildfires on Soil and Plant Characteristics in Shrubby Rangeland

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Abstract: Mediterranean vegetation cover is quite sensitive to wildfire and such fires are the most commonly experienced in Mediterranean region. With the impacts of global warming and anthropogenic impacts, number of wildfires are continuously increasing. The present study was conducted to investigate the effects of low intensity fires on some soil and plant characteristics of shrubby rangelands. Shrubby rangeland was divided into 12 plots as of burnt and unburnt. Soil samples were taken right after the wildfire and during 3 years after the fire. Soil aggregate stability and pH values did not change significantly, but electrical conductivity, organic matter, total N, available P and K levels increased over the burnt plots right after the fire. During the other 3 years experimental period, significant differences were not observed in investigated parameters of burnt and unburnt plots. Herbage yield and crude protein ratios were greater in burnt plots. The burnt shrubs shooted in the first year and they reached to height as much as the shrubs in unburnt sections. It was concluded that low intensity fires did not have significant negative impacts on soil and plant characterizes of shrubby rangeland.

Keywords: Wildfire, vegetation, soil properties, Mediterranean-type ecosysytem, shrub

Salt Stress and Legumes

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Abstract: Agricultural salinity is collection of mineral salts in water and soil. Salts in dissolved mineral electrolyte cation forms may be summarized by Ca+2, K+, Mg+2 and Na+ in addition to Cl-, CO32-, HCO3-, NO3-, SO42-. Some of the other elements such as Al3+, B, Ba2+, Mo, SiO2 and Sr2+, give rise to increase in soil and water salinity. Negative impacts of salinity include; decrease in agricultural production, rising of inputs (cultivation, management etc.), soil erosion, ecologic instability and toxicity on human. Soil salinity is a limiting factor on agricultural sustainability which effects all the cultivation stages from soil preparing to harvest. Only the plants called as "halophytes" that are known on limited number of plants are more tolerant to salt stress. Legume family known as especially sensitive to salinity in addition to negatively effect on symbiotic nitrogen fixation. Proteomics has clearly defined some of the important results on molecular sense, signals, metabolic activities in legumes that are closely related with protein kinases and membrane transporting proteins. Present paper describes the salt stress mechanism and finding issues to improvement of legume production which are meat of poor man and essential for agricultural sustainability by considering global warming and climate change. Some of the future prospects are also summarized for describe the salt stress response and tolerance in legumes especially for grain legumes.

Keywords: Abiotic stress, environmental stress, grain legume, salinity, sustainable agriculture

Investigation of Kinoa Plant Performance in Kahramanmaraş Conditions

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Abstract: The cultivation of the kinoa plant has begun new in our country. The detection of a plant's eligibility is determined by the regional trial. For this reason, we tried to determine herbal and quality characteristics by applying 2 different sowing times in Kahramanmaraş conditions of 'Q-52' kinoa cultivated in some parts of our country. Kinoa agriculture should be done in a period when the soil temperature is 5-7 º C and the flowering season during is not over 35 ºC temperature. In this case, It is equivalent to March-April for this region. The experiment was carried out in three replications according to the design of random blocks in Kahramanmaraş conditions with two different sowing times (25 March and 8 April 2016) with 15 days interval. In the experimental, features as plant emergence time (day), number of plants in m² (number), plant height (cm), flowering time (days), main cluster length (cm), the length of the grain part in the main cluster (cm), number of branches in cluster (number),maturation period (days), harvest index (%), grain yield (kg da-¹) were been investigated. According to the results obtained, it was found that negative and significant differences were observed in the length of the grain part of the main cluster (-5.30) depending on the planting time, also there were negative and very important statistical difference in terms of the plant emergence time (- 21.21), flowering time (- 4.95) and maturation period. It was reported that statistically significant difference did not between sowing times and other characteristics. As a result, it has been determined that Kinoa can be cultivated in Kahramanmaraş conditions.

Keywords: Kinoa, Sowing time, Harvest index, Grain yield

A Comparison on Grain Yields and Some Quality Properties of Some Maize Varieties

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Abstract: This study was conducted in Çukurova where is placed in East Mediterranean Region of Turkey in 2016 year. The aim of the study is to determine effects of some hybrids maize on grain yield and some quality properties. In the study, 7 commercial hybrid corn variety used as trial material. Trials have been randomized complete blocks with four replications. All agricultural practices such as fertilizer, seed rate, and chemical treatment were done according to regional requirements. Based on results of trail; the yield levels of all hybrids varied from 19500 to 15830 kg ha-1. The highest grain yield was proved from MAS78T hybrid maize and the lowest grain yield was proved from hybrid maize Kermes. According to the analysis of protein, starch and fat contents of the varieties, it was determined that the differences between the varieties. Average protein rates of all hybrids maize varied from % 7.97 to % 9.41, average fat rates of all hybrids maize varied from % 3.48 to % 4.78, average starch rates of all hybrids maize varied from % 59.44 to % 66.51. The highest protein rate was proved from Kermes and the lowest protein rate was proved from P1574. The highest fat rate was proved from ADASA16 and the lowest fat rate was proved from Kermes. The highest starch rate was proved from MAS78T and the lowest starch rate was proved from ADASA16.

Keywords: Maize, grain yield and quality properties

Research on Relationships Between Root Traits with Some Morphological and Physiological Parameters in Bread Wheat

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Abstract: This research was planned to observe relationships between root system traits with some morphological and physiological parameters of bread wheat, which are used to improve drought tolerance under Central Anatolian conditions, and the usability of these parameters as selection criteria for breeding studies. The study was conducted on a randomized complete block design with four replications on experimental fields and at the greenhouse in 2015-2016 and 2016-2017 at Eskisehir Transitional Zone Agricultural Research Institute. Gerek79, Bezostaya1, Sönmez2001, İzgi2001, Altay2000, Müfitbey, Yayla305, Kıraç66, Mesut and KateA-1 bread wheat varieties were used as materials in this research. Plants were grown in sand tubes with the length of 100 cm and the diameter of 10 cm. The nutrition solution (hoagland) was equally given to the entire experimental materials at the optimum level during the experimentations. Root biomass as 0.42-1.06 g/plant, root length as 99.0-115.5 cm/plant, grain yield as 6.1-9.5 g/plant, canopy temperature as 28.7-31.1 0C, stem biomass as 13.8-26.6 g/plant and flag leaf duration as 41.5-55.2 days were measured during the research. As a result, root biomass has a positive and significant correlation ($p<0.05$) relationship with peduncle length and flag leaf duration; very significant ($p<0.01$) relationship with stem biomass, root length and canopy temperature. In conclusion, Turkish wheat cultivars were classified according to their root traits, and a different approach has been applied by looking at the hidden half of the plant to the attempts of the improvement of drought tolerance in bread wheat breeding, therefore, providing basic information to breeders and researchers.

Keywords: Bread wheat, root traits, physiological and morphological parameters

Determination of the Effect of Vigour Tests on Germination Performance in Seeds of Different Cowpea Genotypes

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Abstract: All of the seed characteristics that determine seed activity and performance during germination and seedling emergence refer to seed vigor. The losses in the seed vigor are related to the decrease in the all the physiological functions of the seed. The aim of our study is to determine the effect of seed vigor tests at different temperatures and durations applied on different cowpea genotypes seeds on viability. Seven genotypes were used in the experiment; three cultivars and four local varieties. Accelerated aging and saturated salt accelerated aging tests were applied to the seeds of these genotypes at 40 and 45ºC for 24 and 48 hours. Also EC was measured three times at 24, 48 and 72 hours at 20ºC. The best germination performance of control seeds genotypes belonged to Didim, Göktepe and Karagöz-86. At the end of the saturated salt accelerated aging test didnot show any significant loss of viability of Amazon and Karagoz-86 at40°C for 24 hours, while the Sırma, Akkız and Didim genotypes were adversely affected. As a result of accelerated aging test; 45ºC at24 hours the loss of viability was determined as49% in the Amazon and 32% in the Akkız cultivars. According to the results of the ECtest, Göktepe, Bodrum Karagöz and Sırma seeds were found to be directly proportional to the results of the vigor tests performed by giving the lowest electrical conductivity value. Difference in vigor test results between genotypes were found with findings and these differences were confirmed by EC test.

Keywords: Seed vigor, Vigna unguiculata, cowpea, Electrical conductivity test

Determination of Yield and Yield Components Performances of Some Paddy Cultivars

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Abstract: This research was carried out during the 2017 vegetation period in order to determine the yield and yield characteristics of some rice (Oryza sativa L.) varieties grown in Tokat-Zile. In the study, 10 paddy cultivars were used as the material. The research was established as a randomized complete block design with four replications. The planting density was adjusted to 500 plants/m2. In the study; panicle formation period, maturating time, plant height, the number of panicle per square meter, panicle length, the number of grain per panicle, 1000-grain weight, grain yield properties were investigated. Significant differences were found between the varieties in terms of the parameters examined. Osmancık-97 paddy variety (104 days, 134.0 days respectively) in terms of the panicle heading period, the maturating period and Çakmak paddy variety (94.5, 786 kg/da, respectively) in terms of the number of grain per panicle, grain yield; Efe paddy cultivar (648 unit/m2, 13.8 cm respectively) in terms of the number of panicle per square meter, panicle length; Edirne paddy variety (106 cm) in terms of plant height was the highest values. The lowest 1000-grain weight, the number of panicle per square meter were found as 31 g, 518 unit/m2 for Hamzadere paddy cultivar and Meco paddy variety was found to the in terms of grain yield (512 kg/da) lowest. In terms of yield and yield components in Tokat-Zile conditions; Efe and Çakmak paddy varieties were the forefront.

Keywords: Environment, Oryza sativa L., Variety, Yield, Yield Components

Reaction of Durum Wheat Genotypes at Regional Yield Level to Crown and Root Rot Disease Causal Organism Fusarium culmorum (W.G. Smith) under Field Condition

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Abstract: Fusarium culmorum is a soil-borne fungus causing crown and root rot on different small-grain cereals, in particular wheat and durum. As an alternative for control of disease, development and screening the resistant varieties has been emphasis in the plant defence studies. In 2016-2017, this study was conducted in Experimental Area of Bahri Dagdaş International Research Institute-Konya. In the study, totally 34 durum wheat genotypes at regional yield level were included to be evaluated for resistance to F. culmorum under field conditions. 9 out of 34 had been developed for irrigated condition while the rest of genotypes for rainfed areas by breeding studies in the Institute. The experiment was set up according to randomized complete block design with 4 replications for each entry. The durum wheat seeds were sown in the previously contaminated soil with F. culmorum. At the end of growing period, the resistance levels of genotypes to F. culmorum were evaluated considering the 0-10 scale. Based on scale values, the plant genotypes were divided into 3 groups that were susceptible (≥3 scale value), moderately resistant (scale values between 1–3), and resistant (≤1 scale value). As a result for genotypes developed for irrigated condition, 2 genotypes were grouped as resistant, 3 genotypes were in moderately resistant group, while 4 of genotypes were susceptible against F. culmorum. The results of genotypes developed for rainfed area showed that 1 genotype was in group of resistant, 3 genotypes were in moderately resistant group, while 21 of genotypes were susceptible against F. culmorum.

Keywords: Durum wheat, genotype, fusarium culmorum, reaction

Turfgrass Quality and Leaf Texture Performance in Cool Climatic Grass Species

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Abstract: Under Iğdır ecological conditions; turf quality and leaf texture performances were investigated according to season (spring, summer, autumn) in cool climate grass species. The research was performed in 2015-2016 years as a completly randomized block design with three replications according to factorial designs. Festuca arundinacea species showed the highest turfgrass quality and leaf texture for the tested years. The lowest turfgrass quality was obtained for Agrostis tenuis and Festuca ovina species. The smallest leaf texture was found for Festuca rubra trichophylla and Festuca ovina species. According to the seasons; the highest turfgrass quality and the largest leaf texture values were obtained in the autumn for both years.

Keywords: Turfgrasses, turfgrass quality, leaf texture

Rangeland Characteristic of Open for Grazing Area for Long Years of West Black Sea Region

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Abstract: In the present study we aimed to determine the rangeland characteristic such as rangeland condition (RC), rangeland healthy (RH) and vegetation characteristic of open for grazing area for long years of West Black Sea Region. For this aim, a total of 72 rangeland communities were studied. The average size of the suited rangelands was 22.86 ha (min. 0.62, max. 105.63). The rangeland size per livestock unit was calculated as 0.06 ha. The rangeland condition score were 41.66% poor, 50% fair and 8.33% good. When based on the rainfall probability of the region and RC, for a 6-month grazing period, the area required by 1 livestock unit was calculated as 5.91±2.15 ha. There was only 1 rangeland vegetation that had no trees or shrubs. Trees and shrubs were present in the remaining rangelands at rates ranging from 7% to 100% of the vegetation cover. The percentage of 25.49, 37.25, 17.64 and 19.60 of the investigated rangelands had heavy to very heavy, moderate, light to very light grazing intensity and were never grazed. On the other hand, % 94.12, % 3.92 and % 1.96 of the rangelands were found as healthy, risky and unhealthy in RH category, respectively. Our results indicate that; 1) there was not enough size of rangeland for livestock production, 2) there were over-grazed, light-grazed and also no grazed rangelands and 3) there were not enough goat for trees-shrubs control in studied region.

Keywords: Grazing intensity, livestock, rangeland condition, rangeland healthy, weed control

Determination of Effects of Different Row Spacings and Seeding Rates on The Seed Yield and Some Yield Characteristics of Persian Clover (Trifolium resupinatum L.)

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Abstract: Knowledge of the effects of row spacings and seeding rates on seed production of an annual legume crop is essential for its success production. This study was conducted to find out the effects of different row spacings and seed rates on seed yield in persian clover in two consecutive years. Demet-82 variety was used as plant material. The trial was carried out at the Agricultural Research and Application Center of the Agricultural Faculty of Uludag University. It was set up with 3 replication according to the split block trial design, row spacing being main plots and seed rate as sub plots. Four different row spacing (20, 30, 40 and 50 cm) and four different seeding rate (1.5, 2.0, 2.5 and 3.0 kg da-1) were used in the experiment. In this two year study, plant height, the number of lateral stems/plant, the number of heads/plant, the number of seeds/head, 1000 seed weight and seed yield were determined. As a result, it is recomended that 40 cm row spacing and 2.0 kg da-1 seeding rate for seed yield in persian clover.

Keywords: Persian clover, row spacing, seeding rate, yield, seed

Determination Feed Yield and Silage Quality of Different Ratios Intercropping Mixtures of Corn and Soybean Crops in Mardin Ecological Conditions

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Abstract: This study was conducted to determine the forage yield and silage quality of 7 different mixture ratios 100% maize (100M), 70% maize + 30% soybean (70M30S), 60% maize + 40% soybean (60M40S), 50% maize + 50% soybean (50M50S), 40% maize + 60% soya (40M60S), 30% maize + 70% soybean (30M70S) and 100% soybean (100S) of maize and soybean was sown as the second product after wheat harvest in Yeşilli district of Mardin province in year 2015. Treatment in which the yield and quality of grain-still green in the field were determined, was conducted as randomized block with three replication. The determination of quality silage fermentation was conducted as randomized plot with four replications. According to the results of the study, the highest green hay efficiency was obtained as 7107.1 and 6833.3 kg/da respectively from 60M40S and 70M30S mixtures, while the lowest efficiency was obtained from 100S and 40M60S treatments. The highest raw protein efficiency was gained again from the same mixture ratios. The highest silage pH value of 4.94 was recorded from 100S treatment while the lowest pH value of 4.20 and 4.22 were recorded from 100M and 70M30S respectively. Silage fleig score was found in excellent class in all treatments except for 100S treatment. To conclude, in fields having ecological conditions of Mardin province, it is considered that for mixed cultivation of maize and soybean plants, 70M30S and 60M40S mixtures could be used as ideal mixtures in terms of green hay yield efficiency and silage quality.
Keywords: Efficiency, maize, plant ratio, silage quality, soybean

Acknowledgements: This work was financially supported by the Yüzüncü Yıl University Scientific Research Projects Directorate (project no. 2015-FBE-YL279).

Determination of Nectar Potential of Phacelia Plant (Phacelia tanacetifolia Bentham) Grown in Coastal Regional Beach Conditions

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Abstract: The aim of the work carried out in the Black Sea Region in Samsun Province in 2010-2011 is the determination of the amount of nectar released and the content of dry matter in the nectar, determined by the regional adaptation of phacelia which contributes to the establishment of the bee forages required by the bee growers in our country. Plant material was used Phacelia (Phacelia tanacetifolia Bentham) plants which is name Sağlamtimur. The determination of the amount of nectar secretion and the concentration of sugar in the nectar was selected randomly 6 places (each one of 0.50 m2) in phacelia plantation. The nectar was collected from phacelia blooming season at four times in a day (10:00, 12:00 and 14:00, 15:00). The nectar was collected with fine-tipped syringes and sugar concentration was determined hand refractometer. The duration of flowering of Phacelia variety was determined to be 58 days in the first year and 49 days in the second year in the Samsun conditions. The first flowering was occured on 13.04.2010 at the first year of researching and on 02.05.2011 at the second year too. In a day, nectar secretion is observed that there is a decrease in the secretion quantities after 15:00. Weekly observations showed that the most intense nectar releases were in May. It was also determined that there was no statistically significant difference in the concentration of nectar sugar between measurement times in the study.

Keywords: Botanical composition, Quality, Mixture, Artificial pasture, Yield

Genetic Diversity in Sweet Corn ((Zea mays L. saccharata) Genotypes Evaluated of Morphological and Agronomic Traits

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Abstract: For selecting parental genotypes and essential broadening crops' genetic base the genetic diversity need to be understood. Consistent and competent morphological and agronomic method is a prerequisite for genetic engineering of sweet corn (Zea mays L. saccharata). In this study diversity among 11 sweet corn genotypes was cultivated in Erzurum/Turkey in 2017 cropping season. To characterize them based on morphological and agronomic capacity twenty parameters was analyzed using correlation and regression analysis, principal component analysis and cluster analysis. Fresh kernel yields positive significant correlation with ear yield (r=0.74**), number of marketable ears (r=0.68*) and yield of marketable ears (r=0.76*) while negative significant correlation was with plant height (r=-0.83**), ear height (r=-0.69**), ear diameter (r=-0.81**) and biological yield (r=-0.61**). Stepwise regression was used to remove the effects of ineffective or low impact on yield traits in the regression model. Important traits for fresh kernel yields in this study included plant height, ear number/plant and number of kernel rows/ear. The model has a coefficient of determination of 0.93. Understanding of relationships among the morphological and agronomic traits, principal component analysis was used. The first, second, third and fourth principal components explained, respectively, 37.92, 22.70, 15.61 and 12.03% of the total variation in all traits. Cluster analysis based on traits classified the genotypes into two groups. The highest genetic distance was showed between Challenger and Kompozit genotypes. The results shown a remarkable variation for morphological and agronomic ability in genetic materials in different genotypes that can be used in sweet corn breeding program.

Keywords: Cluster analysis, Genetic diversity, PCA, Sweet corn

Assessment of Technological Properties of Variability, Heritability and Genetic Advance in Common Bean Genotypes

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Abstract: Genetic variability and heritability could assist in ascertaining criteria to be used for the breeding programs. Thirty-two bean genotypes were assessed for seven technological traits. Among the genotypes, all the traits exhibited highly significant variation. The higher extent of genotypic (GCV) as well as phenotypic coefficient of variation (PCV) were noticed for water absorption capacity, water absorption index, seed swelling capacity, swelling index and degree of fragmentation. High heritability together with high genetic advance was observed for water absorption capacity and water absorption index indicating dominant role of additive gene action in the expression of these traits. The UPGMA dendrogram divide all genotypes in two major cluster. The PCA showed 7 technological traits generated about 72% total variation among all the genotypes under this study.

Keywords: Variability, Heritability, Genetic advance, Common bean, Principal component analysis

Differential Physiological Responses to Drought in Drought Tolerant and Susceptible Sorghum Cultivars at Pre- and Post-Anthesis

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Abstract: The purpose of this study was to evaluate impact on plant physiological prameters in response to drought applications at pre- and post-anhesis stages in four sorghum cultivars differing in drought tolerance. Drought stress was induced either by withdrawing water or applying potassium chlorate (KCIO3; 1%) as desicant. The duration of stress was lasted for 7-8 days for the pre-anthesis drought inducing group and 10-12 days for the post-anthesis group. Representative physiological traits, e.g., photosynthetic rate, stomatal conductance, transpiration rate, chlorophyll concentration, osmatic potantial, relative water content, starch content as well as root and shoot traits were studied. It was found that the crop physiological properties were reduced with drought applications at pre-and post-anthesis growth stages. Furthermore, significiant variations were found between drought tolerant and susceptible sorghum cultivars with regard to physiological traits under drought stress.

Keywords: Sorghum, drought, physiological traits

Acknowledgements: We would like to thank TUBITAK, Selçuk University and Purdue University to support the work.

Moringa oleifera: A Journey from Neglected to a Popular Multipurpose Plant in Pakistan

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Abstract: Moringa was a neglected tree in Pakistan despite a native to the country. It was a wild and was being cultivated in southern part of the country and used as a vegetable and some folklore medicinal uses. Domestication of moringa was initiated in 2008. Thereafter production technology as multi-cut forage, hedge, tree, landscape plant, vegetable crops was developed. Preliminary work was based on leaf extract as biostimulant on a variety of crops and mitigation of stresses. A series of studies were conducted for identification and survey of naturally occurring moringa, evaluation of nutritional and quality of different land races, cultivation of moringa as field crop for biomass production, moringa leaf/flower/root extracts as crop growth enhancer for a number of field crops under abiotic stresses. Moringa as green manure, moringa leaf powder as poultry feed, moringa seed as water clarifying agent, phytoremediation potential, anti-pathogenic potential, food engineering for the preparation of moringa products for human consumption, animal fodder, feed, poultry feed and diseases were also investigated. Millions of moringa have been planted in the country through motivation of my lab and at least 15 companies have been established and marketing moringa products, mainly as human health supplement. The latest and biggest success is ownership by the government by declaring subsidy on moringa.

Keywords: Moringa, biomass production, biostimulant, abiotic stresses

Effect on Macro-and Micro-Nutrient Concentrations of Sugar Beet (beta vulgaris l.) Leaf by ACC Deaminase-Containing Plant Growth-Promoting Bacteria

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Abstract: The aim of the study was to evaluate the effect of 1-aminocyclopropane -1-carboxylate (ACC) deaminase-containing, N2-fixing, and P-solubilizing plant growth promoting bacteria on macro-and micro-nutrient concentrations of sugar beet leaf (Beta vulgaris L.) under waterlogging and water deprivation. A total of 11 applications at both the trial set; (1) control (without bacteria inoculation and mineral fertilizers), (2) NP-fertilizers (55 mg of N + 40 mg P/kg soil), (3) Rhodococcus erythropolis T9, (4) Pseudomonas fluorescens T26, (5) Paenibacillus polymyxa R2/2, (6) Bacillus subtilis R3/3, (7) Variovorax paradoxus R2/1, (8) Pseudomonas putida B3/10, (9) Pseudomonas fluorescens PF8/6, (10) Bacillus subtilis BS6/3 and (11) Bacillus megaterium A21/3, and five water regimes is determined by the field capacity (150%, 100%, 75%, 50%, and 25%of water-holding capacity). The most important application in terms of nitrogen (2,77%) and potassium (24981mg kg-1) content was found inoculated with P. putida B3/10 bacteria. The most rate in point of Phosphorus (3258 mg kg-1), calcium (9488 mg kg-1), magnesium (3992 mg kg-1) and sodium (1804 mg kg-1) content was found inoculated with V. paradoxus R2/1 bacteria. The highest manganese (56,5 mg kg-1) and zinc (48,2 mg kg-1) content was found respectively inoculated with P. polymyxaR2/2 and P. fluorescens PF8/6 bacteria. Finally, with PGPR inoculation, macro-and micro-nutrient concentrations (N, P, K, Ca, Mg, Mn, and Zn) of sugar beet leaves increased.

Keywords: Water stress, 1-aminocyclopropane-1-carboxylate deaminase, plant growth promoting bacteria, sugar beet

Mineral Content and Essential Oil Components of Thymus migricus (klokov&desj-shost) in Van Province-Turkey

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Abstract: The genus Thymus belongs to family Lamiaceae. It is perennial, aromatic herbs and subshrubs. The flowering parts and leaves of Thymus species have been mainly used for medicinal properties. This study focuses to an investigation carried out on the essential oil constituents of Thymus migricus growing wild in Van area in the Eastern part of Turkey. Twenty three samples were collected from five different locations and the essential oils isolated by hydrodistilation from aerial parts were studied using gas chromatography-mass spectrometry (GC-MS). After quantified the essential oils, Thymol was found to be major constituent and its amount ranged from 23.48-85.51. For identified components, Bootstrap clustring analysis described the samples into five grouped components. Second part of this work was to analyse major and minor mineral contents of T. migricus samples collected from five regions of soils. Ca, Fe, K, Mg, Mn, P, Cu, Zn contents and $CaCO_3$, OM, PH, EC levels were determined in soil samples. N, P, Zn, Mn, Cu, Fe, K, Mg, Ca contents were determined for plant samples. Soil analyses provided that a notable deficiency reported for phosphorus, and organic matter content. However, the soils of research area had sufficient/excessive content in terms of manganese, zinc, copper, iron and lime. Results shows that Fe and Ca concentrations were very high for plant samples. Essential oil components shows different character caused by differences in soil properties. We suggest that these results shuld be useful for the evaluation of the quality of consume at Thymus.

Keywords: Thymus, plant and soil nutrient, essential oil constituents

The Some Wild Plants Fresh Consumed as a Food in Van/Turkey and Consumption Forms of These Plants

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Abstract: In this study, the wild plants fresh consumed as food by people living around Van region and their usage ways were investigated. It is found that 10 families (Apiaceae, Liliaceae, Asteraceae, Polygonaceae, Lamiaceae, Urticaceae, Brassicaceae, Liliaceae, Malvaceae, Plantaginaceae), which consist of 19 taxa (Urtica dioica L., Eremurus spectabilis BİEB., Nasturtium officinale R.Br., Tragopogon reticulatus Boiss. & Huet, Rumex tuberosus L. subsp. horizontalis KOCH RECH., Allium akaka S.G.Gmel. ex Schult. & Schult.f, Chaerophyllum macropodum Boiss, Thymus fallax Fisch. & C.A.Mey, Malva neglecta Wallr., Allium shatakiense Rech. f., Ornithogalum oligophyllum E. D. CLARKE, Ferula rigidula Fisch. ex DC., Heracleum persicum Desf, Gundelia tournefortii L., Rheum ribes L., Prangos ferulacea (L.) Lindl, Mentha longifolia (L.) HUDSON subsp. longifolia (L.) HUDSON, Plantago major L. subsp. intermedia (Gilib.) Lange, Eryngium billardieri F. Delaroche) are consumed as a food in different ways (as an ingredients to meals, peeling, boiling, roasted and salads) according to their evaluated parts. The plants those are generally consumed for leaves by people living in this region were reported as Urtica dioica L., Malva neglecta Wall., Eremurus spectabilis BIEB., Rumex tuberosus L. subsp. horizontalis (KOCH) RECH., Allium akaka S.G.Gmel. ex Schult. & Schult.f, Thymus fallax Fisch. & C.A.Mey, Ornithogalum oligophyllum E.D. CLARKE, Allium shatakiense Rech. f.., Mentha longifolia (L.) HUDSON subsp. longifolia (L.) HUDSON, Plantago major L. subsp. intermedia (Gilib.) Lange. It was also reported that Heracleum persicum Desf., Prangos ferulacea (L.) Lindl., Chaerophyllum macropodum Boiss., Ferula rigidula Fisch. ex DC. were consumed for stem, Rheum ribes L., Eryngium billardierei F.Delaroche, Gundelia tournefortii L. were consumed with peeling stalk and Tragopogon reticulatus Boiss. & Huet and Nasturtium officinale R.Br. were consumed as raw salads.

Keywords: Biodiversity, Food, Local consumption, Wild vegetable

Acknowledgements: The authors wants to thank to the Van YYU University BAP for its finasial supports for the 2015-FBE-YL240 project.

Effects of Water Deficit on the Yield and Yield Components of Fennel (Foeniculum vulgare Mill)

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Abstract: Deficit irrigation is a general strategy applied for the saving of water in arid and semi-arid regions with limited water resources, which can significantly affect the quality of the crop production. Fennel (Foeniculum vulgare Mill) is an important medicinal and aromatic plant showing good response to water, but there has been no previous study of the relationships between seed yield to irrigation water use efficiency in the semi-arid regions. This research was carried out in 2014 in Erzurum ecological conditions in order to determine the impacts of different irrigations quantities on the plant height, the number of branches, the number of umbrella, 1000-fruit weight and seed yield of fennel (Foeniculum vulgare Mill). The study included four different irrigation levels (100 % (I1), 80 % (I2), 60 % (I3) and 40 % (I4) of Class A pan evaporation). Treatments were arranged in a randomized complete block design with three replicates. Significant differences have been observed in the parameters investigated. In general, the increasing water shortage levels have reduced seed yield and the highest yield was obtained from the plots where highest water level is applied. Considering the need for efficient use of water resources and its cost, it was concluded that irrigation application would be more appropriate for 80% of the evaporation in terms of irrigation water use efficiency.

Keywords: Water deficit, Foeniculum vulgare, fennel, yield, yield components

Effect of Different Levels of Zinc on the Harvest Index and Nutrient Content of Lentil (Lens Culinaris medic.) Cultivars Up Ground Parts

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Abstract: Lentil is one of the oldest domesticated crops grown and used mostly in human diets in Turkey. The trial was laid out in a factorial randomized complete block design with three replications. Sazak-91, Yerli Kırmızı and Kışlık Kırmızı-51 lentil varieties were applied at five different zinc levels (0, 5, 10, 15 and 20 kg ha-1) in two years. In the study, the effect of zinc levels on the harvest index and N, P, K, Cu, Fe, Mn, Ca, Zn and Mg content in of lentil cultivars up ground parts were investigated. The highest harvest index was obtained in Sazak-91 cultivar in two years. Whereas the highest harvest index was obtained from 20 kg ha-1 Zn with %27.2 in the first year, the value was 20 kg ha-1 Zn with % 28.6 in the second year. Zinc applications increased the availability of N, K, Fe, Zn, Mn.

Keywords: Lens culinaris, zinc fertilization, harvest index, nutrient content, up ground parts

Responses of Barley Genotypes to Crown and Root Rot Disease Causal Organism Fusarium culmorum (W.G. Smith) under Field Condition

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Abstract: Fusarium culmorum is a soil-borne fungus causing crown and root rot on different small-grain cereals, in particular wheat and barley. In order to control of this disease, application of fungicides are inadequate in some cases besides their hazardous effects for environment and living organisms. As an alternative solution to chemicals, development and screening the resistant varieties has been emphasis in the plant defence studies. In 2016-2017, this study was conducted in Experimental Area of Bahri Dagdaş International Research Institute-Konya. In the study, totally 44 barley genotypes at regional yield level were included to be evaluated for resistance to F. culmorum under field condition. 20 out of 44 had been developed for irrigated condition while the rest of genotypes for rainfed areas by breeding studies in the Institute. The experiment was set up according to randomized complete block design with 4 replications for each entry. The barley seeds were sown in the previously contaminated soil with F. culmorum. At the end of growing period, the resistance levels of genotypes to F. culmorum were evaluated considering the 0-10 scale. Based on scale values, the plant genotypes were divided into 3 groups that were susceptible (≥3 scale value), moderately resistant (scale values between 1–3), and resistant (≤1 scale value). As a result for genotypes developed for irrigated condition, 1 genotype was grouped as moderately resistant, while 19 of genotypes were susceptible against F. culmorum. All genotypes developed for rainfed areas moved into susceptible group against to the pathogen.

Keywords: Fusarium culmorum, barley, genotype, resistance

Evaluation of Some Durum Wheat Genotypes in Terms of Yield and Quality

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Abstract: This study was carried out to identify with superior properties durum wheat lines in 2013-2014 and 2014-2015 growing season in Diyarbakir rainfed conditions. In the study, 5 standard varieties and 20 lines were uesd as material. The experiment established as a randomized complete block design experiment with four replications and grain yield, thousand grain weight, hectoliter weight, protein content, grain color and SDS value were evaluated. According to the analyses of compound variance was observed significant differences between genotypes, years and genotype x year interaction in point of whole parameters. In the Biplot graphics displaying stability position of genotypes, along high yield the most stable genotype had been line 8. According to the two-year averages, promising genotypes in connection with both grain yield and quality characteristics were taken the region yield trials to be evaluated in the registration phase.

Keywords: Durum wheat, Quality, Yield, Biplot

The Effect of Different Location and Sowing Times on the Quality Criteria of Cowpea

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Abstract: In this study, the effects of on 20 April, 5 May, 20 May, 5 June, 20 June, 5 July and 20 July sowing times application in Kahramanmaras and Sanlıurfa conditions on the quality criteria of Simal cowpea variety were researched. The experiment was established in 2015 as a randomized trial design with four replications. The pod length, number of grain of each pod, dry hay weight, moisture ratio, oil ratio, protein ratio and starch ratio characteristics of Simal variety (Vigna sinensis L.) were investigated. At the end of the research, it was noted that the number of grain of each pod, dry hay weight, the moisture ratio, the oil ratio, the protein ratio of cowpea, in terms of the locations, sowing times and locationxsowing time intrections were significantly different. It was determined that the length of pod is insignificant in terms of sowing time, and the pod length of starch ratio was significantly showed differs in terms of location and location x sowing time interactions. The grain number of each pod, the weight of dry hay, the moisture ratio, the fat ratio, the protein ratio, starch ratio of cowpea were reported varieties from 6 to11 unit, from 361 to 1631 kg da-1, from 10 to 13%, from 1.2 to 2.1%, from 22 to 27%, from 42 to 49% respectively. As a result, it was observed that the characteristics of the cowpea investigated were affected by the environmental conditions.

Keywords: Cowpea, locations, sowing times, quality criteria

The Investigation of Growth of Underground and Upground Organs With Spesific Periods at First Growth Stagein Different Wheat Cultivars

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Abstract: This study carried out in climate chamber room according to randomized blocks experimental design with four replications. The aim of this study to determine growth of underground and upground organs with specific periods at first growth stage in different wheat cultivars. The plant cultivars used in this study were choosen from the wheat cultivars widespread used in Turkey. Three seeds were sown each plastic pots having 600 gr soil and thinned one seed. As the growing media were used mixed of soil, peat and sand in ratio of 2:1:1. The experiment was ended after five weeks. The seed length, root length, seedling fresh weight, root fresh weight, seedling dry weight, root dry weight, ratio of root dry weight/seedling dry weight, leaf surface area, root surface area, root volume, primer and seconder root diameter were determined in harvested. The differences in investigated parameters were found signification for the cultivars and periods at statistically. The highest and the lowest leaf surface area were obtained as 13,99 cm2 and 12,33 cm2 in Saraybosna cultivars and Kıraç cultivars respectively. The highest and the lowest leaf surface area were found as 114,48 cm2 and 70,73 cm2 in Tekirdağ cultivar and Alparslan cultivar respectively.

Keywords: Wheat, cultivar, root, growth, period

Marker Assisted Gene Pyramiding in Plants

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Abstract: Gene pyramiding is an important strategy for crop improvement. Gene pyramiding is defined as a method aimed at assembling multiple desirable genes from multiple parents into a single genotype. The end product of a gene pyramiding program is a genotype with all of the target genes. Gene pyramiding is difficult using conventional breeding methods due to the dominance and epistasis effects of genes governing disease resistance. Depending on the trait and inheritance of the targeted genes, gene pyramiding may require much labour, time and material resources. In recent years, with the availability of DNA-based molecular markers and their use for marker-assisted selection (MAS), it has become possible to deal with complex quantitative traits. Marker assisted gene pyramiding has been used extensively for pyramiding major or qualitative disease resistance genes in plants. MAS based gene pyramiding has the potential to increase the rate of genetic gain when used in conjunction with traditional breeding. Marker-based selection reduces/eliminates extensive phenotyping, provides more effective options to control linkage drag, makes the pyramiding of genes with very similar phenotypic effects possible, and reduces the breeding duration. In the present review discussed potential application of gene pyramiding in plant improvement and the basic principles and the successful use of gene pyramiding in practical breeding is summarised.

Keywords: Marker assisted selection, molecular markers, gene pyramiding, breeding, quantitative trait

Constituents and Essential Oils of Naturally Grown Chenopodium Botrys at Suveren Campus, Igdır University

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Abstract: Chenopodium botrys L. is native to Europe and has been used traditionally for medicinal purposes. The therapeutic uses and health benefits of C. botrys are largely based on folklore rather than on scientific substantiation. The herb contains flavonoids, alkaloids and several terpenoids. Research results support medicinal potential of C. botrys for developing new drugs. Different isomers of ascaridole were major constituents of the essential oil of C. botrys. Ascaridole has various properties including anthelmintic, antifungal, sedative and pain-relieving. It also showed activity against different tumor cell lines in vitro. The purpose of this study was to identify ontogenetic variability of Chenopodium botrys in Iğdır conditions during October-November 2015. Naturally grown Chenopodium botrys plants were applied as plant material. Samples were taken at specific time intervals to determine growth stage dependent fluctuation of essential oil components. Results revealed variation of the volatile oil ratio and constituents depending on growth stage and plant different parts. While stem essential oil ratio wasn't recorded as notable for none of the samples, the value reached a maximum of %0.69 in the third cutting sample of the leaf. In terms of volatile oil components, while longifolene of first cutting was identified as main constituent (%35.09), valencene of leaf sample reached top amount of (%24.62) in the second cutting. α-selinen, β-selinen, β-elemene and γ-costol were also found as other major constituents of either leaf or stem samples.

Keywords: Chenopodium botrys, morphogenetic variability, longifolene, valencene, β-elemene

Effect of Different Genotypes on Seed Germination Traits in Fenugreek (Trigonella foenum-graecum L.)

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Abstract: Fenugreek (Trigonella foenum-graecum L.), known to have medicinal properties, belongs to the Fabaceae family. It is native to the eastern Mediterranean but is grown worldwide. It is very effective in treating diabetes and decreasing blood cholesterol. Germination is an important factor for seedling development, thus it is essential to understand the extent of genetic variation present for germination traits. In this study, we aimed to evaluate the germination traits of twelve fenugreek genotypes collected from different countries. For this purpose, fenugreek seeds were surface sterilized and twenty-five seeds from each genotype were germinated on two layers of filter paper in 9-cm petri dishes. The petri dishes were covered to prevent the moisture loss by evaporation and kept in 16:8 h light: dark photoperiod at 25±1 °C for 14 days. Experimental design was completely randomized design with four replications. The values of germination parameters of fenugreek genotypes ranged from 93.75 to 100% for final germination percentage; 1.18 to 2.29 days for mean germination time; 44.13 to 84.72 for coefficient velocity germination; 82.50 to 100% for rate index; 0.36 to 0.38 for germination rate index and 641.50 to 830.05 for seedling vigor index. This study indicated that fenugreek genotypes significantly differed in all parameters, and that these results would provide guidance to future studies on fenugreek.

Keywords: Fenugreek, Trigonella foenum-graecum, germination

Screening of Fenugreek (Trigonella foenum-graceum L.) Genotypes for Seedling Growth Traits

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Abstract: Fenugreek is an annual herbaceous plant of the Fabacae family, with leaves having three small obovate to oblong leaflets. It is native to the Eastern Mediterranean, but is cultivated worldwide. This plant has medicinal alkaloids, steroid compounds, sapogenins and has been widely used in traditional medicine and as food additives. Seedling growth stage is crucial for fenugreek growth and yield, and thus it is essential to understand the amount of genetic variation present for the seedling growth traits in fenugreek genotypes. In this paper, twelve fenugreek genotypes obtained from different countries were used and investigated for their seedling growth traits including the root length, shoot length, seedling length, root dry weight, root fresh weight, shoot fresh weight and shoot dry weight. The values of the seedling growth parameters varied from 1.89 to 3.02 cm for root length; 4.32 to 5.70 cm for shoot length; 6.70 to 8.49 cm for seedling length; 0.0005 to 0.0012 g for root dry weight; 0.0039 to 0.016 g for root fresh weight; 0.0458 to 0.0664 g for shoot fresh weight; 0.0022 to 0.0041g for shoot dry weight. This study revealed that fenugreek genotypes significantly differed in all parameters, except root and shoot dry weight and that these results would provide guidance to future studies on fenugreek.

Keywords: Fenugreek, Trigonella foenum-graceum, seedling growth, shoot length, root growth

Effect of Different Carbon Source Utilization Rate of Plant Growth Promoting Rhizobacteria on Growth and Yield of İzmir Oregano (Origanum onites L.)

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Abstract: The objective of this studies were to evaluate the effects of Thirty-five N2-fixing and/or P-solubilizing and different carbon sources utilizing-bacteria (7 isolates each of Bacillıs megaterium, Bacillus subtilis, Paenibacillus polymyxa, Pseudomonas putida ve Pseudomonas fluorescens) strains, which isolated from the acidic rhizospheric soil of native tea, grapevine and wild red raspberries, as biofertilizer on growth, yield and quality characteristics of the plant, chlorophyll content, essential oil content of İzmir oregano (Origanum onites L.). This study was carried out in Greenhouse at Atatürk University, Faculty of Agriculture and Department of Agronomy. As an average of years and the treatments showed that the plant has 36,8- 48.3 cm of length, 34.78- 46,10 cm of canopy diameter, 37,16-46,42 of chlorophyll concentration (SPAD value), 42,50-70.30 of green herb yield, 11.09-18,60 g/plant of drog herb yield, 6.57-11.25 g/plant of drog leaf yield and 1.85-2.78% of essential oil content rate. In terms of yield and quality criteria of İzmir oregano, in particular, the most effective N2-fixing and P-solubilizing strains P. fluorescens (8/2, 58/3, 9/7, 53/6 and 51/2), B. subtilis (52/1, 6/3 and R 3/3), B. megaterium (21/3, K5E and 35/6), P. polymyxa (R2/2), and P. putida (55/2, 3/10 and 53/5) may be used in agriculture. The single and three strains combinations of the bacteria tested in this study improved for enhanced plant growth promotion will enable reductions in inputs of chemical fertiliser, had a potential to be used as a bio-fertilizer in sustainable and organic İzmir oregano production.

Keywords: Origanum onites L, PGPR, essantial oil

Determining Yield and Some Fiber Technological Properties of F7-F8 Generation Cotton (Gossypium Hirsutum L.) Lines Obtained by Hybrydization of Different Varieties

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Abstract: This study was carried out to determine yield and some fiber technological properties of F7-F8 generation cotton lines obtained by hybrydization of different varieties in Çukurova Region. 14 F7-F8 generation cotton lines obtained from 4 different hybrid combinations (Flora/Özbek 100; ST 468/DP 388; ST 468/Ayhan 107; DP 388/DP 50) and two regional standart cotton varieties (Carisma and Gloria) were used as materials. Those lines evaluated in 2016-2017 as F7-F8 generation were obtained from the hybrydization studies carried out 2009 then selected and maintained according to pedigree selection method. The study was conducted in the East Mediterranean Agricultural Research Institute's experimantal area in the randomized complete block design with four replications in 2016-2017. Seed cotton yield, gin turnout, SCI, fiber fineness, fiber lenght, fiber strenght and fiber uniformity index were investigated were investigated in the study. As a result combined two years, ADN 116, ADN 513, ADN 137, ADN 741, ADN 312, ADN 419, ADN 107 and ADN 372 the lines investigated had superior values for yield; ADN 631, ADN 129, ADN 104, ADN 116, ADN 419 and ADN 107 for gin turnout; Gloria, ADN 137, ADN 372, ADN 312 and ADN 513 for SCI; ADN 312 for fiber fineness; ADN 452 and ADN 513 for fiber lenght; Gloria for fiber strenght; ADN 137, ADN 372 and ADN 452 coded elite lines for fiber unifotmity index comparing the checks varieties. Result of this study some of elite lines had been dedected as a candidate varieties based on seedcotton yield and

Keywords: Cotton, Hybridization, Yield, Fiber Tecnology

Oral Presentation

FOOD ENGINEERING



I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

Freshness Assessment of Mullet (Mugil cephalus) Fillets Stored at 4˚C by Image Analysis Correlated to Chemical and Sensory Attributes

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Abstract: Fresh fish is described as fish being caught/harvested, chilled and stored for a short period before use. Color is one of the most important quality attributes of fish. Color measurements of fish samples have an acceptable potential for determination of freshness. Therefore, our objective was to assess freshness of Mullet fillets based on color changes by machine vision and correlate this to chemical and sensory attributes. Mullet fillets (24) in Ziploc bags were stored 8 days at 4˚C. Triplicate samples were analysed at Days 0-1-2-4-6-8 by machine vision, sensory and chemical analyses (PV, TBARS, TVB-N and biogenic amines). Images of the same 6 fillets were also taken during storage using polarized-lighting. Color profiles were measured as the mean L*a*b* values from the entire area of the fillet surface. The a* and b* value for flesh surface of fillets were significantly different between Day-4 and Day-0, with a decrease in a* and an increase in b*. During storage, all chemical parameters analyzed increased. However, acceptable limits for human consumption were reached at Day-4 for TVB-N (34.30±1.62 mg N/100g fish) and biogenic amines (15.91±2.24 mg putrescine/kg fish muscle; 9.04±0.49 mg cadaverine/kg fish muscle). Chemical analysis revealed spoilage of fillets at Day 4. According to sensory evaluation, fillets were also rejected at Day-4 with an overall quality score of 6.770±3.945 out of 15. Image analysis results were consistent with the chemical and sensory analysis. Therefore, image analysis can be used as a rapid and non-destructive method to evaluate the freshness of Mullet fillets.

Keywords: Image analysis, Mullet fillets, freshness, sensory analysis, cold storage

Factorial Design for Optimizing Infrared Heating Conditions of Atlantic Salmon (Salmo salar) and Impact of Optimum Conditions on Lipid Quality

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Abstract: Consumers are becoming aware of the beneficial effects of fatty fish in the diet such as salmon; therefore it is important to explore the effects of different cooking processes on nutritional value of salmon. The objectives of this study were to determine the optimum infrared (IR) cooking conditions of Atlantic salmon using a full-factorial design, and to investigate the impact of optimum conditions on lipid quality. The optimum cooking conditions were determined by building a full factorial design together with ANOVA. Two factors were considered at three different levels each: halogen lamp power (80%, 90%, 100%) and cooking time (6, 7, 8 minutes). The main and interaction effects of these factors on three responses (internal temperature, cooking yield, color) were examined. F-test in ANOVA was used to identify whether the factors are significant or not, and the results revealed IR levels and cooking time were both significant. The optimum cooking condition was predicted as 7 minutes of cooking at 100% halogen lamp power level by using conventional cooking (at 200ºC for 15 minutes) values as targets. Fat samples extracted from IR cooked salmon at optimum conditions were analyzed for fatty acid composition, free fatty acids (FFA), peroxide value (PV), and p-anisidine (p-AV). The results showed that infrared cooking reduced the cooking time by 53%, and the fatty acid profile and lipid quality of the samples were not significantly affected during infrared cooking as compared to conventional cooking. Therefore, infrared heating can be noted as a sound approach for salmon cooking.

Keywords: Atlantic salmon, Salmo salar, infrared heating, full-factorial design, lipid quality

Effects of Gelatin based Edible Coatings on the Quality of Pearl Mullet (Chalcalburnus tarichi, Pallas, 1811) Fillets

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Abstract: In this study, effects of gelatin based edible coatings on the quality of pearl mullet fillets were investigated. For this purpose, the total of 4 sample groups, including control with no coating and 3 samples coated with different coating solutions, were used for comparison during refrigerated storage at +4°C up to 24 days. Coating solutions were composed of sole gelatin as positive control, gelatin+ascorbic acid and gelatin+potassium sorbate as added antioxidant and antimicrobial agents, respectively. Some biochemical and physical quality parameters were periodically followed during the storage. Based on the results, the content of free fatty acids significantly increased in all treatment groups due to high hydrolytic activity. The content of total volatile basic nitrogen (TVB-N) was under acceptable limits until the 12th day of storage and later on exceeded the limit in sole gelatin and gelatin+ascorbic acid coated samples. TVB-N value was 8,48 mg/100 g sample at the beginning while it was over 130 mg/100 g by the end of storage. Thiobarbituric acid (TBA) content showed increments in all samples in parallel to the extended storage and the progress in deterioration process. pH values of the samples first decreased a bit and later on increased due to further breakdown of proteins and the resultant high amine compounds. It is concluded that edible coatings may be useful in extending shelf life of fish and seafood. However, further studies are needed for optimization of coating formulations and evaluation of bioactive aids, which may provide some additional benefits.

Keywords: Gelatin, edible coating, pearl mullet, fish quality

Acknowledgements: This study was financially supported by TÜBİTAK-BİDEB 2209A Program under the contract number 1919B011502590.

Determination of Incidence and Presence of Motile *Aeromonas* Species in Beef Meats Consumed in Van City

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Abstract: This study was carried out to determine existence and incidence the motile *Aeromonas* species especially *A. hydrophila* in beef meat consumed in Van City. For this purpose, 53 beef samples (28 minced meat and 25 fresh pieces meat) and 75 carcass swabs (25 from buttock, 25 from pelvis and 25 from neck) totally 128 samples collected from butcher and markets of Van and analysed in term of the motile *Aeromonas* species. For isolation and identification *Aeromonas* species was used criteria proposed by Popoff. In 16 (57.14%) samples from 28 minced meat samples was isolated motile *Aeromonas spp*. In 9 (32.14%) from 16 samples was *A. hydrophila*, 5 (17.86%) *A. sobria*, 1 (3.57%) *A. caviae*, and 1 (3.57%) had both *A. hydrophila* and *A. caviae*. In 10 (40.0%) samples from analysed 25 fresh pieces beef samples was isolated motile *Aeromonas spp*. In 7 (28.0%) from 10 samples was *A. hydrophila*, 2 (8.0%) A. sobria, and 1 (4.0%) *A. caviae*. In 31 (41.33%) samples from analysed 75 carcass swab samples was isolated motile *Aeromonas spp*. In 26 (34.66%) from 31 carcass swab samples was *A. hydrophila* and 5 (6.67%) *A. caviae*. As a result, in beef (minced meat, fresh pieces meat and carcass) was determined at important ratios of motile *Aeromonas spp*. and that is should be posed a potential risk for public health.

Keywords: Motile *Aeromonas spp*., beef, minced meat, fresh piece meat, carcass

AnAlternative to Cow Milk: Vegetable Based Milk Types

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Abstract: In the last decades there is an increasing demand to vegatable based food products. Since people give an more importance to healthy and natural food, human dietary habits has changed in last years. Result of this changes, production and development of vegetable based milk and their products have increased and they are used for food ingredient to several food products for their nutritional value. Protein allergy and lactose intolerance are main problems for cow milk for some sensitive people. Therefore vegetable based milk types are alternative to cow milk for these sensitive people. Soy milk, almond milk, hazelnut milk, rice milk, coconut milk are major vegetable milk resources These milk types are important resource of calcium, phospor and potassium. Especially almond and hazelnut have low cholesterol content and an equilibrated monounsaturated fatty acid-polyunsaturated fatty acids ratio, which define the products which are healthy for people with heart disease. On the other hand this nuts have high antioxidative compound which contributes to heart disease prevention. In this study it will be investigated that physicochemical, allergic and bioactive properties of vegetable based milk types.

Keywords: Vegetable based milk, allergy, lactose intolerance, human health

Ultrafiltration and Homogenization Applications in White Cheese Production

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Abstract: In this study, the effects of ultrafiltration and homogenization processes on some properties of White cheese were investigated. Milk, used in cheese production was collected from the market and divided into 8 parts. The first two parts of the milk were reserved for cheese production without ultrafiltration. The remaining milk was subjected to ultrafiltration, with a concentration factor of 1.85, 2.64 and 3.70, respectively. The first portions of all milk were passed through the homogenizer without applying pressure, while the second portions were homogenized at 50 °C at a pressure of 10 MPa. It has been determined that condensing the milk by ultrafiltration and appling the homogenization process to the cheese-milk increases the yield in cheese and this increase is appearing as more protein and fat retention in the cheese mass. The salt, ash, acidity and pH values of the cheeses have not been significantly affected by the applications. Also the applications did not affect the proteolysis and lipolysis values and electrophoretic properties of the cheese at significant levels. However, the applications caused the formation of different bands regions and density in the electrophoresis gels. Even though the ultrafiltration process affected the hardness value of the cheeses negatively, it was determined that the homogenization process eliminated this problem. It has been determined that only the UF treatment, affects the acceptability of cheeses negatively when considered in terms of sensory properties, but when it is applied with homogenization process it has been found that these cheeses were similar to control cheeses.

Keywords: White cheese, ultrafiltration, homogenization, cheese yield

Chemical and Microbiological Properties of Bitlis Tulum Cheese Traditionally Produced and Presented in Market

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Abstract: In this study, total 36 samples of cheese has been used as material to determine chemical and microbiological properties of traditionally produced Bitlis tulum cheese. The chemical analyzes of the samples, the mean dry matter, fat, protein, salt, ash, titratable acidity and pH values has been determined as 59.349±2.657, 31.231±3.783, 22.641±1.243, 3.351±0.809, 3.771±0.529, 1.112±0.122 LA% and 5.141±0.187, respectively. On the microbiological analyzes of the samples, the mean total aerobic mesophilic microorganism, total psychrophilic microorganism, coliform group microorganism, *Escherichia coli*, enterococci, coagulase (+) *Staphylococcus aureus* and yeast-mold has been determined as 8.135±0.897 $\log_{10}$ cfu/g, 6.479±1.319 $\log_{10}$ cfu/g, 3.493±1.447 $\log_{10}$ cfu/g, 4.072±1.404 $\log_{10}$ cfu/g, 8.454±0.576 $\log_{10}$ cfu/g, 3.446±0.453 $\log_{10}$ cfu/g and 6.345±1.236 $\log_{10}$ cfu/g, respectively. It has been determined that cheeses contains high amount of fat and it is a good source of protein in terms of nutrition because of the use of sheep milk, goat milk and theirs mixed in production. However, in some of the cheese samples examined, hygienic quality was not good, 16.66% was coagulase (+) *S. aureus* and 36.11% has been found to contain *E. coli*. As a result, it concluded that hygienic quality the Bitlis tulum cheeses presented in the market was inadequate and maight posed a potential risk for public health. It has been thought that if the production and marketing of these cheeses to be considered into account hygiene rules and a standard production is provided, it will be possible to obtain better quality products, so contribute to the economic development of the region.

Keywords: Bitlis tulum cheese, chemical, microbiological

Protein Depression Analysis during Summer Season in Conventional Milk

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Abstract: Abstract Data of study was obtained from a milk company in Tekirdağ province of Turkey during June, July and August month. If the protein/fat ratio is less than 0.80 in milk, milk protein depression occurs. Protein/fat data were analyzed by one sample t test was made to compare differences ($p<0.05$) between means of months and reference value (0.80 = protein depression threshold) with help of the SPSS 18.0. Milk protein/fat means of June (0.89), July (0.88) and August (0.91) months were higher than reference value (0.80). According to results obtained from all months, it can be said that there were no protein depression during summer season in conventional milk. This study should be repeated for all season of year. The dairy product manufacturers must be careful about protein depression in milk obtained from different season for achieving maximum profit.

Keywords: Protein depression, milk, summer

Effect of Barberry (Berberis vulgaris) Addition on Some Physical, Chemical, and Rheological Properties of Ice Creams

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Abstract: Ice cream has high calorie and nutritional properties, but its content is unsufficient in terms of dietary fiber, natural antioxidants. Recently, many different fruits are used to improve the functional characteristics of ice cream. BB is rich in respect to natural antioxidant, fiber, some minerals and natural colorant. The goal of this study was to investigate the effect of barberry (BB) addition at four different ratios (0%, 5%, 10% and 15%) on the physical, chemical, color and rheological properties of ice creams. The dry matter ($P<0.05$), titratable acidity, pH, fat, overrun, melting rates (45th and 60th min) ($P<0.01$) values of ice cream samples were affected by addition of BB, but first dripping time was not affected ($P>0.05$). The melting rates (45th and 60th min) were higher in 15% (6,66% and 22.05%) and 10% (12.42% and 36.33%) added samples compared to other samples. The increment of BB level caused an significant change of L*, H° ($P<0.01$), a* and b* ($P<0.05$) values, C* and ΔE* values did not indicate a significant change ($P>0.05$). Increasing BB concentration, L* and b* values decreased and a* values increased. The addition of BB had significant effect on viscosity (20 rpm) and consistency coefficient (K) values ($P<0.01$), while flow behavior index (n) values were not affected ($P>0.05$). The ice cream samples including 15% and 10% BB had higher viscosity (20 rpm) values and consistency coefficient than other samples. BB may be added to improve physical and chemical properties of ice cream and as natural colorant.

Keywords: Barberry, ice cream, rheological proeperties, color properties

The Effects of Microwave Treatment and Storage Times on Oxidation of Wheat Germ Oil

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Abstract: This study was performed to determine the effects of microwave heating and storage times on oxidative stability of wheat germ oil. For this purpose wheat germ was stabilized in a microwave oven at 600 W for 5 min. Then microwave heated and raw samples were packed in fridge bags and stored at room temperature (25° C) for 90 days. At 0, 15, 30, 60 and 90 days of storage the wheat germ oil was obtained by the cold extraction method for oil quality analysis such as free fatty acid content (FFA), peroxide value (PV), thiobarbituric acid number (TBA) and fatty acid composition (FAME). Linoleic acid was the most abundant fatty acid in germ oil followed by oleic, palmitic and linolenic acids. The microwave treatment and storage time did not significantly affect the FAME of the samples ($P>0.05$). The FFA values of samples signficicantly changed during storage ($P<0.05$). The FFA content of raw germ sharply increased within the first 30 days of storage and reached to 19.27 %. The FFA of microwaved samples showed lower FFA values than those of raw samples and increaed to 7.80% at the end of the 90 days storage. PV increase was notably retarded in microwaved samples. The PV of raw samples increased from an initial value of 2.28 meq/kg to 20.52 and 15.82 meq/kg after 90 days storage in raw and microwaved samples, respectively.

Keywords: Wheat germ oil, microwave heating, free fatty acid, fatty acid composition, storage

Acknowledgements: Financial support provided by Van Yüzüncü Yıl University Research Fund (FDK-2017-5582) is gratefully acknowledged.

Antistaling Effects of Natural Plant Extracts in Breadmaking

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Abstract: Bread is the most important traditional and commercial food product around the world. Due to the changes in baking industry and the ever-increasing demand for more natural products, plant extracts have gained real importance in breadmaking technology. In this study, the effects of marjoram (Origanum majorana), cinnamon (Cinnamomum zeylanicum) allspice (Pimenta diocia), poppy (Papaver somniferum) paste, potato (Solanum tuberosum) starch additives on bread quality were investigated. Protein content, Zeleny sedimentation, falling number, Alveograph and Farinograph properties of flour and flour+additives, and degree of softening, colour, specific volume and microbiological deterioration of bread were evaluated in the research. Results showed that natural additives increased quality and shelf-life of bread. Addition of poppy paste increased the specific volume of bread, whereas allspice, marjoram and potato starch showed best results in terms of Zeleny sedimentation value. Lowering of softening degree is an important factor in breadmaking industry: Cinnamon extract gave the best value in terms of softening degree, and potato starch and poppy paste followed cinnamon. The best colour values were obtained from allspice, cinnamon and potato starch including breads. When breads compared by the presence of mouldiness, it has been revealed that marjoram, allspice and cinnamon showed the best results for prevention of mouldiness in studied bread samples. In conclusion, natural additives such as marjoram, cinnamon, allspice, potato starch and poppy paste could be suggested to use as natural additives for development of the quality and shelf-life of bread in breadmaking technology.

Keywords: Bread, marjoram, cinnamon, allspice, poppy

An Investigation of Corn Chips Enriched with Sage Seed (Salvia Officinalis L.)

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Abstract: In this study, utilization of sage seed (Salvia officinalis L.) powder was evaluated to produce snack food (corn chips) formulation and for this purpose, corn chips were manufactured using sage seed (Salvia officinalis L.) powder at different concentrations. Response surface modeling techniques was used to study the simultaneous effects of sage seed powder level (0-15%), frying time (40-60 s) and frying temperature (170-190 ºC) on some physicochemical, textural, fatty acids and sensory properties of corn chips enrichment with sage seed powder. Results indicated that the addition of sage seed powder into the formulation decreased the oil content, moisture, water activity, L, b, hardness of the final product. Also, the peroxide of the samples decreased with the increasing of sage seed powder level. As we seen the fatty acids of sample, the palmitic, stearic, oleic acids decreased with the increasing of sage seed powder level while the linoleic and linolenic acids increased with the increasing of sage seed powder level. Otherwise, the dry matter, ash and protein of the samples increased with the increasing of sage seed powder. Generally, corn chips produced with the addition of sage seed powder were more preferred by the panel compared to control sample. Acknowledgment The authors would like to thank the Gumushane University (GUBAP, Project no: 16.F5115.03.02) for financial support of the study.

Keywords: Corn chips, sage seed powder, texture, sensory and fatty acids analysis

The Effect of Wheat Variety and Bulgur Production Method on Phytic Acid and Total Phosphorus Contents

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Abstract: Bulgur is a whole grain product which is commonly produced from Triticum durum in Turkey. The traditional bulgur production steps are cleaning, cooking, drying and crushing. The last step is classification as coarse and fine for pilaff and soup, respectively. There are six types of bulgur according to particle size defined by Turkish Bulgur Standard (TS 2284). The first four of them are coarse bulgur types while the last two of them are fine bulgur types. The aim of the study was to determine the most suitable variety and cooking method for bulgur production in terms of lower phytic acid. In the study; two types of the bulgur (total coarse and fine) were produced by using two different cooking methods (steam cooker and autoclave) and 9 wheat cultivars grown in Haymana and Altınova locations in two production years. The results of the study showed that both the genotypes and environmental conditions caused differences in investigated quality parameters. Phytic acid and total phosphorus contents obtained from wheat varieties grown in the first production year and Altınova location were higher due to smaller kernel size caused by lower amount of rainfall. Differences between varieties, cooking methods and bulgur types were found to be significant in terms of the defined quality criteria in bulgur. The lower phytic acid and total phosphorus contents were obtained from both coarse bulgur type and autoclave cooking method.

Keywords: Bulgur, quality, phytic acid, cooking method, bulgur type

A Study on Some Quality Attributes of Turkish Flat Bread (Bazlama) Supplemented with Pekmez (Beet Molasses)

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Abstract: Cereal based food products, especially bread, have had a great importance in human nutrition since the ancient times. There are lots of bread varieties all over the world and traditionally produced bazlama, a kind of flat bread, is one of them. As a result of the increasing consciousness and demands of the consumers on healthy nutrition, it has become necessary to improve the functional properties of the breads. Therefore in the present study it was aimed to increase the functional quality of bazlama by the supplementation of beet pekmez (BP), which has a high nutritional value with its rich vitamin and mineral composition. BP was incorporated at different levels (0, 10, 20, 30, 40 and 50 %) in bazlama samples (BS) and their physical, chemical and sensory properties were evaluated. It was observed that the width, thickness, water activity and moisture content of BS were decreased with the increasing rate of BP while significant decrease ($P<0.01$) in the specific volume were detected after the addition of BP at 30% level. Generally brightness and yellowness of BS were found significantly higher ($P<0.01$) than that of control bazlama (CB, not including BP). Sensory evaluation showed that BS with acceptable flavor could be obtained by incorporating BP up to 20% level.

Keywords: Bazlama, beet, flat bread, molasses, pekmez

Comparison of Methods Used in Extraction of Bioactive Ingredients from Herbal Materials

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Abstract: Functional foods enriched with bioactive ingredients recently gained wide attention due to potential health benefits of bioactive ingredients and increasing awareness. As these bioactive ingredients has different chemical characteristics, there are various conventional and nonconventional methods utilized for extraction of these ingredients. However, there is no standard method widely accepted for obtaining bioactive ingredients up until to the present day. With this in mind, toxicity of the solvents used, deterioration of the bioactive ingredients during processing and sensitive selectivity of the method towards to the bioactive ingredients are key points among those needed to be considered. Nowadays, requirements for low level use of synthetic and organic chemicals, short operation periods and better extraction yield and quality leaded to environments friendly nonconventional extraction methods. Along with this, every aspect of these nonconventional methods should be clearly understood as these methods are based on different mechanisms. In general, the selection of an appropriate extraction strategy should be based on the type of compound to be extracted as well as the potential up scaling of the method. On the other hand, high demand for herbal extracts, their high economic value and commercial potential may lead to even more sophisticated methods to be used in extraction of these ingredients. Efficiency of conventional and nonconventional methods mostly depend on some critical parameters like the chemistry of bioactive ingredients, nature of herbal sources and professional experience. This paper will review the different extraction methods utilized in extraction of bioactive ingredients from herbal materials.

Keywords: Bioactive ingredient, extraction, herbal material, nonconventional extraction

Effects of Roasting Conditions on the Oxidative Stability of Watermelon Seed Oil

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Abstract: Roasting is the main process for several production lines which causes many complex physicochemical and sensory changes. In this study, the effects of different roasting temperatures (140, 160 and 180 °C) and times (10, 20, 30, 40, 50 and 60 min) on oxidative stability of watermelon seed oil were investigated. Watermelon seed samples were obtained from Batman province (Southeastern Anatoila, Turkey). Oil from watermelon seed extracted by cold extraction. Some parameters such as fatty acid composition, peroxide, K232 and K272 values of extracted oils from roasted seeds were determined. Linoleic acid was the most and palmitoleic acid was the least abundant fatty acids in samples. Fatty acid compositon of the samples did not significiantly change due to increasing roasting temperature ($p>0,05$). Peroxide value of the samples varied between 1.57 and 3.0 meq O2/kg oil. Roasting temperature significiantly affected the peroxide value of the samples ($p<0.05$). The K232 value of samples showed significant differences ($p<0.05$) at all temperatures and increased from the initial value of 2.58 to 4.28 due to increasing roasting temperature. K270 values of samples roasted at 180 °C significiantly differed ($p<0.05$) from those roasted at 140 and 160 °C. The results showed that roasting temperature considerably affected the peroxide and K232 values of the oil samples obtained from the watermelon seeds.

Keywords: Watermelon seed oil, roasting, peroxide value, oxidative stability

Acknowledgements: Financial support provided by Van Yüzüncü Yıl University Research Fund (**FLY-2017-6644**) is gratefully acknowledged.

Effects of Different Drying Methods on Volatile Organic Compounds of Ismailaga Apricot Cultivar

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Abstract: Malatya apricot is important plant fruit with medicinal and aromatic directions. Malatya apricots, which are important in terms of nutrition physiology, provide additional benefits in preventing health and illnesses on human physiology and metabolic functions beyond the inclusion of essential nutritional elements. In human nutrition, usage of food with high antioxidant capacity like apricot is being encouraged. Malatya alone has a share of 12% in world fresh apricot production and 65% in world dried apricot production. In this study, the effects of different drying methods (sun dried, sun dried then sulfurization and oven drier drying) on the volatile organic compound profile of table and dried İsmailağa apricot variety were investigated. The drying and sulphuring process has been significantly effective on volatile organic compounds. It has been determined that the amount of volatile organic compounds decreases due to suplhur aplication and amount. The different driying methods significantly influanced the volatile organic compounds ($p<0,05$).

Keywords: İsmailağa apricots, volatile organic compounds, different drying methods

The Effects of the Amino Acid Decarboxylation in Wine

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Abstract: Process of wine making is consists with tree steps; this steps are fermantation, conservation and aging and this drink have more than five hundred materials in it. Key of the wine making process is looks like grapes but there can be many fruits use to make wines and they take their names from the fruit used fort he base material. Mastering the knowledge of the grape and the wine making process is a requirement to make high quality wines. Wine, is a complex structure that contains both organic and inorganic materials. Other than water and alcohol; there is sugar, organic acid, phenolic compounds, flavor compounds, minerals, pectic compounds and many more compound materials. Ferment and the lactic acid bacterias are using amino acids that inside of nitrogenous compounds as main food resource is the one of the most important compounds in the wine. When the carbone dioxide breaks down its structure that we are calling it as decarboxylation some toxic materials occurs and that toxic materials is lowering down the quality of the wine and carrying risks for human health. If taking too much concentrantions it can leave some of unwanted physiological effects. For this reason determining the amounts of compouns such as biogenic amines named as histamine, tyramine, phenyl, ethylamine and putrescine and toxic effects is very important. For increasing the quality of wines and wime relience that served the customers we need to know better the formation factors.

Keywords: Decarboxylation, Biogenic amines, Wine, Vitis vinefera L.

Comparison of Antioxidant Amounts of Some Fruits and Wines made from these Fruits

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Abstract: The importance of antioxidants having a protective effect against the harmful effects of free radical scavenging cell structure has gradually increased in recent years. Antioxidants are found to high levels in some fruits and wines obtained from these fruits. Several studies have been performed with many fruits and fruit wines containing antioxidants. In the literature, differences have been reported among the values of the antioxidant properties of some fruits and wines made from these fruits being important sources of natural antioxidants. In this review, antioxidants in some fruits and wines made from these fruits were compared. Wine is a rich antioxidant compound having beneficial effects on human health along with the most important of the polyphenols. The amounts of antioxidants have shown different values in the fruit and the wine of the same fruit. At the same time, it has been determined that some fruit wines were contained much more antioxidants than red wine. The fruit wines contain beneficial compounds owing to new gained polyphenols although the amount of antioxidants of fruits is decreased in consequence of composing of wine. The positive effects of antioxidant consumption on human health have been demonstrated through studies. It is thought that regular consumption of antioxidant-containing fruits and fruit wines is much better for the health instead of drugs.

Keywords: Antioxidants, fruit, fruit wines, free radical

Antimicrobial Properties of Fruit Vinegars Produced in Turkey

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Abstract: In the present study, variety of fruit vinegars, which are produced without pasteurization and additives, and sold in Turkey under the name as "organic vinegar" were investigated in terms of their antimicrobial and microbiological properties. The numbers of lactic acid bacteria (LAB), acetic acid bacteria (AAB) and yeast-mould were found in the range of 4.00x101-2.46x105, <10-2.09x106 and 3.40x102-9.52x103, respectively for apple, pulm, grape and blackberry vinegar, while these numbers were found under detection limits for apricot, mandarin, persimmon, pomegranate, fig and rosehip vinegar. The antimicrobial activity of vinegar samples against nine bacterial strains (Listeria monocytogenes, Enterococcus faecalis, Bacillus subtilis, Staphylococcus aureus, Escherichia coli O157:H7, Salmonella Typhimurium, Escherichia coli, Bacillus cereus, Pediococcus acidilactici) was examined. In the determination of in vitro antimicrobial activity of vinegar samples, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) assays were done. MIC was determined for each microorganism using a 96-well microtiter plate method. Vinegar samples exhibited growth-inhibitory effect for all test microorganisms. Most of the samples were found inhibitive at concentrations between 3.12. and 6.25% (MIC, v/v), while apple vinegar showed inhibitive effect at higher concentrations. The most sensitive bacteria to all vinegar samples was P. acidilactici. Bactericidal effect was not observed only in apple vinegar sample for all test cultures. These results indicated the potential of fruit vinegars as antimicrobial agents that could be used as functional food ingredients and as food supplements.

Keywords: Fruit vinegar, antimicrobial, MIC, MBC

Research on the Activity of Protein Oxidation in Different Concentrations of Almond (Amygdalus Trichamygdalus) Fruit

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Abstract: Aim: In this study, it was aimed to investigate the antioxidant activity and thus the protein oxidation inhibition activity of ethanol extract of cultivated almonds (A. trichamygdalus) cultivated in and around Ergani province of Diyarbakır province in different concentrations. Material method: Extract was prepared from dried almond (A. trichamygdalus)fruit collected from Diyarbakır Ergani region using the soxlet method. Total phenolic compound determination of almond (A. trichamygdalus) extract was determined by Folin-Ciocalteus method. The total flavonoid component content of the A. trichamygdalus ethanol extract was inspired by the Zhishen study, which previously identified this method. The protein oxidation inhibition activity of A. trichamygdalus ethanol extract, the ability of the H2O2/Fe+3/Ascorbic acid system to inhibit damage to the Bovine Serum Albumin (BSA) protein, was carried out using the vertical electrophoresis method. Results: The total phenolic component content of the ethanol extract at 0.5 mg/ml was 28.16 ±9.990µg/ml gallic acid equivalent and the total flavonoid component content was 8.86± 0.208µg / ml quercetin equivalent. The oxidative damage induced by the A. trichamygdalus ethanol extract in the H2O2/Fe + 3/Ascorbic acid system and the BSA protein inhibited 32.47 ± 0.94-76.27±1.14% in the lowest and highest values at the concentration range of 500-2000 µg / determined. If these results are taken into consideration; Studies have shown that the ethanol extract of A. trichamygdalus juice is a good antioxidant and very good in protein oxidation inhibition activity.

Keywords: A. Trichamygdalus, Almond, BHA, Ergani, Protein oxidation

The Use of Encapsulated of St. Johns Wort Extract in Production of Ayran

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Abstract: St. Johns Wort helps with treatment of diseases caused by depression, cancer and some viruses. The use of this plant, use of which is difficult and not preferred in general, can be increased by using it in food products appreciated by people. In this study, St. Jonn's Wort (Hypericum perforatum L.) plant was extracted with ethanol + water mixture and the obtained extract was encapsulated. In this study, St. Johns Wort extract was encapsulated with coating materials containing 10% maltodextrin and 10% maltodextrin + 5% whey. The control group and samples of which adding 5% and 2.5% encapsulant containing 10% maltodextrin, 2.5% encapsulant containing 10% maltodextrin + 5% whey some of the physicochemical and microbiologic analyzes were performed. As a result of the analyzes, there were statistically differences in dry matter, pH, ash, salt and acidity values between ayran samples and control group ($p > 0,05$). As a result of the microbiological analyzes, were found statistical differences in the total mesophilic bacterial group ($p > 0,05$) whereas the coliform group and the growth of the yeast were not observed between the ayran samples and control group. St. John's Wort has a bitter taste and color. Encapsulation technology has been tried to be masked these properties. When the bitter taste masking is provided, the color pass is not completely prevented. As a result of it has been decided that different materials should be tested as coating material.

Keywords: Encapsulation, St. John's Wort, ayran

Acknowledgements: This study was supported by Amasya University BAP FMB-BAP 17-0273 project.

Celiac Disease and Disorder Proteins

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Abstract: Celiac disease; is an autoimmune enteropathy known as persistent intolerance to gluten-like proteins, caused by inherited and environmental factors. Gliadin is highly immunogenic and is not completely digested in humans. After in vitro or in vivo proteolytic degradation, the 33 amino acid peptide (33-mer), LQLQPF (PQPQLPY) 3PQPQPF remains intact among the other small peptides. This 33-mer fragment is considered as one of the most important immunologically modulating peptides responsible for Celiac disease, and the complex immunological disorder is seen in 1% of healthy populations. Until now, the only treatment in both pathologies is a lifelong diet without gliadin and 50 mg/day gluten intake is sufficient for mucosal damage. Alpha, beta and gamma gliadins and gliadins synthesized from the C and D subunits of LMW-GS are responsible for the pathogenesis of Celiac Disease. However, the role of Celiac Disease in the pathogenesis of HMW-GS has not been clearly understood. In fact, HMW-GS is not responsible for the pathogenesis of Celiac Disease. In our study, HMW GS protein bands were determined in a vertical electrophoresis apparatus, and band density was modeled using a densitometric method. The National Center for Biotechnology Information (NCBI) was used to identify the amino acids synthesized from the primers in the indicated genomes. As a result, a disorder protein consisting of 294 amino acids was detected. We believe that these disorder proteins may play a role in the etiopathogenesis of celiac disease or gluten susceptibility due to the autoantigenic character.

Keywords: Celiac, gliadin, peptide, primer

Plant Based Compounds with Antimicrobial Potentials

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Abstract: Fresh or dried forms of various plants are commonly used for improving quality attributes of the foods. The natural substances of plants and spices can also act as antimicrobial agents. The components found in the plants such as phenolic compounds, organic acids and essential oils have broad antimicrobial properties against various microorganisms, including foodborne pathogens. Essential oils obtained from plants also have active components such as thymol, carvacrol, eugenol, and limonene. Therefore, plants provide important potential for ensuring food safety. There is an increasing demand amongst the populations all over the world to consume natural foods produced without using any chemical preservative, which are commonly used in the food industry to extend the shelf life of foods. Hence, the use of plant-derived antimicrobials in foods can best meet the demands of consumers to consume more healthy foods. During the last decade, antimicrobial activities of essential oils and extracts of various plants have been extensively studied. In this review, antimicrobial active ingredients in plants and their mechanisms of action are discussed in detail. At the same time, the studies investigating the antimicrobial effects of plant origin products and the inhibitor activities in food systems have been examined.

Keywords: Antimicrobial activity, plants, natural additives, food safety

Use of Antioxidants with Polymer Matrix in Food Packaging Industry

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Abstract: In recent years, interest in preserving the quality of food packaging materials has been increasing. One of the main problems is oxidative reactions involving food components such as lipids, proteins and polysaccharides. Among these, lipids play a significant role in determining food quality, because they are the major cause of oxidative reactions, the main problem of natural and processed food products. Lipid oxidation can cause a serious drop in food quality. In particular (depending on the availability of essential fatty acids and oil soluble vitamins), it affects the health characteristics of flavor, satiety and food products. It is necessary to remove hydroperoxides and free radicals or free radicals produced in the food system to prevent oxidation of food components. For this reason, synthetic or natural antioxidant agents are added to active packaging materials to prevent oxidative reactions and to preserve food quality and nutritional value. The product of antioxidant selected for active packaging should be developed taking into account the appropriate and specific mechanism of action. According to the investigations made, antioxidant agents are included in the packaging polymer matrix. The general methods used can be applied to packaging systems in different forms, including independent bag packages, adhesive bonded labels, physical adsorption/coating on the packaging material surface, multilayer films, and covalent immobilization. In this study, literature was searched about which polymer matrix and antioxidants used in active packaging were used.

Keywords: Antioxidant, lipid oxidation, food industry

The Effect of Calf Gender on Milk Parameters Having Economic Importance

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Abstract: This research was carried out to learn the effect of calf gender on milk parameters with economic situation. The research was focused on the 20 female Simmental beef animals. These animals were divided equally into 2 groups according to their offspring gender in Mazgirt province of Tunceli. Milk samples were taken from the breeding animals for analysis. The milk samples were collected and their statistical comparisons were made by obtaining fat and protein values from laboratory analyzes. An independent two-sample t-test was used to determine the effect of different calf genders on the milk parameters with economic prescription. As a result of the analyzes there were no statistical differences in milk parameters between female and male born cattle. In this study, there was no difference in milk parameters of cattle with different sex offspring, indicating that the mode of delivery is not effective on milk parameters such as fat and protein. Therefore, it is understood that there is no remarkable effect of the puppy sex when the value of the cigarette parameter is determined. It is necessary to support the results obtained by repeating the study on different races.

Keywords: Cow, milk, biochemical parameter, calf gender

Antimicrobial Properties of Plant-Derived Essential Oils and Their Uses on Food Preservation

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Abstract: Recently, there has been a renewed interest in the antimicrobial effects of natural herbal compounds which were generally used as therapeutic in the worldwide until the advent of penicillin, the first true antibiotic, was discovered by Alexander Fleming. Essential oils (EOs) are concentrated natural, volatile, complex mixtures compounds, oily or lipid-like in nature and can be removed from various parts of herbs. They and their fractions have been orginally used as flavouring ingredients in foods since the earliest recorded history. Although the majority of the essential oils are accepted as Generally Recognized As Safe (GRAS), their use in foods as preservatives is often restricted due to flavour considerations. Also, the uses of essential oils have attracted increasing interest as the native additives for the shelf-life extension of foodstuff, because of the risk in using synthetic chemical preservatives. EOs have antimicrobial properties. They kill or inhibit the growth of microorganisms such as bacteria, fungi, or viruses. Plant-derived essential oils (EOs) have demonstrated significiant antimicrobial capacity against spoilage and pathogenic microorganisms in food preservation and safety. This review evaluates the usage of plant-derived natural antimicrobial agents (Essential oils) and their uses on food preservation and safety.

Keywords: Essential oils, antimicrobial, shelf-life, food, plant-derived

Benchmarking of the Food Safety Management Systems for Food Packaging Materials: ISO 22000, IFS and BRC

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Abstract: According to Regulation EC 178/2002, food may not be placed on the market which is injurious to health or unfit for human consumption. Therefore, food business operators shall establish an integrated traceable food safety management system from farm to fork. The shelf life of food can be extended for a certain period by means of packaging. An integrated food safety approach should also be applied for food packaging process. International Organization for Standardization (ISO) published general food safety management system ISO 22000:2005 for any organization in the food chain in 2005, which is based on the HACCP.ISO released ISO 22002-4 in 2013 to meet the needs for pre-requisite program for food packaging. Moreover, the new revision of ISO 22000 is expected to be published in the middle of 2018. The new revision includes modification to its structure and new understanding for risk approach. There are other food safety programs/standards/guidelines for food packaging that were released by British Retailers Consortium (BRC) and International Featured Standards (IFS). Moreover, The Confederation of Food and Drink Industries released guideline called as PAS 223 specific for food packaging. The increased number of standards on food safety made confusion for producer and increased the audit duplications. Therefore, The Global Food Safety Initiative (GFSI) was established in 2000 by food manufacturers and retails mainly for reducing audit duplication and costs. In this presentation, food safety standards/guidelines/programs (ISO 22000, BRC, IFS, FSSC 22000, HACCP) and their application into food packaging manufacturing is aimed to be compared and discussed.

Keywords: ISO 22000:2018, BRC, IFS, Food Safety Management Systems, Food Packaging

The Biochemical Parameters Having Economic Importance in Milk Obtained from Different Breed Cows

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Abstract: Abstract In the research, milk samples were gathered totally from 27 dairy cows are grown at the plants under the name of Gespa Dairy Product and Food Industry in Bursa and analyses were done at the same Company's lab. In the research three different cow breeds (Black Holstein, Red Holstein and Brown Swiss) were compared for total fat and non fat solid in milk. To do this, one way variance analyses was applied to data. While it was found significant effect of cow breed to the total fat, the non fat solid was found similar at all groups. Fat rates of milk obtained from Holstein (Red and Black) cows were lower than that of Brown Swiss cattle. It is required to be done new researches to investigate the effect of breed on milk parameters having economic importance by generating different breeds. Beneficial breed of cattle should be preferred for enhance the raw milk quality and parameters having economic importance such as fat and NFS.

Keywords: Milk, non fat solid, fat, cow, breed

Lactose, Lactose Derivatives and Usage Areas

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Abstract: Lactose is the principal carbohydrate in the milk of most mammals. It is a disaccharide, composed of galactose and glucose linked by a β1 → 4 glycosidic bond. The ratio in milk is around 4.8%. The use of lactose is limited in most applications because of its sweetness and its low solubility. Lactose value can be increased by chemical, biochemical and enzymatic routes to produce more valuable lactose derivative products such as lactulose, lactobionic acid, lactitol, lactosucrose, galactooligosaccharides and tagatose. In general, lactose derivatives are widely used in functional food applications, the chemical industry, the pharmaceutical industry.

Keywords: Lactose, Lactose Derivatives, Prebiotic, Functional Food

Antioxidant Activities of UHT Treated Milk Samples

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Abstract: In this study, some chemical, total phenolics and antioxidant activities of UHT treated 26 milk samples (5 full fat, 5 semi-skimmed, 3 skimmed, 2 semi-skimmed lactose free, 3 semi skimmed banana, 4 semi-skimmed chocolate, 4 semi-skimmed strawberry milk) obtained from national markets were determined. The total phenolic content of milk samples were determined by Folin Ciocalteu and antioxidant activities by DPPH (2,2-difenil-1-picrylhydrazyl) and ABTS (2,2′-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid)) methods. According to the results, the average dry matter was determined as 11.60±2,69%, pH 6.70±0,07, lactic acid (l.a) 0.14±0,01%, total phenolic content 350.22±95,74 mg gallic acid equivalents/L, DPPH inhibition 31.22±21,78%, ABTS 1688,28±492,97 µM Trolox equivalent/ml. It was determined that total phenolic and antioxidant activities of milk samples were changed according to variety of fruit, fat and lactose content.

Keywords: UHT milk, total phenolic compound, antioxidant activity

Some Phsycochemical and Microbiological Characteristics of Yogurts Enriched With Different Fruits During the Shelf Life

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Abstract: The aim of this study is to investigate the chemical composition (total solids, ash, fat and protein), qualitative properties (acidity, pH, syneresis and viscosity) and microbiological counts (Lactobacillus bulgaricus and Streptococcus thermophilus) of stirred yogurts enriched with different fruits during the shelf life. Different fruit pulps namely cranberry, blueberry, karayemis (cherry laurel) and Isabella grape (8%, w/v) were added to yogurt. These fruits grow in the Black Sea region, especially Trabzon and Rize province in Turkey.The chemical composition was determined after the first day; however, viscosity, syneresis, titratable acidity, pH and bacterial counts of yogurt samples were determined after 1, 7, 14, 21 and 28 days of storage. Results showed that fruit addition significantly affected total solid and protein contents while it had no effect on fat and ash contents of yogurts. Fruit addition increased the acidity values and decreased syneresis and viscosity values compared to control sample. Karayemis fruit was the most effective fruit for yogurt in terms of these parameters. L. bulgaricus and S. thermophilus counts were not affected by the fruit addition while shelf life was effective on these bacteria. During storage time, syneresis and acidity values of yogurt samples increased significantly ($P<0.05$), whereas viscosity values and S. thermophilus counts decreased ($P<0.05$). The results indicated that the fruits used in this study may be advisable for the stirred yogurt production.

Keywords: Fruit yogurt, phsycochemical and microbiological properties, shelf life

The Use of Oleogels As Fat Substitutes

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Abstract: Oleogel technology has been developed with increasing health problems in recent years and with the importance of reducing the consumption of saturated and trans fat in the protection of human health. Oleogelation is one of the current methods used as an alternative to fats by modifying them without disturbing the nutritional content of the fats. Oleogels are defined as organic liquid trapped in a continuous, thermo recycled, three dimensional gel network formed by spontaneous clustering or crystallization of an oleogelator with low molecular weight and limited solubility in consumable vegetable oils. Oleogels have advantages like low level of trans fats, low content of saturated fatty acids, no change in the fatty acid composition, high binding capacity and thermo recyclability as well as low investment cost. Different types of organo gelators such as triacylglycerol, diacylglycerol, monoacylglycerol, fatty acids, fatty alcohols, lecithin, sorbitan tristearate, phytosterols, γ-oryzanol and waxes, which impart three dimensional gel structure to liquid oils, are used in the food industry. Waxes are more preferred because of their affordability, commercial availability and even low concentrations. Solid oils are used in many areas of the food industry due to their functional properties such as plasticity, elasticity and durability. Studies show that oleogels are an alternative to solid fat in their use in bakery products, dairy products, emulsified meat products, chocolate and margarine. In this study, oleo gelation techniques, mechanisms of oleogel formation and use as solid fat substitutes were evaluated from the relevant literature.

Keywords: Oleogel, fat substitutes, oleogelation, trans fat

Characterization and Comparison of Tiger Nuts (Cyperus Esculentus L.) From Different Year

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Abstract: Cyperus esculentus L. is an underutilized crop of the family cyperaceae which produces rhizomes from the base and tubers that are somewhat spherical. It has many other names like; Chufa, Zulu nuts, yellow nut grass, and ground almond, edible rush and rush nuts. Major fatty acids of tiger nut oil are monounsaturated (>60%), which is why its profile is comparable to olive or hazelnuts oils. Eastern Mediterranean Agricultural Research Institute (EMARI) has two registered tiger nuts (Sarışeker and Balyumru). The objective of the present work was to compare the quality characteristics of tiger nuts from different years (2016-2017) which are cultivated in EMARI for the production of derived products, in order to generate more information about the effect of site cultivation on their physicochemical characteristics. Fat contents of tiger nuts were determined by soxhelet extraction method. The amount of protein was determined by the Kjeldal method. Fatty acid contents were then evaluated using GC equipped with capillary column and FID detector. In the years 2016 and 2017, the protein and fat values of the Balyumru variety ranged from 5.08 to 6.88% and from 21.3 to 20.81%, while the values of the Sarışeker variety were 3.84-6.76% and 22.9-23.21%, respectively. In 2017, palmitic, linoleic and linolenic acid values were found to be higher in both varieties. The content of stearic and oleic acids varied 4.61-4.21% and 70.72-68.09%. Both site and variety have a significant influence on the different oil fractions, since it has been verified that tiger nut fatty acid profile could be

Keywords: Tigernut, protein, oleic acid, palmitic acid, oil

The Effects of Using Encapsulated Fish Oil and Black Carrot Pomace on Physicochemical and Sensory Characteristics of Low Fat Beef Meatball

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Abstract: In this research, the effects of encapsulated fish oil and black carrot on some quality characteristics of low fat beef meatball were determined. Samples stored at 4oC for 7 days were evaluated in terms of color parameters and sensory characteristics. Moisture content and pH analysis were done after production of samples. Four sample groups containing various percentages of encapsulated fish oil and black carrot pomace were prepared as C: control sample, H0: 4% encapsulated fish oil, H3: 4% encapsulated fish oil+3% black carrot pomace, H6: 4% encapsulated fish oil+6% black carrot pomace. Using black carrot pomace in meatball reduced pH values of samples. Significant differences were found among the samples in terms of moisture content. Moisture value of H0 sample was detected significantly lower than the control sample ($P<0,05$). L* and b* values of H0 samples were detected higher than the other samples in 0th, 2nd and 7th days of storage ($P<0,05$). The higher a* values were observed in C and H0 samples than H3 and H6 samples. Addition of black carrot pomace caused darker color so appearance and color scores of H6 samples were determined lower than C and H0 samples ($P<0,05$). Consequently it can be recommended that addition of 3% black carrot pomace with 4% encapsulated fish oil to the low fat meatball for acceptable sensory properties. Results indicate that usage of encapsulated fish oil and black carrot pomace in low fat meatball could give an opportunity to obtain a new healthier meat product.

Keywords: Encapsulated fish oil, black carrot, low fat meatball

Possibilities of Using Olive Mill Wastewater for Irrigation and Fertilizer Purposes

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Abstract: Turkish olive cultivation sector with its 0.8 million hectares of olive land and 95 million olive trees is an important agricultural, industrial, trade and employment area. Turkey is one of the world's leading olive and olive oil producers thanks to its geographical location and Mediterranean climate features. The olive mill wastewater is a by-product emerging during olive oil production. Its composition creates a significant environmental pollution potential because of its oil content and unpleasant smell. Discharge of olive mill wastewaters into lakes, rivers and seas is extremely harmful to the environment. The idea of using olive oil wastewater for irrigation purposes has firstly come to the fore in countries such as Italy and Spain. Studies have shown that the olive mill wastewaters discharged in certain volumes into agricultural land have a positive effect not only on olive trees but also on vineyards, corn and sunflower fields, functioning as fertilizer. This review study aims to examine the treatment and assessment possibilities of olive mill wastewater, one of the most important problems faced by the olive industry all over the world, and to provide an insight for subsequent studies thereafter.

Keywords: Olive mill wastewater, general features, usage areas

Methods for the Determination of Antioxidant Activity

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Abstract: Free radical is a chemical compound which contains an unpaired electron spinning on the peripheral layer around the nucleus. Because of these unpaired electrons, free radicals are highly reactive and readily take part in chemical reactions with virtually all cell components. The family of free radicals generated from the oxygen is called reactive oxygen species (ROS) which cause damage to other molecules by extracting electrons from them in order to attain stability. When the level of ROS exceeds the defense mechanisms, a cell is said to be in a state of "oxidative stress. ROS production can lead to oxidative damage to mitochondrial proteins, membranes, and DNA. Antioxidants play an important role in food preservation by inhibiting oxidation processes and contributing to health promotion rendered by many dietary supplements, nutraceuticals and functional food ingredients. Antioxidant activity should not be concluded based on a single antioxidant test model. Several in vitro test procedures are carried out for evaluating antioxidant activities of samples. Antioxidant activity can be monitored by a variety of assays with different mechanisms, including hydrogen atom transfer (HAT), single electron transfer (ET). These methods include DPPH, TEAC, FRAP, CUPRAC, TPC assays and others. Understanding the principle mechanisms, advantages and limitations of the measurement assays is important for proper selection of methods for valid evaluation of antioxidant potential in desired applications. The aim of this review is to provide a comprehensive listing of all the proposed methods to test antioxidants, and discuss the advantages and limitations of these methods.

Keywords: Antioxidant activity, DPPH, FRAP, TEAC

Applications of Artificial Neural Networks in Agriculture and Food Industry

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Abstract: Computers and computer systems have become an indispensable part of our daily lives. In recent years, computer imaging systems have gained importance in the agriculture and food industry. Commonly used fields of artificial intelligence technology can be classified as expert systems, fuzzy logic, genetic algorithm and artificial neural networks. Artificial neural network is one of the most popular areas of artificial intelligence. Artificial neural network (ANNs) systems are computing systems inspired by the biological neural networks that constitute animal brains. ANNs are relatively crude electronic models based on the neural structure of the brain. The brain basically learns from experience. Such systems learn tasks by considering examples, generally without task-specific programming. ANNs have three layers that are interconnected. The first layer consist of input neurons. Those neurons send data on to the second layer, which in turn sends the output neurons to the third layer. Training an artificial neural network involves choosing from allowed models for which there are several associated algorithms. ANNs can be used in analysis of linear and nonlinear problems and so it is preferred to many areas such as classification, pattern recognition, prediction, optimization. ANNs have been used in food and agricultural industries for the optimization of different food processing and for the visualization of some foods, the modeling of heat treatment applied to food, prediction of bacterial growth, prediction of foods freezing and thawing times and the estimation of the ripening period of agricultural products. In this review, we will mention to the applications of

Keywords: Agriculture, artificial neural network, artificial intelligence, food industry

Encapsulation Technologies in Food Industry

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Abstract: Developments in technology arise the need for novel functional materials. Materials in nano-scale are one of the best choice to supply this due to their unique properties. Nanoencapsulation is a process to entrap active molecules within a carrier material and it is a useful tool to improve delivery of bioactive ingredients and living cells into foods. Bioactive compounds may have certain disadvantages such as off flavors and an early loss of functionality. Encapsulation is a promising technique that can solve the disadvantages of the use of bioactive compounds as food additives. The incorporation of bioactive compounds into food products provides many advantages in food preservation and contributes to the development of functional foods. Applications for this technique have increased in the food industry since the encapsulated materials can be protected from heat, light, moisture, or oxidation, thus enhancing their stability and maintaining viability. There are different nanoencapsulation technologies including electrospinning, nanoemulsions, nanoliposomes, solid lipid nanoparticles, lipid nanostructure nanocarriers, biopolymeric nanoparticles, and instrument-based methods. The encapsulating material should be food stable, biodegradable, stable in food systems during processing, storage and consumption. The most suitable nanostructured carrier materials for food applications are carbohydrate, protein and lipid based ones. Examples are alginate, chitosan, carrageenan, pectin, starch, gliadin, maltodextrin, gelatin, casein, zein, cellulose and gums. The review will address the use of encapsulation in the food industry.

Keywords: Bioactive ingredients, encapsulation, nanoencapsulation

Selective Enrichment of Folic Acid from Orange Juice by Molecularly Imprinted PDMS Elastomer

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Abstract: Herein, we report an effective method to prepare novel molecularly imprinted polymers (MIP) on poly(dimethylsiloxane) (PDMS) elastomer via surface initiated reversible addition fragmentation chain transfer (SI-RAFT) polymerization for sensitive and selective extraction of folic acid (FA). For this purpose, 2-(2-Methoxyethoxy) ethyl methacrylate (MEOMA), ethylene glycol methacrylate (EGDMA), azobisisobutyronitrile (AIBN), FA and dimethylsulfoxide were used as functional monomer, cross-linker, initiator, template molecule, and porogen, respectively. The adsorption behavior followed Scathard equation between FA and PDMS-MIP with a saturation adsorption capacity 4.51 mg/g and pseudo-second-order kinetics with 60 min. equilibrium adsorption time. Furthermore, PDMS-MIP elastomer was successfully applied to selective extraction of FA from orange juice with a sufficient recovery (94.7%-100.8%) and relative standard deviation less than 7.0%. The limit of detection (LOD) for FA was found to be 0.0031 µg/mL by a linear range between 0.01-100 µg/mL with a correlation coefficient 0.9997. Results showed the proposed method could be easily, efficiently and selectively extracted FA in complex media.

Keywords: Polymer, molecular imprinted polymers, folic asid, PDMS, surface initiated RAFT polymerization

The Synthesis of Carbon-Based Nano Particles by Arc Discharge Method to Use in Agriculture and Food Industry

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Abstract: Food safety is one of the top issues in agriculture and food industries. Insufficiency of custom methods to solve new challenges in food safety area leads to develop new, portable, and fast analytical techniques with the low limit of detection. The objective of study is to synthesize Carbon Nano particles by arc discharge method for toxin detection in agricultural products. Materials & Methods: Two metallic electrodes as cathode and anode have been used on a glass with a distance of 1 mm from each other. Then, Polyethylene balls have been heated by a lighter between the electrodes. Finally, electrons have been drifted by applying a potential difference with a Carbon Nano particle grower. As the result of encountering electrons with the hydrocarbon source, carbon ions deposited on cathode and Carbon Nano particles have been built. Results: Two linear and non-linear behaviors can be seen in acquired graphs. If I-V graph is linear and symmetrical, the connection is Ohmic and the slope of graph demonstrates the resistance of Nano particles. Otherwise, the connection is a rectifier. Conclusions: After obtaining I-V graph of electrochemical Nano-sensors, the demanded analyte can be injected into sensors. By comparing the slope of I-V curves before and after injection, different doses of toxins can be detected in agricultural products. The novelty of this research is designing Carbon Nano particles using polymers that are cheaper than Apta-Nano-sensors and need no purification. In addition, the synthesis has been done in the absence of metallic catalysts and inert gases.

Keywords: Food safety, carbon nano particles, arc discharge, current-voltage curve, electrochemical nano-sensors

Potential Applications of Nanotechnology in the Food Industry

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Abstract: In recent years, the term nanotechnology has emerged as a result of scientific developments in nanotechnology coupled with developments in the food industry. In addition to existing technologies, nanofoods are generally called nanotechnology-developed processes such as production, packaging, and food products that contain components such as nanoparticles. Due to the rich composition and sensitivity of food, the use of nanotechnology in food has shown slower progress compared to other fields. Nonetheless, nanotechnology has made significant progress in the food industry, with the development of new functional foods, nano-scale processing, food preservation and food safety. For this purpose, many areas such as extension of shelf life, development of new functional products, transport of bioactive substances and development of new packaging products, detection of pathogens through nanoscale sensors and indicators and utilization of nanoparticles for water treatment are being studied. In addition, gaining of mechanical and sensory properties such as food aroma, color and texture at this molecular level is among the potential food applications and researches of nanotechnology. Nanotechnology studies have become the focus of attention due to innovations brought to the food industry and studies have started to progress in this direction. In addition, there are uncertainties about the risks and damages arising from nanotechnology-derived foods and packaging materials. With the development of technology, it is necessary to determine the effects on health and it is aimed to eliminate the deficiencies in terms of legal, scientific and health with later studies.

Keywords: Nanotechnology, food, nanofoods

Determination of Some Pesticide Residue Observation Used in Apricot

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Abstract: The use of plant protection products is necessary in order to obtain efficient and high-quality of agricultural products. Out of advice or overuse of pesticides leads to many problems such as acute or chronic poisoning in humans and animals, various lung diseases in the long term, carcinogen, disease with allergenic effects, resistance to harmful and weed tolerance and residue. In this study, pirimicarb, malathion and tebuconazole active ingredient pesticides in apricot and supervised experiments were established at producer garden of Kuşsarayı Village of Elazığ, Baskil District. Plant protection products, licensed and used by the growers, were selected in the study. The treatments were made in accordance with the Technical Instructions and the maximum dose and maximum number of treatments were applied to give the worst residue. It was aimed to determine the change of the amount of residue at certain intervals from the day of the last application of apricot in order to reveal the course of the remains. Analytical samples were prepared from samples taken from the first day of pesticide application and pesticide residue analyzes were carried out by GS-MS / MS and LC-MS / MS according to QUECHERS multiple analysis method. Residues of Pirimicarb, Tebuconazole and Malathion were determined under the maximum residue limit. Malathion was detected the most rapid degradation plant protection product; however, Pirimicarb was found the most stable plant protection product in the study.

Keywords: Apricot, pesticide residue, quechers method, residue observation

Phenolics Content and Antioxidant Capacity of Mung Bean (Vigna Radiata L.) Seeds

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Abstract: Mung beans (Vigna radiata) are popular and widely consumed legume in the form of mung bean sprouts in Asian cuisines. In recent years, the functional properties of mung bean have received attention, particularly with respect to antioxidant, antitumor, anti-diabetic, and anti-melanocyte effects. In terms of biological activity, it was repoted that intake of mung bean extract favorably controlled glucose and lipid metabolism in rats. The aim of this study was to determine the antioxidant capacity and phenolic compound profiles of mung bean seeds. The total phenolic content, DPPH• scavenging activity, ferric-reducing antioxidant power (FRAP), ABTS•+ scavenging activity were determined after methanol and acetone extractions. HPLC analyse was used to identification mung bean phenolic compounds. The total phenolic content of mung bean seed was determined as 47.16 mg GA eq / g extract (504.65 mg / 100 g seed) and 66.05 mg GA eq / g extract (526.41 mg / 100 g seed) after methanol and acetoneuse as extractans, respectively. The dominant phenolic compounds of seeds were hydroxybenzoic acid derivatives. The radical scavenging activity of mung bean extracts against ABTS•+ was 1.093 mmol Trolox / g in acetone extract. This study compared the antioxidant capacity of mung bean with literature data related to antioxidant properties widely consumed different bean varieties such as red and white beans. Obtained results suggest that mung bean can be used as functional ingredient with high antioxidant activity in several foods such as soup, pasta therefore larger field productions can be achieved for this legume.

Keywords: Phenolic content, Vigna radiata, DPPH• scavenging activity, FRAP, ABTS

Antioxidant Capacity Properties of Sumac Samples Collected from Tunceli, Turkey

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Abstract: Sumac; the Rhus genus belonging to the Anacardiaceae family grows in about 250 different species in different parts of the world. Sumac plant is a bush, the fruit is reddish and consists of a core. In our country, sumac is used as a spice so as to its aroma, flavor, sourness and coloring in most regional foods. It is stated that the sumac plant has diuretic, bleeding inhibitor, antiseptic, digestive facilitator, antipyretic and antiseptic properties. Because of the various substances it contains, sumac plant has been used as pharmaceutical raw material as many years. Sumac is also a good natural antioxidant source. However, due to possible toxicities of synthetic antioxidants, in recent years interest has focused on natural antioxidants. In this study sumac samples were collected from at five different parts of Tunceli-Turkey. Samples were cleaned, dried and grinded. The dried samples were extracted with three different solutions and antioxidant capacity tests were applied to these extracts. Total phenolic content were the highest in acidified methanol extract in all samples. Sumac samples total phenolic contents were found in the range of 797±5 mg GAE kg-1 and 1929±63 mg GAE kg-1. DPPH free radical scavenging capacity was found higher in acidified acetonitrile extract than other extracts. Reducing capacity of samples was compared with synthetic antioxidants as α-tocopherol, butylated hydroxytoluene and vitamin C. Synthetic antioxidants reducing capacities were higher than sumac samples. Acknowledgment This study was a part of the Project supported by Munzur University Scientific Investigations Project Unit (MUNIBAP-YLMUB016-24).

Keywords: Sumac, antioxidant capacity, Tunceli

Determination of Mineral Content of Rosa Pimpinellifolia L. (Black Rosehip) Fruit And its Kernel

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Abstract: Today, natural and organic dietary has been gaining attention and recommend by scientists for the treatment and prevention of certain diseases. Phytochemicals in these natural products are thought to be components that have an important influence on health. In this context, wild fruits are excellent sources that contain in high quantity bioactive components therefore its possess an important and positive role for a healthy and balanced diet. Turkey is very rich for numerous species of wild fruits and vegetables that may help resolve a number of concerns related to nutrition and may include into the diet. One of these wild fruit species is also Kuşburnu.There are 27 different rosehip species naturally growing in our country and 17 of these 27 species are located in Bayburt and Gümüşhane provinces. Rosa pimpinellifolia L., also known as 'KoyunGözü' around Bayburt, is a species of rosehip found as wild in mountain areas. In this study, the mineral matter profile of Rosa pimpinellifolia L., which is also known as the Black Rosehip fruit and having high phenolic contents in addition to these including important mineral matter in terms of nutrition, is also determined by ICP-MS.According to research findings obtained from the point of mineral matter, it has been found that the fruit and its kernel isvery rich for K and it is followed by Mg and Ca.The results showed that also have been potential to evaluatedin different forms of its kernel besides fruit of Black Rosehip.

Keywords: Rosa pimpinellifolia L., black rosehip, wild fruit, mineral matters

Sorting of Potato Tubers Based on A-Solanine Toxicant by Single Layer Perceptron Neural Networks

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Abstract: Potato tubers may contain high levels of α-solanine and α-chaconine, two glycoalkaloids which occur together and are usually discussed under one heading, "solanine". The admissible concentration of solanine is about 200 mg kg-1 (fresh weight) of potato. The overall objectives of this research are to check the ability of a non-destructive technique such as RGB digital imaging on detection of only α-solanine toxicant in potatoes and sorting of them by single layer perceptron neural networks. Materials & Methods: Image preparation of potato tubers cv. 'Donald' and 'Ceasar' was done in an imaging chamber under LED light. A digital camera equipped with CCD sensor was used for this purpose. Due to quantify α-solanine in potato tubers, high performance liquid chromatography (HPLC) has been used at 2.6 min retention time. Then, Potatoes had been classified in healthy and toxic categories by single layer perceptron (SLP) networks. The features, which had been extracted from the images by MATLAB software, were the percentage of green parts of potato in total parts of potato and mean values of red, green, and blue components of green parts. Results: The results of classification showed that ANN has the ability to classify potatoes by using digital images with the accuracies of 98.51% and 96.17% for 'Ceasar' and 'Donald' potatoes, respectively. Conclusions: It can be concluded that RGB digital imaging can detect α-solanine in potato tubers, accurately. So, the development of this technique is needed in agriculture and food industry

Keywords: Potato, α-solanine, digital imaging, artificial neural network, HPLC

The Effects of Starter Culture on White Cheese Texture Profiles

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Abstract: The most preferred cheese type in our country is white cheese. The amount of production is increasing day by day, it is known that this value has reached 500 thousand tons / year levels in recent years. With increased production, more detailed studies have become necessary to solve the problems that may arise during and after production. In this study, effects of using different starter cultures or effect of do not use starter cultures on the structural stability of White cheese, were investigated. The cheeses that made without starter cultures, with cheese starters (Lactococcus lactis subsp. lactis ve Lc. lactis subsp. cremoris) and with mixed starters (Lc. lactis subsp. lactis ve Lc. lactis subsp. cremoris + Lactobacillus delbrueckii subsp. bulgaricus ve Streptococcus thermophilus) are investigated in terms of textural properties for 90 days. As a result of the study, it was determined that statistically significant differences were found among cheese samples in terms of textural properties.

Keywords: White cheese, texture profile, starter culture

Some Physochemical and Microbiological Properties of Kastamonu Tarhana Obtained Different Districts

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Abstract: One of the most heavily consumed traditional fermented foods in Kastamonu is wet tarhana, which has unique flavour and taste. The basic difference of Kastamonu's wet tarhana from other tarhanas is that it is prepared without drying step. To obtain traditional Kastamonu's wet tarhana white wheat flour, yoghurt and chopped onion, pepper, tomato and optional grens are kneaded together. After that obtained dough left to fermantation process around 10 days. During this process the dough is mixed everyday. During fermentation process, yogurt bacteria (Streptococcus thermophilus and Lactobacillus bulgaricus) produce several organic acids such as lactic acid and some other organic compounds. The ingredients added to the tarhana dough and the compounds formed during fermentation creates tarhana's characteristic aroma and flavour. Kastamonu tarhana is placed in the jars and stored in a cool place. The aim of the study was to investigate physical, chemical and microbiological properties of wet Kastamonu tarhanas produced in different region of Kastamonu province and comparing the results of obtained samples from each region. For this aim, wet tarhana samples were collected from different districts of Kastamonu. Some physicochemical properties (pH, total acidity, dry matter, fat and soluble ash content), viscosity and counts of microbiota were performed. The results showed that the vitality of the microbiota especially lactic acid bacteria were maintained during shelf life. Also the samples had high acidic profile and ash content. The relationship between the results were evaluated statistically.

Keywords: Wet tarhana, Kastamonu, lactic acid bacteria, viscosity

Comparision of Some Nutritional Properties and Mineral Contents of Siyez Wheat (Triticum Monococcum) Samples Cultivated from Kastamonu and Abroad

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Abstract: Einkorn wheat (Triticum monococcum L. subsp. monococcum) which also named as Siyez wheat is the ancestor of today's wheats. Siyez wheat, which was first cultivated in Karaca Mountain located in the Southeastern Anatolia region, has spread from the northern part of the Fertile Crescent region to the Caucasus, the Balkans and Central Europe. Nowadays it is still planting in North Anatolia, Balkan countries, Germany, Switzerland, Spain, Italy, France and Morocco.It is grown in Kastamonu, especially in İhsangazi, Seydiler and Devrekani. In this study, in order to meet the increasing demand, the einkorn wheats obtained from abroad and the einkorn wheats obtained from Kastamonu region were compared in terms of various nutritional properties (antioxidant activity, phytic acid, ash etc.) and mineral contents which were analysed with Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) technique. According to obtained results, Kastamonu siyez wheat was generally rich in major and trace elements than the other samples. Especially the content of Fe and Zn were higher statistically significant. The micronutrient malnutrition effects over two billion people in the developing countries. In many micronutrient-deficient shown countries, wheat and cereals is the dominant staple food of the diet. For that reason, many foods can be fortified through einkorn or einkorn products such as semolina, flour, germ or bulgur.

Keywords: Siyez, einkorn, triticum monococcum, phytic acid, mineral content

Quercetin Detection in Red Wine via Molecularly Imprinted Nanoparticles

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Abstract: Interest in plant-derived foods and their active ingredients has increased in recent years, and intensive studies have been made especially on the effects of protecting against cancer. Quercetin, a plant-based nutrient, is a polyphenolic flavonoid that is found naturally in fruit shells, leafy vegetables, strawberries, black tea, red wine and various fruit juices. Today, it is considered as an important food source by its antifungal, anti-inflammatory, blood sugar and cholesterol lowering, antihypertensive, liver protective, painkiller, antiviral and anti-allergic properties. In this study, we synthesized a novel quercetin imprinted silica nanoparticles using surface-initiated addition-fragmentation chain transfer (RAFT) polymerization. The synthesized material was examined in terms of binding capacity, adsorption-desorption, recognition ability, stability, reusability and equilibrium properties. The prepared nanoparticles were characterized several surface analyzed methods such as Fourier Transform Infrared Spectroscopy (FT-IR), X-ray photoelectron spectroscopy (XPS), and transmission electron microscopy (TEM). As a result of the investigations, it presents strong features such as high binding capacity, short adsorption equilibrium. Moreover, quercetin was detected at moderately low concentration high recovery and low relative standard deviation in red wine by using imprinted silica nanoparticles.

Keywords: Molecular imprinted polymers, quercetin, silica nanoparticles, surface-initiated RAFT polymerization

Regional and Seasonal Phenolic Content of Green Walnuts

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Abstract: Objective Green walnut jam is the most popular product as a traditional food. Green walnut jam was made from unripe green walnuts and bitterness is the main problem in this product. Phenolic compounds may be the main source of bitterness in green walnuts. This study was designed to determine the changes in phenolic components of green walnuts harvested at different times in regions around Van Lake. Materials and Methods Materials The samples of green walnut used in the study were obtained from Van-City Center, Edremit and Gevas districts around Van Lake on June 1-2, June 15-16, June 29-30 and July 15-16, 2017. Methods Total phenolic content in methanolic extracts was determined by the Folin-Ciocalteu method (Singleton and Rossi, 1965). Chromatographic analyses of individual phenolic components were carried out using the HPLC system (Coloric et al. 2005). DPPH assay was performed, with a slight modification, according to Pyo et al. (2004). The ABTS assay was performed according to the method described by Re et al. (1999). Results Total phenolic content and antioxidant activity values were highest in all regions at the beginning of June, these values showed fluctuations during green walnut harvest season. Gallic acid, chlorogenic acid, rutin, and juglone amongst phenolic compounds were detected in green walnut samples. The highest content of juglone was determined at the end of June in all regions. Conclusion The results of the study showed that the geographical region and harvesting period were effective on phenolic contents and antioxidant activity values of green walnuts.

Keywords: Green walnut, phenolic content, antioxidant activity, different region and season

Acknowledgements: This study was supported by Scientific Research Projects Unit (FBA-2016-5358) of Van Yuzuncu Yil University.

The Effect of Juniperus Communis L. Oil on Oxidative Stress in the Liver Tissue of Diabetic Rats

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Abstract: Juniperus communis L. oil is a traditional Eurasian medicine that has been used in the treatment of diabetes. However, the mechanism of action of Juniperus communis L. oil is still unclear. This study aims to examine the effect of Juniperus communis L. oil on the oxidative stress in liver tissues of experimental diabetic rats. In this study, 28 rats were disturbed into 4 different groups. Group I was control group, group II was diabetes group which was administered single dose of streptozotocin (45 mg/ kg), in Group III, rats were not made diabetic but given Juniperus communis L. oil (200 mg/kg) by gavage for 21 days; Group IV rats were made diabetic and given Juniperus communis L. oil (200 mg/kg) by gavage for 21 days. After these practices, all the animals were sacrificed, and the liver tissues of each animal were isolated. These tissues were homogenized and superoxide dismutase (SOD), catalase (CAT) activities and malondialdehyde (MDA) and glutathione (GSH) levels were examined. According to our results, MDA levels increased, CAT, SOD activities and GSH level decreased in group II comparing with group I ($p<0.05$). Furthermore, MDA levels decreased, CAT, SOD activities and GSH level increased in group IV comparing with group II ($p<0.05$). According to these results, it can be suggested that Juniperus communis L. oil was found to reduce the oxidative stress in liver tissue. As a result, we can suggest Juniperus communis L. may be used for the treatment of diabetes.

Keywords: Juniperus communis L. oil, diabetes, liver, oxidative stress, antioxidant defence system

Glycitein Reduces the Proliferation and Adipogenesis of 3T3-L1 Preadipocytes

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Abstract: Glycitein one of the main bioactive substances of soybean isoflavones that has a wide range of health benefits. This research explored the anti-obesity effect of glycitein and the mechanism of lipid metabolism for adipogenesis in 3T3-L1 adipocytes by experiment design of reducing matrix effects. The results indicated that high concentrations of glycitein significantly inhibited preadipocyte proliferation, fat deposition and the ratio of linolenic acid in 3T3-L1 adipocytes. Western blot and relative quantitative RT-PCR results indicated that glycitein significantly decreased protein and gene levels of the nuclear transcription factors C/EBPα and PPARγ. Meanwhile, glycitein also downregulated the expression of downstream genes (LPL, FAS, ACC, SCD1, FADS2); however, the relative expression levels were not dose-dependent for glycitein. Therefore, isolated from soybean, glycitein as a plant health product has a potential function for the prevention and therapy of obesity and related metabolic disorders.

Keywords: Glycitein, 3T3-L1 preadipocytes, proliferation, adipogenesis

The Effect of Rheum Ribes L. Extract on Oxidative Stress in Heart Tissue of Diabetic Rats

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Abstract: Rheum ribes L., a perennial plant in the family Polygonaceae, has many bioactivities and is often used in traditional therapy. One of its bioactivities is known to be its anti-diabetic effect. This study aims to examine the effect of Rheum ribes L. on the oxidative stress in experimental diabetic rats. In this study, 36 rats were distributed in to 6 different groups. Group I was the control group; Group II is the diabetes group to which was intraperitoneally administered single dose of streptozotocin (40 mg/kg); in Group III rats were made diabetic and given the infusion of Rheum ribes L. (50 mg/kg) by gavage for 15 days; in Group IV rats were made diabetic and given the ethanol extract of Rheum ribes L. (50 mg/kg) by gavage for 15 days; in Group V rats were not made diabetic but given the infusion of Rheum ribes L. by gavage for 15 days; in Group VI rats were not made diabetic and given the ethanol extract of Rheum ribes L. by gavage for 15 days. After these practices, experimental animals were sacrificed, and the heart of each animal were taken. Heart tissues were homogenized and superoxide dismutase, catalase, malondialdehyde and glutathione peroxidase levels were examined on the obtained tissue homogenizers. According to our results, Rheum ribes L. was found to reduce the oxidative stress and increase the levels of the antioxidant enzyme As a result, we suggest that extract of Rheum Ribes L., may be used to treat diabetes.

Keywords: Rheum Ribes L., oxidative stress, streptozotocin, diabetes mellitus, heart

Effect of Pholiota aurivella Lyophilized Extract on Erythrocyte Hemolysis and Some Antioxidan Parameters Against CCl4-Induced Oxidative Stress in Rat Erythrocytes

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Abstract: Preventive medicine and food industry have shown an increased interest in the development of natural antioxidants. Mushrooms have an important place due to their natural antioxidant properties however, the unconscious consumption of mushrooms can sometimes cause unwanted serious side effects. In this study, it was aimed to evaluate the effects of Pholiota aurivella lyophilized extract on blood parameters against carbon tetrachloride (CCl4)-induced oxidative stress in rats. After the toxicity test, rats were divided into four experimental groups: Control, CCl4, CCl4+P.aurivella (100 mg/kg) and CCl4+P.aurivella (500 mg/kg) groups. At the end of 28 days experiment, the roles of the orally administrated P.aurivella extract against CCI4-induced oxidative stress were evaluated by measuring erythrocyte fragility and antioxidant defence system such as reducte glutathione (GSH), glutathione peroxidase (GPx), superoxide dismutase (SOD) activities and malondialdehyde (MDA) content in erythrocyte of rats. According to the results, CCl4 and CCl4+P.aurivella groups caused significantly decrease in GSH and Gpx level according to Control group. On the other hand, in the treated groups GPx enzyme activity significantly increased according to CCl4 group. Also, erythrocyte fragility (especially 0.6 % NaCl concentration) significantly increased in the CCl4 and CCI4+P.aurivella groups according to Control group. Although CCl4 had clear harmful effects on the parameters examined, it was difficult to say this for P.aurivella. However, P.aurivella might be harmful because of its contribution to the hemolysis of erythrocytes. Therefore, people should be careful consumption of this mushroom.

Keywords: CCl4, Pholiota aurivella, antioxidants, erythrocyte fragility, rat

Investigation of Healing Effects of Lemon (Citrus limonum) Seeds Extracts on Experimentally Diabetic Induced Rats

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Abstract: In this study, the effects of lemon (Citrus limonum) seed extract (CLSE) on experimental Diabetes mellitus (DM) complications was investigated in rats. 42 male rats groups were formed 6 groups randomly containing 7 rats. Groups were conducted as NK (normal control), DC (diabetes control), DAK (diabetes + acarbose 20mg/kg), DL1 (diabetes + lemon seed extract 100mg/kg), DL2 (diabetes + lemon seed extract 200mg/kg), DL3 (diabetes + lemon seed extract 400 mg/kg) orally via gastric gavage. Experimental diabetes was induced with STZ [45 mg/kg, intraperitonal (i.p.)]. At the end of application, serum aspartate aminotransferase (AST), alanine aminotransferase (ALT), lactate dehydrogenase (LDH), insulin, C-peptide, glucose, lipid profile, creatinine (CRE), urea (Ure) and glucosylated hemoglobin (HbA1c) levels were determined. Also, antioxidant enzymes constituens such as catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GSH-Px), glutathione S-transferase (GST), glutathione reductase (GR) and reduced glutathione (GSH) and malondialdehyde (MDA) levels were measured in brain, kidney, erythrocyte and liver tissues. Further, α-glucosidase activity in small intestine tissue samples were investigated. According to the results; glucose, AST, ALT, LDH, HbA1c, urea, creatinine, TC, TG and LDL-c levels were increased in DC compared to NK, whereas these parameters of the extract supplemented groups were found a significant reduction compared to DC. MDA levels increased in the all DC tissues except for erythrocyte and antioxidant defense system constituents fluctuated whereas the extract supplementations diet restored the separameters towards to the NC. As a result; limon seed extract is might behave antioxidant, antidiabetic and antioxidative effects against diabetic complications.

Keywords: Antilipidemia, antioxidant, diabetes mellitus, limon seed, rat

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I. International Agricultural Science Congress
09-12 May 2018
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Chemical Changes During Storage in Hazelnuts Separated from Husks by Patoz and by Hand

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Abstract: This study was carried out to determine the chemical changes during storage in 'Tombul', 'Palaz' and 'Kalınkara' hazelnuts that separated from husks by patoz and hand in province of Giresun (Turkey) in 2014. In the study, it was researched kernel moisture (%), total fat (%), crude protein (%), ash (%), free fatty acids (%), peroxide (meqO2/kg) and colour values with 3 months intervals during 9 months in storage room at ambient temperature. As results of the study, in the samples separated by patoz, the fat content was more stable during storage; the free fatty acids and the a* value was more changed, and the peroxide value was higher at the end of the storage. In addition, it was determined that there was no significant effect of the separation methods on moisture, protein and ash ratio, and moisture decreased, protein increased during storage; peroxide value was determined only at the end of the storage.

Keywords: *Corylus avellana*, hazelnut, husking, storage, chemical

Determination of Performances of Some Almond Germplasm in Yalova

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Abstract: This study was conducted for four consective years from 2007 to 2011 at the field and experimental of Yalova Atatürk Horticultural Central Research Institute. In this study, almond cultivars (Drake, Genco, Guara, Laurenne, Ferraduel, Texas and Nikitski) and genotypes (101/13, 101/9, 101/23, 48/1, 48/2, 48/5, 300/1 and 17/4) were used as plan material. In the study, the flowering periods of the genotypes were observed by checking the flowering time and late frosting time of spring season of the yalova region. Yield performances of all varieties were determined by calculating trunk cross-sectional areas of trees. The earliest flowering period and the latest flowering period were determined in the 48/5 genotype (14/02 to 26/02 dates) and Ferraduel cultivar (24/03 to 10/04 dates), respectively. As a result of the pomological studies, shelled fruit weights of genotypes were determined between as 1.10 g to 3.60 g. The highest and the lowest yield were detected in the Nikitski variety (49%) and 101/13 genotpe (25%), respectively. When the cumulative yield of genotypes was evaluated, cumulative yields of Ferraduel, Drake and 101/13 varieties were determined as 17.50 kg, 14.50 kg and 9.90 kg, respectively. In this study, Ferraduel, Drake cultivars and 101/13 genotype was found to be important in terms of yield parameters and fruit quality. As a result, these genotype and cultivars can be easily recommended to Yalova and similar ecologies.

Keywords: Almond, Phenology, Pomology, Yield

The Determination of the High Quality Walnut (*Juglans regia* L.) Genotypes in the Dohok Akre Region of North Iraq

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Abstract: Walnut trees grown from seed over 1000 during this selection study carried out for two years (205-2016) in Dohok Akre province were investigated. Fruit samples from 180 walnut trees were collected. Important fruit and tree characteristics in these walnut genotypes were examined. At the end of this study 15 genotypes were selected for superior fruit caharacteristics. In these selected genotypes the average fruit weights 11.15-15.76 g, kernel weights 5.64-9.16 g. kernel percentages 52.96-66.53 %,, thicknesses shell 1.20-2.05 mm. were found to be, respectively. In respect to flowering characteristics, eight genotypes were protoandrous. five genotype was protogenous and tree genotype was homogamous within selected genotypes. As a result; 15 genotyps were found to be promising walnut genotypes and are the suggested that they should be considered for further studies.

Keywords: Dohok Akre, Walnut, Selection

Effects of Bio-Stimulant Application on Strawberry Fruits (*Fragaria x Ananassa*) Quality from Cultivar of 'Fortuna' Using Different Irrigation Levels

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Abstract: Cultivation of strawberry requires optimal irrigation for best production though crop production is limited by drought. That's why it should know about variation in drought tolerance within whole species. This research explores effects of drought tolerance in conjunction with bio-stimulant application on some fruit quality parameters (Fruit width, Fruit height, Fruit weight, TSS, Acidity, Sugar/asid) at cv. Fortuna. These parameters with genotype 'Fortuna' were compared when well-watered (%100 of evapotranspiration), and subjected to a water deficit (%50 of evapotranspiration). Additively, bio-stimulant applications were applied and these parameters were compared with bio-stimulant and control as well. Decreasing of irrigation levels increased the concentration of some taste-related (TSS and sugar/asid ratio) compounds, however, this increase was found non-significant. While fruit weight and fruit width was significantly decreased under deficit irrigation (DI) conditions, the highest TSS and sugar/acid ratio were determined under DI in conjunction with bio-stimulant application with 10.3 % and 29.0 values, respectively. Though bio-stimulant applications effected positively on all parameters, these applications had no significant effects on all target analysis measured as statistically. Although, DI may cause a decrease on some parameters, with bio-stimulant applications, it could be good strategy to enhancing of taste-related compounds.

Keywords: Comcat, Full Irrigation, High tunnel, Mediterranean

Effects of Prohexadione-Calcium on 'Monroe' Peach Vegetative Shoot Growth and Fruit Quality

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Abstract: Prohexadione-calcium (Pro-Ca) is a recently developed plant growth retardant used in some fruit trees. However, it is important that the reduction of vegetative shoot growth dose not decrease yield and fruit quality. In this study, the effects of Pro-Ca applications on the vegetative growth and some fruit quality of the Monroe peach, growing on vigor rootstock (GF 677) were investigated. For this reason, trees were sprayed twice with 0 (water + surfactant), 62.5, 125, 250 g/100 L water Pro-Ca in the annual shoots reached 5 cm within a three week interval in the spring. Shoot length was decreased by 28% for shoots treated with Pro-Ca. The average internode length were significantly reduced for Pro-Ca-treated shoots. The lowest average internode length on the shoot was obtained with 125 and 250 g/100 L. The effects on fruit quality were positive in this study. Application of Pro-Ca (125 and 250 g/100 L) increased the fruit size and fruit mass of cv 'Monroe' peach. 250 g/100 L Pro-Ca concentration led to firmer fruit relative to the other applications and control fruits. Two application 125 or 250 g/100 L Pro-Ca applications were found more effective considering the criteria investigated. The Pro-Ca applications were found to be effective in controlling the vegetative shoot growth and fruit quality in cv. Monroe/GF-677 peach.

Keywords: Peach, Shoot growth control, Prohexadione calcium, Fruit quality

How Yield and Fruit Quality Influenced from Plant Type in Strawberry Varieties?

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Abstract: The experiment were designed with two type plant (frigo and fresh) of June-bearing strawberry varieties ('Rubygem' and 'Fortuna' cv.) under Spanish type high tunnels during the 2016-2017 growing season. Fruit quality parameters were analyzed as two factor randomized complete block combined active harvest months (March, April and May) with 3 replication. Each replication were consisted of 20 plants. The fruit quality parameters (Total Soluble Solid (TSS), Acidity, L, C* and hue angle) were investigated during active harvest with one month interval. The yield were obtained by accumulated of all harvested fruit during growing period. Analysis of yield was conducted as two factor randomized design. The yield indicates the importance of choosing of plant type (56.6% higher in frigo) and cultivar (9% higher in Rubygem). At the same time, interaction of these were found significant. While the highest yield were obtained frigo plants of 'Rubygem' variety with 937.2 g plant-1. The lowest yield was determined on fresh plant of 'Fortuna' (558.3 g plant-1). In spite of the acidity not effect, the higher TSS was measured from fresh plant with 8.3 % value. The color parameters were significantly increased by using frigo plant. Thus, brighter (higher L*), and light-colored (higher C* and hue) fruits were harvested from frigo plants. The highest TSS content (8.9%) was observed in May due to increased temperature. whereas the lowest titratable acidity was determined same month with 0. 35% value. As a result, with highest TSS/Acidity ratio, the tastiest fruits were harvested in May.

Keywords: Color, Eating quality, Harvesting time, Mediterranean climate

Clonel Selection of 'Çakıldak' Hazelnut Cultivar in Ulubey, Kabadüz and Gölköy (Ordu, Turkey) Districts

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Abstract: This study was conducted to determine the superior clones of 'Çakıldak' hazelnut as intensive grown in Ulubey, Kabadüz and Gölköy districts of Ordu province (Turkey) in 2015-2017. According to the averages of 2015-2016, in terms of yield/cm^2 trunk diameter, kernel percentage (%), nut size (mm), kernel size (mm) and shell thickness (mm).'1. Weighted Rating Method' has been applied to determined clone candidates. The 'Çakıldak' clone in collection orchard of the Hazelnut Research Institute was used as the control. According to the average values of at least 2 years of 2015, 2016 and 2017, in terms of yield/cm^2 trunk diameter, kernel percentage (%), nut size (mm), kernel size (mm), shell thickness (mm), good kernel (%), internal cavatiy (mm), pellicle removal (%) and yield fluctuation (%) characteristics of clone candidates got high scores from the control group, 2nd. 'Weighted Rating Method'has been applied. As a result of the sutdy, 15 clone candidates with high scores from the control group were identified as promising genotypes. The highest of values for yield/cm2 trunk diameter, kernel percentage (%), nut size (mm), kernel size (mm), good kernel (%), pellicle removal (%) of the selections was 48.87 g/cm^2 for 52KZ17; % 57.65 for 52KZ09; 18.38 mm for 52UY04; 13.88 mm for 52GY15; % 97.34 for 52UY04 and % 99.50 for 52KZ17 respectively. The lowest of values for shell thickness (mm), internal cavatiy (mm) and yield fluctuation (%) of the selected clones was 0.94 mm for 52GY16; 2.06 mm for control gruop; and %1.86 for 52UY04 respectively.

Keywords: *Corylus avellana*, Çakıldak, Clonal selection

The Effect of Cyclanilide Applications in the Nursery on Latheral Branching Sweet Cherry Trees

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Abstract: In this study, the effects of 25, 50, 75 and 100 ppm cyclanilide (Cyc), 250 and 500 ppm Perlan (Pr) on feather formation in nursery trees of 0900 Ziraat sweet cherry were investigated. While mean feathers numbers per tree was 2.9 in control treatment, it ranged from 2.3 (50 ppm Cyc) to 3.8 (100 ppm Cyc) in trees treated Cyc. None of Cyc concentration used in this study caused significant difference in the number of feathers, compared to control treatment. The effects of PR treatment on feathers numbers were also not significant. The number of feathers per tree was 3.1 in 250 ppm Pr treatment and 2.8 in 500 ppm Pr treatment. Although there were some variability among treatment in terms of height of first feather, the differences among treatments was not found significant. Crotch angles ranged from 55.4º (in 100 ppm Cyc) to 47.2º (in 50 ppm Cyc) and both Cyc and Pr treatments did not caused a significant difference in crotch angles as compared to control. Additionally, mean feather length, tree length and trunk diameter of nursery trees were measured in the study and although there were some differences in these values among treatment, the differences were not found statistically significant.

Keywords: 0900 Ziraat, Cyclanilide, Feather, Perlan

The Determination of Fruit and Oil Properties of Some Olives Which are Cultivated in Şırnak and Mardin

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Abstract: This study was carried out in Şırnak University and Çanakkale Onsekiz Mart University laboratories in 2016-2017. The genotypes obtained from Şırnak / Kumçatı, Şırnak / Kızılsu, Şırnak / Cizre, Mardin / Kızıltepe and Mardin / Derik were compared with important olive varieties such as Ayvalık and Gemlik in terms of pomological and oil analyzes. In the study, pomological characteristics of fruit were examined by looking at fruit width, fruit height, fruit index, fruit shape, fruit weight, fruit pulp rate and maturity index. In the analysis of olive oil obtained by mechanical method, iodine number, peroxide number, total phenol amount, UV absorbance values and refractive index values were examined and compared with Ayvalık and Gemlik olive varieties. In the measurements made, Kızıltepe genotype (17.63 mm) showed the closest value to Ayvalık (18.85 mm) and Gemlik varieties (18 mm) in terms of fruit width and Kızıltepe genotype (22.56 mm) showed the closest value to Ayvalık (23.09 mm) and Gemlik varieties (22.57 mm) in terms of fruit length. Also, Kızıltepe genotype (372.19 g) showed the closest value to Ayvalık (498.44 g) and Gemlik (537.35 g) in terms of fruit weight. As a result of oil analysis, Derik genotype showed the closest value to Ayvalık and Gemlik varieties in terms of iodine number and total phenol amount whereas Kızılsu genotype showed a close value to these varieties in terms of peroxide number.

Keywords: Olive, Olive oil, Pomology, Fruit index, Şırnak

Determining the Relationship Between Several Fruit Characteristics of Wild Grown Currant Accessions Through Explanatory Factor, Hierarchical Cluster and Fuzzy Clustering Analysis Methods

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Abstract: This work was carried out to detect genetic diversity among several wild currant accessions native to Eastern Anatolia of Turkey, and to reveal the relationship between their berry characteristics (berry weight, berry length, pH, soluble solid content, taste, aroma, L, A and B). Explanatory factor analysis, hierarchical cluster analysis (single linkage-Euclidian distance) and fuzzy clustering (Manhattan distance) analyses were employed. Four factors extracted from the examined characteristics in the factor analysis explained 89 (%) of the currant data. The first factor had large positive loadings on A (0.947), B (0.925) and negative loading on L (-0.909). The first factor was named as a `berry color` factor. The second factor was called an `organoleptic` factor, and had a large positive loadings on aroma (0.993) and taste (0.993). The third factor, named 'pomology and pH' factor, had positive loadings on fruit weight (0.903) and fruit length (0.824) but negative loading on pH (-0.583). The fourth factor was a `soluble solid content` factor with a loading value of 0.928. Seven clusters were generated in the hierarchical cluster analysis. The first, second, third, fourth, fifth, sixth and seventh clusters showed 83.89 (%), 83.33 (%), 80.71 (%), 88.21 (%), 91.28 (%), 95.12 (%) and 90.37 (%) similarity, respectively. We can say that, the statistical methods used in this study could be an beneficial tool to determine the phenotypic similarities and differences between currant accessions and the relationship between their berry characteristics, which could be an useful information in plant breeding.

Keywords: Currant, Berry characteristics, Fuzzy clustering, Hierarchical cluster analysis, Factor analysis

Fruit Physical and Chemical Properties of Some Walnut Cultivars and Local Walnut Genotypes Grown under Plain Conditions in Malatya

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Abstract: Climate, especially temperature, is one of the most important factors influencing performances of cultivars and plays the key role when deciding a cultivar to be cultivated in a certain area. In order to determine fruit quality properties of 4 walnut cultivars and 4 local walnut genotypes under plain conditions, a study was conducted in Battalgazi city (725 m from sea level) of Malatya in 2017. For this aim; fruit height, width and thickness, fruit weight with or without fruit shell, thickness of fruit shell, kernel shrinkage, kernel dry matter content and kernel color were detected as physical parameters and total oil and protein contents were examined as chemical parameters. Results indicated significant differences in all evaluated parameters of cultivars and genotypes included in the study. Fruit height, width and thickness varied between 32.03 mm - 50.29 mm, 29.06 mm - 42.1 mm, and 29.02 mm - 37.49 mm, respectively. Fruit weight varied between 6.57 g and 16.34 g and cumulative variance was 16.9 %. Ratio of fruit weight without shell and with shell varied between 43.9 % and 69.3 % and cumulative variance between genotypes was 8.2%. Total oil and protein contents varied between 64.1 % - 75.4 %, and 14.0 % - 19.7 %, respectively. The study resulted with various values in all evaluated physical and chemical parameters of the cultivars and the genotypes observed. Leading cultivar or genotype depended on different parameters, but according to overall evaluations two of the cultivars and two of the genotypes were distinguished.

Keywords: Cultivars, Local genotypes, Performances, Plain conditions, Walnut

The Determination of Relationship between Rooting Success and Endogenous Phenolic Compounds in Tree Olives Cultivars Having Different Rooting Ability

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Abstract: The rooting ability of cutting of Domat, Gemlik and Ayvalık cv. olive collected in different two periods and treated with 4000 ppm of IBA was examined. No rooting was observed in Domat cultivar at both period. The rotting rate of control cutting of Gemlik and Ayvalık cv. collected at April were 10% and 5% respectively. The rates of rooting of cutting treated with IBA were 33.3% for Gemlik and 25.0% for Ayvalık. While control cuttings of Gemlik and Ayvalık cv collected at August did not form any root, the rate of rooting were enhanced to 25% in Gemlik and 20% in Ayvalık by 4000 ppm IBA treatment. The contents of total phenolic compound declined progressively during rooting process. Generally, while the highest total phenol content was determined in Domat, Gemlik cv. had the lowest the content of total phenolik compound. IBA treatment did not cause any change in total phenol contents of all cultivars.

Keywords: Propagation by cutting, IBA, Phenolic, Adventive root

Influence of Storage Temperature on Viability and *in vitro* Germination Capacity of Pollens of Some Prunus Species

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Abstract: Pollination is a very important part of the life cycle of a flowering plant. In the case of use in breeding studies, it is important to preserve the viability of pollens of pollinator plants. So, it needs to determine storing conditions in order to maintain germination capability of pollens. The high viability and germination capacity of pollens in plants are crucial for successful fertilization and consequently successful fruit formation. Today, there is a great deal of change in how the viability and germination capacities of flower pollen, which are preserved in various forms and environments. Therefore, the polllens almond, sweet cherry and peach species in the Prunus genus were stored at room temperature (24 °C) for six days, in refrigerator (4 °C) for 30 days and in freezer (-10 °C, -20 °C, -80 °C) for 120 days as polen grains and as anter form of flower in this study. Pollens in these conditions were taken in periodic interval, then viability and germination tests on agar medium, with 1% concentration containing 15 % sucroz, were carried out. While the polllens stored as grains were sown on medium directly, the anters were kept under halojen lamps for 12 hours to obtain pollen grains and then sown. The results of viability and germination capacity of pollens in different storing conditions were evaluated.

Keywords: Pollen, Germination, Storage, Temperature, *in vitro*

Investigation of Growth Conditions of Some Apricot and Plum Varieties on *Prunus spinosa* Clonal and Seedling Rootstock

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Abstract: The performance of some plum and apricot varieties which grafted on *Prunus spinosa* clone and seedling rootstock were measured such as plant vigour, morphological change, phenological characteristics and ability to produce fruit nodes in this study. The study was carried out at the Eastern Mediterranean Crossing Region Agricultural Research Institute in Kahramanmaras province. Prunus Spinosa clone and seedling rootstock, Black Diamond and Friar plum varieties, Hacıhaliloglu and Hasanbey apricot varieties, and Myrobolan 29C control rootstock were used as materiel. The lowest vigour and the highest fruit node formation were observed in the apricot and plum varieties on *Prunus spinosa* clone and seedling rootstock at the end of the study. It was determined that the three apricot varieties grafted on to Prunus spinosa rootstock more weak (40%) compared to the Myrobolan 29C (*Prunus cerasifera*) clonal rootstock. Two plum varieties grafted on to *Prunus spinosa* (2.20 m^3) showed 51% more weak than the Myrobolan 29C (*Prunus cerasifera*) seedlings (4.24 m^3).

Keywords: Apricot, Plum, *Prunus spinosa* sp., Rootstock

Plant Height Control of Narcissus cv. 'Ice Follies' by Giberellin Inhibitors as Bulb Soak

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Abstract: In this study, effect of gibberellin inhibtors as preplant bulb soaks on plant height of Narcissus cv. 'Ice Follies' grown in pots were investigated. Bulbs of Narcissus cv. 'Ice Follies' were soaked in flurprimidol at 0, 10, 20 ppm and paclobutrazol at 0, 100, 200 ppm before planting. Effect of gibberellin inhibitors on the time of flowering, leaf length, plant height, flower life, chlorophyll content of leaves were determined. In addition, after narcissus were grown in pots in the greenhouse arrived at the sales stage to determinate the changes that occur in the plant height, plants were taken to the laboratory which was temperature held constant at 20 °C. The shortest plant height was obtained from the 20 ppm flurprimidol and 200 ppm paclobutrazol treatment as given bulb soaks. In this treatments, plant heihgt was 7.11 and 7.31 cm and were 52% , 51% shorter than untreated control. The lower dose of flurprimidol (10 ppm) was also effective on height control with 7.75 cm plant height and 48% shorter than untreated control. Gibberellin inhibitors also shortened leaf lenght. Flurprimidol and paclobutrazol treatments were resulted higher chlorophyll content per unit area in the leaves than untreated controls. The highest chlorophyll contetnt was obtained from the plants were treated 20 ppm flurprimidol with 60.6 CCI, while the control was 40.96 CCI. The effects of treatments on plant height has been maintained in lab conditions (home-office). The shortest plant height was obtained from 200 paclobutrazol treatment with 10.12 cm during post production period.

Keywords: Flurprimidol, Paclobutrazol, Bulb Soak, Narcissus, Plant Height

The Softscaping of Seasonal and Bulbous Plants Growing in The Traditional Gardens of The City of Van Based on Their Florescence Periods

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Abstract: The ethos of gardening as part of the civil architecture in the Van Lake basin has been going on since the days of the Urartian civilization. The traditional gardens of the city of Van have survived until the present day, adapting to the urban texture and hosting a large number of native and foreign plant species. With this study, suggestions have been made for the seasonal and bulbous plants grown for ornamental purposes by the people of Van and its environs for years, in terms of the flower composition designs using the vegetative succession method. This method takes into consideration the tiller-flower states, flower colors and the flower times in order to create compositions. Plant species included in the study were: Aster spp., Alcea rosea, Coreopsis grandiflora, Viola odorata, Allium hirtifolium, Dahlia spp., Fritillaria imperialis, Helianthe tubereux, Hemerocallis fulva, Iris germanica, Iris spuria subsp musculanica and Narcissus poeticus, and Tulipa sylvestris. The aim was to create aesthetic and consecutive flowering during the florescence periods in open and green areas where these plants are planted with the recommended compositions.

Keywords: Open-green area, sequential design, Traditional ornamental plants, Van garden

Determination of Different Salt Sources and Concentrations on Germination and Early Seedling Growing in Primrose (*Primula acaulis* L.)

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Abstract: Salt tolerance is important for selection of the plant materials in breeding and cultivation to select the adapted genotypes to the unfavorable environment and to be grown in different medium conditions. It is the first and the most important step in the execution of landscape projects when they are placed and maintained. To achieve high seed germination rates from ornemantal plant seeds in salt stress condition depends on the knowledge of the extent of salt source and concentration in the germination conditions. The main objective of this study was to determine different salt sources (NaCl, $CaCl_2$ and KCl) and levels (control, 25 mM, 50 mM, 75 mM, and 100 mM) on germination and early seedling growing in Primrose. In the experiment, germination percentage, mean germination time, shoot length, root length and fresh weights of shoots and roots were measured and calculated. The highest germination rate (51,85 %) was recorded at 50 mM concentration of KCl salt treatment. Germination properties were negatively affected from the 100 mM concentration of all salt sources. The shortest mean germination time (4,5 day) was found in 75 mM concentration of $CaCl_2$ salt treatment. However, the values of germination and early seedling growing were higher in KCl treated seeds than NaCl and $CaCl_2$ treatments. Salinity blocked the early seedling growth characteristics of Primrose seeds depending on the concentrations when compared to the control treatment. These results reflect the most appropriate germination conditions for the seeds of Primrose and its successful cultivation.

Keywords: Primrose (English Primrose), salt tolerance, seed, germination

Some Changes on Chyrsanthemums via Mutation Breeding

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Abstract: Chrysanthemum is the second cut flower in the international flower market that is the most consumed cut flower in our country. Since there are no local varieties of chrysanthemums which belong to our country, all of the used varieties have foreign origin. In order to find a solution to this situation, new color and shape changes have been obtained via mutation breeding on chrysanthemums. Mutation breeding is one of the method which most used for ornamental plant breeding and Chrysanthemum is the genus that has the richest mutant varieties in ornamental plants. In this study it is aimed that to get mutant plants using mutation breeding techniques. With this aim 3000 rooted cuttings of white "Bacardi" variety were irradiated with gamma (60Co) source at 20 Gy (Gray). Observations were continued between M1V2 and M1V4 period. Some changes were observed at leaves and flowers of the plants. It was observed that; variable flower diameter, flowering time, differentiation on ray and disc flowers' width, plant length, chimeric leaves, flower number per bunch, cluster flowering and petal differentiation. The changes of the petals were; pink – salmon color, pink strips, disappearing disc florets. The rate of pink colored plants and cluster flowers' was 11%. Daisy and more flowering types' rate was 10 %. The ratio of long plants was 8%.

Keywords: Chrysanthemum, Mutation breeding, Chimera

The Effects of Pre Harvest GA_3 Application on the Quality of the Nectarne Variety, Caldesi 2000 and the White Nectar Fruit

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Abstract: In Turkey, nectarines have been long cultivated since the early period to the late period. Nectarines are cultivated in different regions, where they are harvested by different methods. Nectarines are smooth skinned and are consumed in different forms in addition to fresh consumption. In Turkey, outside the known varieties of nectarines, the production of white nectarine, an endemic species, is limited to the Çanakkale province and demanded by consumers increasingly every day. Plant growth regulators can be used to increase the quality and durability of nectar fruits. The effects of pre-harvest GA_3 applications on the quality of Caldesi 2000 nectarine variety and white nectar fruits were investigated in this study. GA_3 applications were of 20 and 50 ppm were given at color change periods. In the fruits harvested at the firm stages, fruit weight, fruit width, fruit length fruit color, fruit firmness, water-soluble dry matter, titratable acid, and the pH value were determined

Keywords: Nectarine, White nectarin, GA_3, Fruit quality

The Effect of Different Application Times of GA_3 on Black Myrtle Berries (*Myrtus communis* L.)

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Abstract: Myrtle (*Myrtus communis* L.) is a widespread Mediterranean shrub that is one of the most characteristic species in Turkey. Its berries and leaves are employed to obtain some derivates, such as essential oils and extracts for food and cosmetic use. Myrtle fruits have white and black color. Nowadays, there is a big demand for black myrtle fruits because of its high antioxidant capacity. But it contains high amount of seeds and this situation reduces marketing and production. GA_3 is one of the most important hormones used to improve fruit quality and provide seedlessness. The main objective of this study is to investigate the effects of GA_3 on seedlesness and quality in black myrtle fruits. Studies were carried out in the orchard of black myrtle cultivar located in Antalya. At different flowering stages, GA_3 dose of 100 ppm were applied to the whole of the plants. Some applications significantly reduced seed number in fruits. Three applications of GA_3 at great ballon, full bloom and fruit keeping stages consecutively decreased seed number from 9.20 (control) to 2.17 seed fruit-1. In addition, with three consecutive application of GA_3, seed rate decreased to 5.38% while 14.54% in control. Additionally, these GA_3 applications caused the total seed weight reduced to 29.92 (mg/fruit) from 99.13 (mg/fruit) in control. Some GA_3 applications resulted in fully seedless fruits up to 12.00%. Conversely, GA_3 applications did not change at fruit weight and fruit size of fruits.

Keywords: *Myrtus communis*, Growth regulators, Fruit, Seedlessness

Effect of Nutrient Media, Pretreatments and Stress Applications on Androgenic Respons in Pepper

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Abstract: Success in anther culture, which provides important advantages in pepper breeding, depends on many factors. Genotypes, pretreatments, nutrient media and incubation conditions are the most important factors. In this study, the influence of pretreatments, nutrient media and incubation conditions on induction of androgenic embryos and haploid plantles in pepper (*Capsicum annum* L.) were investigated. F2 generation of Belissa RZ F1 Red Kapia pepper cultuvar was used as donor plants. Flower buds were pretreated at +4 °C for 24 and 48 hours. Untreated buds were used as control. Anthers were cultured according to Dumas de Vaulx et al. (1981), supplemented with 0 (control), 0.03 and 0.05 mg l -1 vitamin B12 (DDV) and Dolcet-Sanjuan et al. (1997), supplemented with 0 (control), 0.10% and 0.20% activated charcoal (double layer). Anthers were incubated for 8 days at 9 °C and 35 °C in darkness. After the incubation, anthers transferred to a growth chamber and maintained in16 hours light/8 hours dark photoperiod, at a light intensity of 3000 lux, and at 24 °C±2 °C. Androgenic response was changed according to treatments, especially nutrient media. Pretreatment of flower buds at +4 oC for 24 h resulted the highest embryo formation. DDV medium was more efficient in embryo formation than double layer medium. Vitamin B12 was not effective in embryo formation. Incubation of anthers at 35 °C is more effective in embryo formation. As a result, pretreatments, nutrient media and incubation conditions have been effective on androgenic success individually and together.

Keywords: Androgenesis, Anther culture, Embryoid, Haploidy

Effect of Pre-Harvest Foliar Applications of GA3 and 28-Homobrassinolide on Yield and Quality of "Yuvarlak Çekirdeksiz" (*Vitis vinifera* L.)

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Abstract: This study was conducted to determine the effect of pre-harvest leaf application of gibberellic acid (GA_3) and 28-homobrassinolide on the yield and quality of "Yuvarlak Çekirdeksiz (*Vitis vinifera* L. cv.) the vines, grafted on 41 B and 12 years of age treated with 10 ppm GA_3 at fully bloom and pea-size stages and 0.4 and 0.8 ppm 28-homobrassinolide (HBR) at the veraison. Pure water was applied to the control vines. According to the results obtained, yield increased with applications, except with 8 ppm HBR. The content of soluble solids increased significantly with the applications compared with the control, and the highest soluble solids content was obtained from 20.2% with 0.4 ppm HBR application. There were no significant effects on TA, pH and fruit firmness. The maturity index was above the average with 0.4 ppm HBR application (35.16).Both sizes and weights of cluster and berry were not significantly affected. However, cluster weight and size were always found greater with GA_3.The effect of 4 ppm HBR was also determined to be better than higher concentration and the control. The lightest clusters were obtained with 0.8 ppm HBR. Berry weight and size were higher in applications of GA_3 and 4 ppm HBR, respectively, whereas this order was the opposite for the berry length. HBR applications reduced stem removal force. It was determined that the berry color was greener with 0.4 ppm HBR with increased brightness. In general,GA_3 application increased cluster and berry weight, HBR applications improved quality characteristics, and 4 ppm HBR leaf application in veraison period provided positive results.

Keywords: Homobrassinolide, Grape, Quality, Yield, Gibberellic acid

Gibberellic Acid and Plastic Box Combination Improve Seed Germination of Hybrid Seeds in Grapes

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Abstract: Improving germination parameters of hybrid seeds are useful in increasing the breeding success. hybrid grape seeds have a lower germination rate ranging from 37% to 60%, depending on pollen sources. The main goal of this study was to improve germination parameters of Alphonse Lavalle x Regent hybrid seeds by treating with Gibberellic acid (GA_3, 1000ppm), Benzylaminopurine (BAP, 1000ppm) and Hydrogen peroxide (H2O2, 1 M) and then by germinating in plastic boxes with high air humidity. Seeds were soaked in GA_3, BAP, H_2O_2 solutions and water (control) for 24 hours after stratification (4 months at 5 ºC) and then sown in Perlitte:Peat moss (1:1) potting soil. Germination was carried out in the plastic boxes with constant temperature (27 °C) and relative humidity (99%). Total Germination (TG), Germination Speed (GS) and Germination Period (GP) were calculated. Seed germination started on the eleventh day after sowing and continued until the 31st day. Total germination ranged from 60.39% to 78.32% in the control and GA_3, respectively). GA_3 significantly increased total germination when compared to the other treatments. The germination speed varied from minimum of 1.79 in BAP to the maximum of 2.91 in GA_3 treatment. Chemical treatments had no significant effect on the germination periods which ranged between 11 days in BAP+GA_3 combination and 18 days in the control treatment. The results of the study indicated that the rate and speed of germination of hybrid grape seeds could be increased by GA_3 applications just before sowing and then growing the seedlings in plastic boxes with high humidity (99%) and air temperature (27°C).

Keywords: *vinifera*, *Vitis*, Germination, Seedling, Stratification

Phenological Characteristics and Effective Heat Summation Requirements of Grape Cultivars in Antalya Ecological Conditions

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Abstract: Many new grape cultivars were lately introduced or released in Turkey. But there is lack of information on adaptation of these cultivars to different locations. Calculating effective heat summation requirements (EHSR) of cultivars is one of the reliable methods for measuring adaptation of grapes to locations. Main goals of this study were to determine the number of days and EHSR of grape cultivars between various phenological periods. EHSR and phenological characteristics of 34 grape cultivars grown in Antalya were determined in 2017. Different daily average air temperature and EHSR calculating methods were also compared for each cultivar. Dates of bud burst, flowering, veraison, and ripening were noted for all cultivars. EHSR values and number of days between phenological stages were calculated for each cultivar. Hourly temperature recording for average daily temperature and Winkler index for calculating EHSR of cultivars were assumed to be reliable methods. Very early ripening grape cultivar named Early Sweet has all earliest phenological dates. Bud burst and ripening have occurred on 01.03.2017 and 16.06.2017, respectively. It has 926 degree days(dd) of EHSR. This cultivar needs 107 days of a period between bud burst to ripening and only needs 23 days after flowering for ripening. Latest bud burst has occurred in Italy and Prima cultivars(27.03.2017) while latest ripening cultivar was Reçel Üzümü(19.08.2017). Flowering period for all cultivars was observed between 19.04.2017 (Early Sweet) and 15.05.2017(Autumn Royal). Reçel Üzümü(2127dd) has the highest EHSR value among cultivars. Red Globe and Reçel Üzümü had the uneven coloring of berries in Antalya.

Keywords: *vinifera*, Ecology, Ripening, Bud Burst, Temperature

Determination of the Bud Fertility of Some Grape Varieties Grown in Şemdinli (Hakkâri)

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Abstract: This study was carried out in Çekirdeksiz, Süleymani, Hurıst, Mılaki, Reşık, Keçimemesi, Veşifır and Sipiyaşin grape varieties grown on their own roots in Şemdinli (Hakkâri) in 2015. Aim of this study was to determine the winter bud fertility and the optimum pruning level in grape varieties investigated. Bud fertility of grape varieties (number of bunches/bud) were determined by counting number of bunches on shoots obtained by forcing shooting one bud cuttings which taken from 1-10. nodes of one year old shoots. Consequently, it was determined that Sipiyaşin variety has to be short pruned from 1-3 rd bud and Süleymani, Hurıst, Mılaki, Reşık, Keçimemesi, Veşifır varieties have to be short pruned from 4-5rd bud and Çekirdeksiz variety has to be long pruned from 7rd bud.

Keywords: Pruning Level, Bud Fertility, Grape varieties

Post-Harvest Quality Properties of Some Wine Grape Varieties Grown in Malatya Province

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Abstract: In order to determine some quality characteristics of wine grape varieties (Öküzgözü, Kalecik Karası, Hasandede, Kabarcık) grown in Malatya province and correlation levels among examined characteristics, this research was carried out. In respect to berry characteristics, it was determined that Öküzgözü variety had the highest values berry weight (3.46 g), berry volume (3.20 ml), berry length (17.90 mm) and berry width (16.95 mm) while Hasandede variety had the lowest values berry weight (1.40 g), berry volume (1.30 ml), berry length (12.52 mm) and berry width (12.06 mm). The highest total soluble solid (TSS) content (22.1%) was measured in the Kalecik Karası variety. Among varieties was statically observed no difference in terms of pH and acidity content. A seed weight was founded to be highest in Öküzgözü variety (49.24 mg/seed) and lowest in Kabarcık variety (34.65 mg/seed). It was determined that seed weight in berry was higer in Öküzgözü variety (96.60 mg / berry) than other varieties.

Keywords: Malatya, Wine grape variety, Quality characteristics

Effects of Some Plant Nutritional Applications on Phenolic and Antioxidant Content of Fruits in Sepirze Grapevine Grown in Mardin (Nusaybin)

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Abstract: The effects of Humic Acid (HA), which was used in different doses as plant nutrition material, and Rock Phosphate (RP), which is an important product of the region and which is extracted from the Mount Mazı, on total phenolic and antioxidant contents of Sepirze grapevine cultivar grown in Mardin-Nusaybin were investigated. The study was planned in the early spring to determine the effect of these nutrient applications on the fruit content of that year; fruit flesh, fruit skin and seed were separately analyzed so that it was tried to determine which part of the fruit was more affected from the applications. Although these nutritional applications caused a slight increase in the phenolic contents in grapes compared with the control application, this increase was not statistically significant. The amounts of antioxidants in grapes were differed according to the applications. Phenolic and antioxidant amounts were found to be statistically significant ($P < 0.01$) when the different parts of the grape were taken into consideration. The highest proportion of phenolic and antioxidant was detected in the seed, followed by fruit skin and fruit flesh.

Keywords: Antioxidant, Grapevine, Humic Acid, Phenolic, Rock Phosphate

The Effect of Rootstock Cutting Diameter on Final Take, Quality of Potted Grapevine Saplings

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Abstract: In grapevine propagation, dormant cutting quality of rootstock and scion is as equally important as the quantity. The best length and diameter of cuttings for propagation were determined by researches. Cuttings should be at least 7-12 mm in diameter at the top. The length can vary from 30 to 40 cm, depending on location and soil type. In this study, the effects of rootstock diameter on the grafting grapevine production and growth of potted grapevine plants in vineyard were investigated. The dormant cuttings of 5BB, 1103 P and 110 R rootstocks were grouped by their diameters (6-9 mm,10-13 mm, 14 mm≤), then scions of Narince cultivars were grafted by omega grafting machine on rootstock cutting. The callusing and rooting perfomance of grafted cuttings, final take of potted grafted saplings were evaluated. The ratios (100%) of round callusing on graft union in 5BB and 1103 P rootstock decreased with increasing of cutting diameters. The callusing formation on basal union in three rootstocks increased with increasing of cutting diameters, but root formation decreased. Total final take ratios ranged from 94 % to 98%; the final take of the first grade ranged from 60% to 90%. The ratios of total and first grade final take decreased with increasing in cutting diameters.

Keywords: 5BB, 110 R, 1103 P, Shoot Lenght, Root Fresh Weight, Potted-Grapevine

Effects of Different Mulching Materials And Shading Rates on Sapling Yield and Quality in the Grafted Grapevine Production

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Abstract: The aim of study was to determine of the effects of different mulching treatments (textile mulch, white and black mogul mulch, gray upper side and black lower side plastic mulch, black plastic mulch and mulch-free control) and diffrenet shading rates (control, 35%, 55%) on yield and quality of grafted grapevine sapling under field conditions. 1613 C Sultana (seedless grape) grapes were used as the material of study. The results revealed that levels of shoot lenght were affected from shading applications; and the level of shoot growth, shoot lenght, first and second size of sapling yield and overall yield were affected from mulching applications. The highest shoot lenght (110 cm) and yield (78%) were obtained from black plastic mulching application under the shading rate of 35%.

Keywords: Grafted grape nursery, Shading, Mulch

The Study on Determination, Conservation and Identification of Grapevine Genetic Resources in South-East Anatolia

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Abstract: Turkey having suitable ecological conditions for viticulture is one of the origin of grapevine. As a result of centuries long viticultural activities Turkey has lots of varieties and kinds of grapes. Beside grape is growing almost anywhere in the country, it has genetic abundance and variety. Determination, conservation and identification of these materials has significance especially for breeding. For this purpose, from different location in the region where grapevine is under risk growing locations are determined, materials are collected and conserved. Alongside existing grapevine genetic collection new genotypes are determined and added to this collection. South East Anatolian genetic wealth has risk because of cancer, Phylloxera, forestry and climate change. In consequence of these factors, famous with products such as pekmez, pestil, sucuk, bastık and köfter number of region's vineyards decreased and with addition of pest and disease productivity declined. South East Anatolian Grapevine Genetic Resources is a project by means this study materials are collected and conserved for future research. Through this project, 40 grapevine varieties in Pistachio Research Center in 2010 are raised to 117 in 2015. Beside the new addition to the collection, 50 varieties and kinds of grapes have been identified by molecular markers. Rest of the collection 67 grapevines are still in investigation for identification.

Keywords: Grapevine, Grape Variety and Kind, Genetic Resource, Collection Vineyard

Effects of Trunk Height and Training Systems on the Some Physicochemical Properties of Karaerik

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Abstract: In this study, the effect of trunk heights and training systems on physicochemical properties of the 'Karerik' grape cultivar grown on different trunk heights (75-100-125 cm) and training systems (Wall, Y, Baran) were investigated. In the study, color (L*, a*, b*, C, h˚), cluster weight (g), berry weight, pH, titratable Acidity (TA%), total soluble solids (TSS%), maturity index (MI), sugar, organic acid, vitamin C and antioxidant activity (FRAP) as well as total and individual phenolic compounds were considered. As a result of the study, it was found that various training system and trunk height had no significant effect on the content of b*, h˚, cluster weight, berry weight, pH, TA%, TSS%, MI, sugar, organic acid and macro-micro nutrients and individual phenolic compound, however, effects on density of color (a*) and saturation (C), antioxidant activity and total phenolic content were found statistically significant. It can be concluded that 125 cm trunk height and double cordon training system supported by Y system are considerable due to some advantages for quality.

Keywords: Karaerik grape cultivar, Physicochemical content, Training system, Trunk height

Acknowledgements: We are grateful for the financial support provided for this research by Van Yüzüncü Yıl University Scientific Research Project Department (FYL-2017-5568).

Biodynamic Viticulture

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Abstract: In recent years environment friendly production system has been headed towards by people that faced problems that the rapid growth of the world population and the unconscious and unsupervised development of industrialization have brought many problems about human and environmental health. Both Organic agriculture and biodynamic agriculture are environment friendly production system. Biodynamic agriculture is a type of organic agriculture. Biodynamic was developed by Dr. Rudolf Steiner, an Austrian philosopher and scientist in 1924. Biodynamic Agriculture is one of the earliest sustainable agriculture movements and quite a successful one as it is in practice in 62 countries and has its own certification process called Demeter. In the world 180.706 hectares agriculture area are grown biodynamicly and 5.279 farmers have Demeter certificate. In Turkey, there are 163 biodynamic farmers in 1.019 hectares areas. Biodynamic viticulture differs from organic systems primarily in the use of fermented preparations in compost and as field sprays. These unique preparations consist of specific minerals or plants treated or fermented with animal organs, water and/or soil. Biodynamics viticulture focuses on agriculture, nutrition and healing and uses very specific techniques and special preparations made from mineral, plant or animal extracts. Biodynamic emphasizes spiritual and mystical perspectives and uses the astrological sowing and planting calendar. In Tukey 167.83 hectares viticulture area are grown biodynamicly and 6 farmers have Demeter certificate. Biodynamic viticulture requires knowledge and analysis. Biodynamic viticulture is an opportunity for us to appreciate the little pollution of our country's geography and its climate.

Keywords: *Vitis vinifera* L., Biodynamic viticulture, Biodynamic production, Demeter certificate

Effect of Oryzalin Treatment on *in Vitro* Regeneration in cv. Sultana (*Vitis vinifera* L.)

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Abstract: Oryzalin is considered as a valuable antimitotic agent in chromosome doubling in plants. In several genera such as *Vitis*, induction of autopolyploidy combined with proper tissue culture has provide effective *in vitro* polyploidization. In this study, it is aimed to determine the useful treatment of oryzalin for *in vitro* regeneration on grape cultivar Sultana (*Vitis vinifera* L.). *In vitro* axillary buds of diploid Sultana were treated with oryzalin concentration (0, 20, 30 and 40 µM) for 24, 36 and 48 h in two different media (liquid and solid MS medium). Growth rates were assessed and survival rates were recorded. Although axillary buds have been shown to survive in both nutrient media there were differences regarding to concentration and treatment period of oryzalin. High survival rates were achieved in 20 µM oryzalin treatment for 36 and 48 hours on liquid MS medium. Survival rates were 45.83% for 36 hours and 50% for 48 hours treatment.

Keywords: *Vitis vinifera* L., Oryzalin, Axillary bud, *in vitro*, Regeneration

Aromatic Composition of Pink Skinned Grape Cultivar: Gülüzümü (*Vitis vinifera* L.)

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Abstract: Gülüzümü is a grape cultivar used for fresh consumption. In addition to table grape characteristics, it is also used for traditional must products thanks to its berry skin color and flavor properties. This variety, which is one of the important genetic resources of Ankara province, comes into prominence with its attractive "pink" skin color and unique "rosy" flavor. In this study, the aroma composition of Gülüzümü was investigated on the grape material obtained from Ankara-Beypazarı district, which is the original ecology of the variety. Analysis was carried out using solid-phase microextraction technique with gas chromatography (GC) and mass spectrometry (MS). Results were expressed in peak area (%) as a mean value. A total of 28 volatile compounds were identified. These compounds included 5 acids, 5 alcohols, 2 C6 compounds, 3 terpenes, 1 C13 norisoprenoid and 12 aldehydes and ketones. The quantities of other compounds were detected very low. The relative distribution of the aroma compounds were; C6 compounds 67.9%, aldehydes and ketones 10%, acids and alcohols 4.9%, terpenes 2.5%, C13 norisoprenoids 0.3% and other compounds 9.5%. The C6-compounds (hexanal and 2-hexenal) that have vegetal flavor had the highest values in total aroma composition of Gülüzümü. Although terpene compounds are proportionally low in the aromatic composition, nerol, the main compound that contributes rosy flavor, was the compound that detected high amount. Benzene acetaldehyde (hyacinth), 2-ethyl hexanol (floral) benzene methanol (fruity), maltol (caramel), heptanoic acid (sour) and acetic acid (vinegar) were determined as proportionally important compounds in total aroma composition of Gülüzümü.

Keywords: Volatiles, Flavor, Table grape, Gülüzümü, *V.vinifera* L.

Evaluation of Rootstock Effects on Pollen Quality and Germination in Some Self Fertile Grape Cultivars

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Abstract: Rootstocks affect both vegetative and generative growth of the scion grapevine. However there is limited or often lack comparisons on fruit set components between grafted vines. The aim of the present study was to determine pollen quality and germination rate of a cultivar when grafted onto different rootstocks. In the study two cultivars, Kalecik Karası and Narince were grown on three rootstock (5BB, 41B, 1103P) and Alphonse Lavallée was grown on two rootstocks (5BB and 1103P). Results showed that pollen viability was higher in the three cultivars grafted on 5BB. The highest averages were 93.03% in Narince, 74.43% in Kalecik Karası and 78.84% in Alphonse Lavallée. Pollen germination was found to be high on 5BB in Narince (22.04%) and Alphonse Lavallée (20.65%) while the lowest germination rate was determined in Kalecik Karası on 5BB (18.55%). However reproductive performance of pollen differs between grape cultivars, rootstocks can manipulate this performance.

Keywords: *Vitis vinifera* L., Pollen, Viability, Germination, Rootstock

Effects of Water Deficit Treatments on Coloration and Fruit Quality of (*Vitis vinifera* L.) cv. Fantasy Seedless

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Abstract: The study was carried out to determine the effects of water deficit treatments on coloration, berry composition and quality of (Vitis vinifera L.) cv. Fantasy Seedless table grape variety. There were 3 different irrigation treatments in the experiment; T1- irrigation until field capacity; T2- irrigation 35% of T1 and T3-irrigation 65% of T1. Deficit irrigation treatments were started when the available water decreased %50 in the effective root depth and also all treatments were performed over two growing seasons 2016-2017 in the Manisa Viticultural Research Institute. Statistical analyses showed that TSS, colour parameters, CIRG Index, anthocyanin content, total phenolics and total flavonoid contents of Fantasy Seedless were significantly affected by the water stress. The best coloration was observed with the T2, T3 and T1 treatments, respectively. In addition leaf water potential values were increased with water stress and the highest value (-1.75MPa) was observed by T2 treatment in both years. On the other hand the lowest leaf area index (LAI) value was obtained from T2 treatment. As a result it was determined that water stress had various positive effects on berry composition and coloration. However deficit irrigation had some adverse effects on yield parameters. Therefore it needs to be optimize yield and water relation on a basis of grape cultivar and growing regions.

Keywords: Water stress, Deficit Irrigation, Table Grape, Coloration, Quality

Different Bud Load and Leaf Removal Treatments Affects Bud Burst Rate, Leaf Water Potential and Stomatal Conductance Relations of cv. Sultan 7 (*Vitis vinifera* L.) Grapevines

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Abstract: The study was conducted to determine the effects of two different bud load levels (15 buds and 30 buds/m^2) and leaf removal (25-50%) treatments on bud burst (%), fruitfulness (number), midday leaf water potential (ΨMD), stomatal conductance (gs) of Vitis vinifera L. cv. Sultan 7 grapevines on 1103 Paulsen rootstock in 2016 and 2017 vegetation season in Manisa, Turkey. Vine spacing was 3.0 to 2.0 m and the vines were cane pruned on Y type trellis system. Leaf removal treatments were performed only once approximately one month before verasion. Midday measurements of leaf water potential (ΨMD) showed difference between-1.20 MPa to-1.80 MPa and leaf gs values were determined between 226.86 mmol/$m^{-2}s^{-}$1 and 33.36 mmol/$m^{-2}s^{-1}$ according to different measured day throughout the two seasons. Especially, the leaf stomatal conductance value was higher as a consequence of the 15 buds/m^2 treatment compared with 30 buds/m^2 under the same irrigation conditions. The results indicate that extreme bud load (30 buds/m^2) treatment on vines generally reduced leaf ΨMD, and gs values. On the other hand, bud burst rate was reduced by 84,51 to 61,76 % when bud load increased from 15 to 30 buds/m^2.

Keywords: Raisin, Bud load, Viticulture, Leaf water potential

The Effects of Different Growing Medium and Root Pruning Applications on Trakya Ilkeren Grape Variety Grown in Soilless Culture

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Abstract: In this research, the effects of shearing of 10 cm lower part of the root zone of 3 aged Trakya ilkeren grape varieties grown cocopeat and Perlite: Peat (2: 1, v: v) solid culture media and 32 L pots on grape yield, cluster and berry weights with must characteristics and macro and micro nutrient levels of the leaves were investigated. A modified Hoagland nutrient solution was applied to the plants once a week. The effect of the growing conditions on the stem diameter measured during bud burst and full bloom period was significant and the highest stem diameter values were determined in Perlite: Peat medium with 17.18 mm and 17.65 mm for both periods in the order mentioned above. The effect of the applications on the yield, cluster, berry and must characteristics was not significant. The content of leaf nutrients in the full bloom and veraison period changed according to the growing media and root shearing application. Ca and Mg in plants grown in Perlite: Peat medium; P, K, Zn and Mn in Cocopeat; Zn and Mn in roots-pruned plants; Ca and Mg values in the unsheared (Control) plants, were found to be higher. Considering N, Fe and Cu contents of the leaf samples taken in both periods, there was no significant difference between the applications.

Keywords: Grapevine, Grape, Soilless culture, Growing medium, Mineral element

Determination of Morphological Characteristics of Some Grapevine Rootstocks and Clones

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Abstract: This study was carried out in the experimental vineyards of the Tekirdag Viticultural Research Institute. six grapevine rootstocks and 17 clones that had been selected by Tekirdağ Viticulture Research Institute were characterized morphologically and ampelographically. The differences and similarities among them were determined. The description studies had been made between 2009-2011 on Rupestris du Lot, 99R, 5BB, 110R, 5C, 1103P rootstocks and their clonal morphological characteristics. Morphological charasteristics and phenological observations related to shoot, leaf and inflorescence were based on the Minimal Descriptor List for Grapevine Varieties of OIV, UPOV and IBPGR. Although there was no statistical difference between the clones belonging to the same rootstocks, it was determined that some characters showed differences. Furthermore, it has been suggested that the morphological definitions should be supported with molecular description methods in these studies.

Keywords: Grapevine Rootstocks, Clones, Ampelography, OIV, IBGRI

Breeding of New Table Grape Candidates at Manisa Viticultural Research Institute

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Abstract: Türkiye is also the major motherland of grapevine like lots of other fruits. Therefore, there is a large grapevine biodiversity in Turkey. There are lots of local grape varieties in Aegean Region alike the other geographic regions. Although this large biodiversity, there is not enough high quality table grape variety matured at different times. Cross-pollination method is used largely for developing new varieties in different countries around the world. Purpose of the breeding program is to improve early and late maturing new table grape cultivars. Special emphasis is given to firmness, special aromas, loose and uniform bunches, natural big berries, good shelf life and reduced labor costs. Manisa Viticulture Research Institute is actively involved in breeding. In the last few years, the numbers of new cultivars of a total of 7 varieties have been registered and released. Spil Karası, Manisa Pembesi, Mesir, Lidya, Ece, Efem and Beyra table grapes cultivars have been presented to the grape growers. New table grape varieties that can have high market value with superior properties. Evaluation of the plants obtained in cross-pollination studies have been continued in Manisa Viticulture Research Institute. This study will focus on some quality parameters of table grape candidates developed by crossbreeding process. Hopeful grape variety candidates having superior properties will be determined and registration process will be carried out.

Keywords: *Vitis vinifera* L., Table Grape, Breeding, Quality Parameters

Grape (*Vitis vinifera* L.) Seed Oil, Extraction Methods and Evaluation of the Potential in the Food Industry

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Abstract: Grape (*Vitis vinifera* L.) is one of the most produced fruits of the world. Approximately 7.5 million hectares of land are produced in the world. and 75 million tons are produced each year. This production is used in the world about 50% fruit juice and wine production. Wastes remaining from the production of products such as wine and fruit juice have an important potential. Grape seeds are an important part of these wastes. Nowadays, these wastes can be used by the cosmetic and pharmaceutical production sectors due to its high antioxidant properties, as an alternative to synthetic antioxidants in the food industry to extend the shelf life of foods. Grape seed oil is known to be rich in unsaturated fatty acids, such as linoleic and oleic acid, and proanthocyanidins, which have high antioxidant properties. Grapes and seeds which are functional food, contain important bioactive compounds. These compounds, called nutraceuticals, should be prevented from disappearing with grape waste. The quality and isolation of the basic bioactive components of the grape seeds may vary according to various methods, and a number of different studies have been conducted in this regard. in the present day with the start of the depletion of natural resources, both economically and environmentally are trying to assess each waste. Grape seeds, which are taking place in the growing chain of recycling, gain importance for our country day by day.

Keywords: Grape seed oil, Functional food, *Vitis vinifera* L.

The Effect of Microbial Fertilizer Applications on Grape Yield, Quality and Mineral Nutrition of Some Early Table Grape Varieties

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Abstract: In the study, a commercial microbial fertilizer (Terra Doc-Biofertilizer) containing 3.5 × 10 7cells/mL of Chlorella vulgaris algae and ranging from pH 3.5-5.5 was used. Four applications of microbial fertilizer;1)control(no fertilizer),2)from leaf,3)from soil,4)from soil plus from leaf were experimented.The effects of the treatments on grape yield and cluster,berry and juice characteristics of Trakya ilkeren,Yalova incisi and Prima grape varieties of 4 years old were investigated. In addition, the effects of these applications on macro and micro element contents of leaf samples taken during the veraison were examined. Microbial fertilizer application was started when shoots reached 20 cm length and made five times in total including veraison time. The highest yield (6076 g /vine, 3038 kg /da), bunch weight (300.1g) and 100 berry weight (622.6g) as well as other berry characteristics and maturity index (60.21) values were obtained from the Yalova incisi variety.It has been determined that the most suitable fertilizer application was soil + leaf application for the highest yield(4059g/vine,2030kg/da) and bunch weight(249.7g) and for 100 volumes (393mL).It has been observed that application from the soil causes some earlier maturation of the grapes.The contents of nutrients in the leaf samples were different in terms of varieties except nitrogen and manganese. The highest K content was found in Trakya ilkeren; Ca, Mg and Fe in Yalova incisi; P, Fe and Zn were in the Prima variety. There were no significant differences in leaf N,P,Mn and Zn contents between fertilizer applications. For the other elements, the highest values were obtained from leaf applications followed by soil plus leaf applications.

Keywords: Grapevine, Grape, Microbial fertilizer, Macro and micro mineral element

Determination of the Effects of Pumpkin Rootstocks on Yield and Fruit Quality in Mini Watermelon Cultivation

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Abstract: In this study, it was aimed to determine the effects of the pumpkin rootstocks developed through hybridization breeding technique on the yield and fruit quality in grafted mini watermelon cultivation. In this research, 7 rootstock candidates obtained from intraspecific pumpkin hybrids developed by rootstock breeding program and RS 841 commercial rootstock were used. These rootstocks were grafted with Bonanza mini watermelon cultivar. Non-grafted Bonanza seedlings were planted as control. Yield per decare, mean fruit weight, fruit dry matter content, total soluble solids (TTS), fruit flesh color, fruit firmness and vitamin C determined to search out the effect of rootstocks on the yield and quality components of mini watermelon. Mean TTS value was found 11.8% in grafted mini watermelons. It was obtained 8.95% in non-grafted Bonanza fruits (control). Fruit flesh color, vitamin C and fruit dry matter contents were changed according to the rootstocks. The rootstock/scion combinations of 15/B, 26/B and 35/B found superior for yield and quality than non-grafted and other rootstock/scion combinations.

Keywords: Grafted Watermelon, Pumpkin Rootstock, Quality, Yield

Determination of the some Seed Characteristics of Hybrid Eggplant Rootstocks

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Abstract: The purpose of this study is; the determination of some physical seed characteristics, germination and emergence performance at different temperatures of hybrid eggplant rootstock seeds. In the study, eight hybrid eggplant rootstock seeds which were determined to be resistant to Fusarium and Verticillium wilt and nematode were used. The seed characteristics such as seed width (mm), seed length (mm), seed thickness (mm), weight of 100 seed (g), number of seeds/fruit, number of abortive seeds and ratio were examined. In the study, germination and emergence performance of rootstock seeds at four different temperature values (12 °C, 16 °C, 20 °C, 25 °C) were investigated. It was determined that the rootstock combinations obtained as a result of hybridization had significant differences in terms of seed characteristics. In the germination experiment; the highest germination speed values were obtained in the rootstocks of RS-3 (100%), RS-7 (91.7%), RS-8 (87.9%) and the highest germination rate values were obtained in the rootstocks of RS-3 (100.0%), RS-8 (97.0%) and RS-7 (97.0%). Above 80% emergence rate values were determined at 20 °C temperature application. At optimal temperature application (25 °C), the highest emergence rate (100%) were recorded in RS-3, RS-7 and RS-8 rootstocks.

Keywords: Rootstock seed, Germination, Emergence, Temperature

Improvement of Industrial Phytophthora (*Phytophthora capsici* Leon.) Tolerant Pepper Lines Using Molecular Markers and Anther Culture

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Abstract: Althought Turkey has big potantial with regard to production area and quantity pepper production, equated yield is low because of plant diseases. One of plant diseases is Phytophthora capsici Leon. Phytophthora capsici Leon. disease tolerance in pepper species controlled with more than one gene (QTL). Until now, there are some reports on QTL mapping disease tolerance in pepper species and one of them is Phyto.5.2 which linked Phytophthora capsici Leon. disease tolerance. In this study, we aimed and have used pepper genotypes to transfer disease tolerance which grown Central Anatolia region and used for spice. It was crossed Cırgalan pepper and CM334 and backcrossed to Cırgalan pepper genotype to obtain BC1F1. BC1F1 plants were tested using molecular marker which linked with Phyto.5.2 QTL. Tolerant plants were backcrossed with Cırgalan pepper genotypes to obtain BC2F1 plants. BC2F1 plants were tested again using molecular markers and tolerant plants selfed to obtain BC2F2. After testing, it was taken anthers of tolerant plants to get double haploid plants. As obtained results of this study, 25 pure industrial pepper lines were obtained which they were Phytophthora capsici Leon. disease tolerance. This lines are usuful for Phytophthora capsici Leon. disease tolerance breeding programs.

Keywords: Pepper, Breeding, Molecular markers

In vitro Propagation Possibilities of Stone Pine (*Pinus pinea* L.) through Somatic Embryogenesis and Shoot Tip Culture

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Abstract: In the study, somatic embryogenesis and shoot-tip culture technique were used to be clonally and rapidly propagated of stone pine (Pinus pinea L.). Cotyledons of embryos excised from mature seeds were used for somatic embryogenesis experiments. The cotyledons were cultured on three different media DCR (Douglas Fir Cotyledon Revised), modified LP (Quoirin and Le Poivre) and modified 1214, contain three levels of three growth regulators (BA, KIN and NAA). White, transparent, and succulent callus masses were formed on cotyledon explants. But somatic embryos were not achieved. In the shoot-tip culture experiment, approximately 5-8 mm of tips of shoots from 9-10 years old trees was used. Shoot-tips were cultured on ½ DCR medium contained seven different levels of growth regulators (BA and NAA). Growth and needle-leaf protrusion were seen on some of the shoot-tips.

Keywords: *in vitro*, Somatic embryogenesis, Shoot-tip culture, *Pinus pinea*

The Effects of Different Planting Times on the Flower Quality Characteristics of Gladiolus (*Gladiolus grandiflorus*) Cultivars in Field Conditions in Ankara

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Abstract: This research was carried out to determine the effect of different corn planting times on the plant height, spike length and number of candle in gladiolus cultivation in Ankara. In this study, corms of 11 different gladiolus varieties with different flowering times, including early, mid-season, the medium late and late types were planted at four different planting times including (May 31st, June 15th June 30th and July 15th). All varieties in the trial were eligible to be grown in Ankara conditions. The most suitable date for planting gladiolus corm in Ankara has been determined as June 30th and July 15th. The best results in terms of plant height, spike length and number of candle were obtained from Amsterdam and Rose Supreme varieties.

Keywords: Gladiolus, Planting time, Genotype, Plant length, Spike length

Effect of Preharvest Applications on Storage and Quality Properties of Miho Wase Mandarin

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Abstract: In this study, liquid Nutri-Cal, powdered Sulfone and water (control) from leaves were applied to the Miho Wase mandarin before harvest. The fruits were stored for 3 months under conditions containing 1°C temperature and 90% relative humidity. The fruit was kept in the shelf life for 7 days. The weight loss, color change, fruit juice, titratable acidity amount, total soluble solids amount, pH and decay values of the fruits storage and shelf life were evaluated periodically. When all the data were evaluated, Nutri-Cal liquid fertilizer application, which was applied to fruits 1 month before harvest, was found to have a positive effect on quality criteria during storage and shelf life.

Keywords: Mandarin, Storage, Nutri-Cal, Sulfone, Quality

Aqueous and Gaseous 1-Methylcyclypropene (1-MCP) Effects on Postharvest Quality of Carrot Roots Kept at Room Temperature

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Abstract: The effect of aqueous and gaseous 1-methylcyclopropene (1-MCP) on postharvest quality of carrots stored at room temperature was studied. Carrots were distributed into 4 groups, and afterwards the first ones were treated with gaseous 1-MCP, the second ones were treated with aqueous 1-MCP, the third ones were placed in a modified atmosphere package (MAP), and the fort ones were left non-treated as controls. The carrots were placed in clamshell PET boxes except MAP-treated ones and stored 23 ± 1 °C for 10 days. During the period of the storage, weight loss, firmness, color, headspace gas composition, total soluble solids, pH, titratable acidity, carotene content, and decays were monitored. The results signify gaseous 1-MCP application may have potential for delaying postharvest quality losses by suppressing decays. However, aqueous 1-MCP or MAP application was found to be inept suppressing or delaying postharvest quality losses.

Keywords: Postharvest quality, Postharvest quality loss, Modified atmosphere packaging, Carrot firmness, Carrot color

Effects of UV-C and Hot Water Applications on Fruit Quality and Storage Postharvest in Some Cherry Varieties

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Abstract: The aim of this study is to determine both the suitability of two standard (Regina and Lambert) cherry varieties grown in Mersin province and the effectiveness of UV-C, hot water and combined applications in preserving fruit quality during storage in MAP. For this purpose, cherries with the same maturation are divided into 4 different groups. The first group of fruits were determined as control group. The second group were irradiated with 254 nm UV-C (0.25 kJ/m2) with Vilber Lourmat UV-C lamp on both surfaces, which was for 4 minutes at 20 cm distance. The third group of fruits were kept at 50°C for 1 minute in a hot water bath. In the fourth group (combined application) both UV-C and hot water applications were applied. Later, the fruits were stored for 20 days in a cold air storage (0°C) and the physical (weight loss and color (L*, a*, b*, chrome and Hue)) and biochemical (soluble solid contents (SSC), titratable acid (TA), pH, total phenolics content (TPC), total antioxidant capacity (TAC)) changes were analyzed. When the parameters were examined, UV-C + hot water application was effective in respect of biochemical changes, whereas UV-C application was effective in terms of color change

Keywords: Cherry, Storage, UV-C, Hot Water

The Effect of Foliar Nutrition with Potassium Sulfate and Zinc Sulfate on Winter Cold Hardiness of Grapevine

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Abstract: Grapevine (*Vitis vinifera*) is an important horticultural perennial plant. Total production of grape in the world is about 77,181,122 tons, 2,046,420 tons of which is produced in Iran. Table grape cv. Bidaneh Ghermez is a very important variety in Iran. It is a seedless grape in reddish purple color. The present study evaluated the effects of foliar application of potassium sulfate (K_2SO_4) and zinc sulfate ($ZnSO_4$) on winter cold hardiness of table grape buds (*Vitis vinifera* cv. Bidaneh Ghermez). K_2SO_4 was sprayed at three concentrations (0, 5, and 10 g L^{-1}) and $ZnSO_4$ was sprayed at four concentrations (0, 0.5, 1, and 2 g L^{-1}) on eight-year-old grapevines located in a commercial vineyard. The lowest LT50 of buds (lethal temperature at which 50% of buds are dead) based on electrolyte leakage (EL) and tetrazolium test was observed in 10 g L^{-1} K_2SO_4 and 2 g L^{-1} $ZnSO_4$ treatments, at the average temperatures of -20°C and -19.30°C, respectively. Also, the highest soluble carbohydrates, proline content and the lowest bud relative water content were detected using 10 g L^{-1} K2SO4 and 2 g L^{-1} $ZnSO^4$. These biochemical changes were correlated with the reduction in LT50. It seems that foliar application of K_2SO_4 and $ZnSO_4$ can simultaneously help winter cold tolerance in grapevine cv. Bidaneh Ghermez.

Keywords: Lethal temperature, Potassium, Proline, Tetrazolium test, Zinc

Some Growth Parameters of 'Red Globe' Grafted on 140 Ru (Ruggeri) Rootstock Grown on Silty Clay Loam Soil under Diluted Brackish Water Irrigation

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Abstract: Application of brackish water mixed with irrigation water in ratios to keep the salinity of the irrigated soils below the threshold of the grapevines might be an urgent management practice in areas suffering from scarce water resources such as Jordan. The objective of this research was to evaluate some growth parameters of 'Red Globe' grafted on 140 Ru irrigated with three water salinity levels: 3.0, 5.0 and 7.0 dS m^{-1} in addition to 1.0 dS m^{-1} as the control treatment. A complete randomized design was used with four replicates. 'Red Globe' grafted on 140 Ru maintained good performance at only 3.0 dS m^{-1} irrigation water salinity level in terms of shoot length, leaf area and pruning weights. This experiment shows that grapevine rootstocks that have *V. berlandieri* x *V. rupestris* in their parentage are good salinity tolerant rootstocks. It can be also concluded that mixing diluted brackish water with irrigation water can be practiced for a certain period of time (approximately for two months; under the conditions of the current research), to be followed by irrigation with good quality water in order to flush excessive salts out of the root zone.

Keywords: Salinity, Leaf area, Shoot length, Alternate irrigation

New Chromosome Counting of a Natural Hybrid or New Member in Prunus genus (*P. cerasifera* × P. spp.) and Chromosomal Similarities with Two Closely Related Species

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Abstract: Chromosome number and karyotype morphology including chromosome length, centromere position, arm ratio, secondary constriction and staining properties by aceto-iron-hematoxylin were analyzed for Prunus species of Apricot (Prunus armeniaca L.), Plum (P. cerasifera Ehrh.) and a natural hybrid or new species known as "TANASGOL" (*P. cerasifera*× P. spp.). The obtained root tips from germinated seeds at 4-6 °C and young seedlings were pretreated in hydroxyquinoline solution with 50 drops of DMSO. All species had 2n=2x=16 very small chromosomes and were uniformly stained. The ranges of chromosome length in the three species were as follows: Apricot (Prunus armeniaca L.) 1.50 to 2.70 µm; Plum (P. cerasifera Ehrh.) 1.5 to 2.77 µm; and (*P. cerasifera*× P. spp.) "TANASGOL" 1.35 to 2.82 µm. Other features of the chromosomes, such as variation in the length of chromosomes within species, number of satellites and size, constrictions, centromere placements and karyographs were used to distinguish species. The similarities and differences of chromosomes morphology in species were analyzed by karyographs based on Relative Length (RL%) and Chromosome Index. Chromosomal similarities between "TANASGOL" and Plum (P. cerasifera Ehrh.) were more evident.

Keywords: Cytogenetics, Natural Hybrid, TANASGOL, *Prunus*, Karyotype

Determination of Some Mineral Content in Quinoa Greens (*Chenopodium quinoa*) as a Vegetable

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Abstract: The genus *Chenopodium* (family *Chenopodiaceae*) comprises about 250 species which include herbaceous, suffrutescent and arborescent perennials, although most species are colonizing annuals. *Chenopodium* spp. have been cultivated for centuries as a leafy vegetable (*Chenopodium album*) as well as an important subsidiary grain crop (*Chenopodium quinoa* and *C. album*) for human. Recently, there has been growing interest in a number of countries (especially in Europe), initiating introduction and research work on quinoa. The fresh greenery of quinoa is considered to be used as salad greens in this study. And this study was conducted in 2017 in spring in order to determine mineral material content in vegetable quinoa greens (*Chenopodium quinoa*). In this research, data obtained from the plants was evaluated by calculating the minimum, maximum and average values in order to determine the basic descriptive statistical characteristics. At the end of the study, the average nutrient content of quinoa greens is listed as follows. N: 5.62%, P: 0.39%, K: 4.74%, Ca: 3.88%, Mg: 0.14%, Fe: 168.32 $mgkg^{-1}$, Cu: 19.86 $mgkg^{-1}$, Zn: 34.56 $mgkg^{-1}$, Mn: 26.26 $mgkg^{-1}$. When these results are taken into account Quinoa greens can also be an acceptable substitute and an alternative for traditional greens in Turkey.

Keywords: Quinoa Greens (*Chenopodium quinoa*), Mineral Content, Nitrogen

The Effect of Some Mutagens and Priming Applications on Common Bean in M2 Generation

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Abstract: Depending on the amount and duration of the applied mutagen, various damages might occur on a seed, one of the commonly used materials in mutation breeding; thus, there will be some problems in the germination and emergence stages of the seed. The effects of priming applications [humidification (H) and humidification with neem oil (HN)] before application of mutation to the seeds of common bean (Phaseolus vulgaris L. Gina cv.) were investigated in order to minimize these negative effects of mutagenic applications. In the mutation process, three different doses (30, 40, and 50 mM) of EMS (Ethyl Methane Sulphonate) and the irradiation with Gamma rays by Cobalt 60 device (120 Gy) were applied to the seeds. It was observed that the priming applications with HN resulted in a decrease in the stem diameter in the M2 generations. The significant differences were determined on the pod size and pod size characteristics when the M2 generation plants were examined in terms of interactions between priming and mutation applications. Furthermore, it was determined that EMS mutation applications reduced the pod weights in M2 generation plants. The lowest values were obtained from the application of EMS1 (30mM) mutagen, but the highest values were obtained from the application of EMS2 (40mM) mutagen in the generations of M2 generation in terms of the number of pods and the number of seeds. It was observed that the mutation applications decreased the seed weight; the lowest value for total seed weight was obtained from the EMS1 application.

Keywords: Common bean, Ethyl methane sulphonate, Mutation

Acknowledgements: We are grateful for the financial support provided for this research by Van YüzüncüYıl University Scientific Research Project Department (2015-FBE-D016).

Quality and Yield Traits of Developed Mutant Tomato Lines

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Abstract: In this study, some of the data obtained from the mutation breeding trial conducted to improve a number of traits for yield and quality in beef, cherry and pink type tomato varieties, which are popular for greenhouse cultivation, is presented. In the study, selected lines developed from gamma rays irradiated (at effective irradiation dose (ED50) of 150 Gy) seeds were used. In this research presented here, vitamin C value, yield, fruit hardness, dry matter content and brix ratio were examined in the control and 12 mutant lines at M6 and M7 generations (4 pink, 1 cherry and 7 beef respectively) as well as their hybrids. The statistical analysis on the obtained data showed that the difference between dry matter and brix values weren't statistically significant but the difference between vitamin C and fruit hardness scores were statistically significant. In terms of fruit hardness, the superiority of lines which were numbered as 38/10, 776, 676, 619 according to the control; 776, 802, 2050 and 38/10 in terms of vitamin C has been determined. Currently, the latest studies on the registration are being made on the selected lines.

Keywords: Fruit hardness, Gamma irradiation, Mutation, Tomato, Vitamin C

Effects of Waterweed on Physiological, Morphological and Pomological Properties of Acur (*Cucumis melo agrestis*) Grown in Drought Conditions

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Abstract: Many of cucurbitacea grown in Turkey and one of the major centers of diversity cucurbits is Turkey. Our country is the secondary gene center of melon vegetable. A melon variety locally called acur is particularly suitable for growing in arid regions. Climate change is causing drought. Drought includes a long period of water shortage. In recent years, unstable climate conditions are frequent and lead to severe drought. Cumulative impacts of drought on soil layers and plant species have been identified. In addition to abiotic stress resistance/tolerant plant varieties, growing methods should also be developed. The aim of this study is defined using water algae at drought condition. Cucumis melo locally called acur, which has been found to be highly resistant to drought earlier. Aimed to determine the effects of the use of water algae on the drought in the agrestis type melon genotypes. The study conducted at two loci and field tests of drought-tolerant genotypes were carried out with water algae application. Morphological and pomological characteristics of genotypes applied to waterweed were investigated. Each plant is given 10 gr commercial and local water algae. Control group was created. In application parcels; yield, leaf temperature, plant height, fruit width and height, and fruit seed existence are investigated. While the commercial water algae is the best result in terms of all properties, the plots where the local water algae are applied have been the subject of better results than the control group. The control group ranks first in terms of early yield.

Keywords: Cucrbitacea, Waterweed, Drought

Effects of Different Microbial Organic Fertilizers on Yield and Quality of Tomato Grown in Greenhouse Condition

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Abstract: Vegetables have protective and healing effects on humman health due to the containing and the increase of these substances are associated with their grown conditions especially organic means. This study was carried out to determine the effects of L, N and S microbial organic fertilizers consisting of microbial formulations and natural products of plant origin in different doses [1000 mL/100 L (A), 3000 mL/100 L (B), 5000 mL/100 L (C) and control (no application) (D)] on yield and quality of organic grown Cevahir F_1 tomato (*Solanum lycopersicum* L.) cultivar in greenhouse condition. The number of fruit per plant, the number of fruit weight per plant, total yield, fruit width and length, total soluble solid, pH, ascorbic acid, color properties, dry matter yield parameters were evaluated on tomato cultivar. The fruit weight per plant and total yield in doses A and C treatments were found the highest in N microbial organic fertilizer. The fruit width in dose A treatment was determined the highest in L microbial organic fertilizer. The highest fruit shape index was obtained in D treatment and dose B of L treatment. The fruit number per plant (respectively 24,71 and 23,56), the total solid contents (5,80 %) and ascorbic acid contents (261,67 mg/l usare) in doses A and C treatments were found the highest in L microbial organic fertilizer. It is concluded that both fruit quality and nutrient content could be significantly increased in tomato by using microbial organic fertilizers.

Keywords: Fruit quality, microbial, organic fertilizers, *Solanum lycopersicum* L

Effect of Different Salt Levels on Germination in Some Snap Bean (*Phaseolus vulgaris L.*) Genotypes Collected from Erzurum Region

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Abstract: This study was carried out in laboratory conditions in the Atatürk University, Faculty of Agriculture, Department of Horticulture. In the research, 5 local snap bean genotypes (1:ERZ-TO-48, 2:ERZ-HN-78, 3:ERZ-TO-64, 4:ERZ-P5-117, 5:ERZ-OL-99) collected from Erzurum region and 1 commercial variety (ALMAN AYŞE-6) were used as experimental material. The experiment was conducted with completely randomized design comprising three replicates in three concentration levels (0, 75, and 150 mM) of sodium chloride (NaCl). Twenty-five seeds from each genotype were placed between filter paper in petri dishes (120 mm in diameter). Petri dishes added 10 ml of irrigation water were observed for 9 days at 25 °C and germinated seeds were recorded. The results of the study showed that the increase in salinity concentration caused a statistically significant decrease in seeds germination percentages, germination index, stem lengths, stem diameter, root lengths, seedling fresh and dry weights, except mean germination time and the results varied between 90,55 and 76,11%, 4,39 and 3,38, 16,52 and 11,97 mm, 2,96 and 2,55 mm, 53,49 and 21,16 mm, 1,10 and 0,99 g, 0,12 and 0,10 g, respectively. The correlation coefficient between all possible combinations was calculated, it observed that all the parameters studied have a significant positive or negative correlation with each other. When the results were analyzed, it was determined that the local genotypes collected were more tolerant than the selected commercial cultivar. As a result, all parameters examined were decreased with increasing NaCl concentration.

Keywords: Snap bean, NaCl, Stress, Germination

Screening of High Temperature Tolerant Tomato Genotypes for Their Fruit Mineral Content

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Abstract: Agriculture is at the forefront of the sectors that will be most affected by climate change. It is inevitable that Turkey is exposed to the negative effects of climate change due to its geographical location. The development of new high temperature tolerant varieties is seen as an important economic measure in the adaptation process to climate change. With this study, the tomato genotypes with high temperature tolerance were investigated for their fruit mineral content. For this purposes, ten tolerant tomatoes from the gene pool of the Çukurova University, Department of Horticulture the and two trade cultivars were grown in the open field conditions during 2016 summer period, June, July, August, in Adana in Turkey. Tomato fruits grown under control and high temperature stresses conditions were analyzed for phosphorus, potassium, calcium, magnesium, iron, manganese, copper and zinc.

Keywords: *Solanum lycopersicum*, Potassium, Calcium, Magnesium, iron

Acknowledgements: The authors wants to thank to the Cukurova University BAP for its finasial supports for the FBA-2016-5615 project.

Effects of Potassium Doses on Growth Rate and Some Micro Nutrient Elements Contents in Drought Sensitive Bean

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Abstract: This study aimed to determine the effects of potassium doses in order to decrease yield and quality losses due to drought stress during bean production. The cv. Zulbiye, a drought susceptible cultivar, and the bean genotype V71, a drought susceptiblebean genotype were chosen from previous studies. The bean seeds of were sowninto 2 liter pots just filled with perlite. Four doses of Potassium (K) were applied as 0 K ppm (control), 500 ppm K, 1000 ppm K, and 2000 ppm K in a completely randomized factorial experimental design with four replications each having two pots. The seedlings were supplied with Hoagland solution in a growth chamber at 22± 2 °C. Irrigation has been completely stopped in the 20-day-old seedlingsin drought stress application for 10 days, while irrigation the control seedlings were irrigated regularly. On the 10^{th} day of the drought stress, the study was terminated, and the growth rate and some micro element contents (Cu, Mn, Zn and Fe) were determined. It was also noticed that drought stress symptoms were decreased especially in the doses of 1000 and 2000 ppm K applications.

Keywords: Drought, Growth rate, Micronutrients, *Phaseolus vulgaris*

Investigation of Responses of Some Pole and Dwarf Beans (*Phaseolus vulgaris* L.) Genotypes to Different Levels of Salt Stress

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Abstract: This study aimed to investigate the reactions to salt stress by applying 25 mM and 50 mM salt (NaCI) doses to 13 poles and 7 dwarf bean genotypes. According to the randomized plot design, the plants were grown as 3 replicates in the pots containing peat-perlite at a ratio of 2:1 at 23±2 ºC in a climate room. Salt application was carried out for 4 consecutive days with irrigation water. At the end of the study, the content of nutrients (Cu, Fe, Mn, Mg, P, and Zn), shoot-root dry matter, percentage of tolerance, root/shoot ratio were examined to determine tolerance to salinity in bean genotypes. According to the results obtained at the end of the study, differences in genotypes in dwarf genotypes were statistically significant ($p < 0.05$) in terms of shoot and root dry matter, Cu, Mg and root/shoot ratio. Fe, Zn, Mn, P and tolerance percentage were considered to be insignificant. Statistical differences between salt applications in dwarf genotypes were significant except for Mn and P elements ($p < 0.05$). The difference in pole genotypes was statistically insignificant ($p < 0.05$) in all parameters; the parameters except for Mg and the percentage of tolerance in salt applications were determined significant. The genotype-salt interaction for dwarf and pole genotypes was determined statistically significant only for the shoot dry matter.

Keywords: Nutrients, Salt stress, Pole bean, Dwarf bean

Acknowledgements: We are grateful for the financial support provided for this research by Van YüzüncüYıl University Scientific Search Project Department (2015- FBE-YL359).

Effect of Vermicompost on Growth of Seedlings and Seedling Quality in Cucumber

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Abstract: This study was conducted to determine the effect of vermicomposting on growth of cucumber seedlings. In the study, the classical seedling mixture (3 peat / 1.5 perlite) constitutes the control group of the study. For this control group, cucumber seedlings were cultivated by adding vermicompost (10%, 20, 40, 60, 80, 100) at different doses. Cevher F1 cucumber (Cucumis sativus L.) cultivar was used. Macro nutrients were 100 ppm N, 50 ppm P, 100 ppm K, and the appropriate nutrients were given in the appropriate amount. Leaf number, stem diameter, leaf dry matter, root height, root weight and root dry matter contents were determined in the study. At the end of the study, it was determined that some of the properties examined by the compost application were increased.

Keywords: Vermicompost, Cucumber, Leaf weight

Validity Control of Markers Used in Molecular Marker Assisted Selection in Tomato

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Abstract: This study aimed to check the validity of the SCAR and CAPS markers developed for certain diseases and pests on some tomato cultivars and genotypes in molecular marker-assisted selection. For this purpose, developed molecular markers for resistance were tested for tomato spotted wilt virus (TSWV), Fusarium wilt (FOL), Tomato yellow leaf curl virus (TYLCV), root-knot nematode (RKN), verticillium (Ve) and tomato mosaic virus (ToMV). For TSWV, CAPS Sw5b-IRR, CT220 markers and SCAR Scr-001, SCAR-421 markers were selected, for FOL; CAPS markers; P7-43BF1, PTG-190, TAO1 and SCAR markers; P743BF1-P743BR1, P743DF3-P743DR3, P743DF1-P743DR1, At2F- At2R, For TYLCV; SCAR P6-25 and CAPS JB-1 markers, For RKN; SCAR Mi-23 and PMI, TG-180 and TG-263, CAPS APS and C8B markers, for ToMV; Tomv markers. The selected markers were screened in 24 tomato genotypes, 9 of them were commercial, 12 were local genotypes and three control group-Mountain merit, NCICELBR and NCI123S. For TSWV; SCAR Scr-001 marker, for FOL; P7-43BF1, PTG-190, TAO1 CAPS markers and P743DF3-P743DR3, P743DF1-P743DR1, At2-F-At2-R. For TYLCV; SCAR P6-25, for RKN; SCAR Mi-23 and PMI have given results. However, CAPS SW5b-IRR, CT220, SCAR421, 43BF1, CAPS VVF2 and Ve1YP markers have failed to get results due to various reasons such as genotypic diffrences, differences in PCR conditions, impaired connectivity

Keywords: CAPS, Molecular marker assisted selection, SCAR, *Solanum lycopersicum* L.

Acknowledgements: We are grateful for the financial support provided for this research by Van YuzuncuYil University Scientific Research Project Department (2015- FBE-YL277).

Determination of Salt Tolerance Levels of Local Pepper Genotypes

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Abstract: In this study, it was aimed to investigate the tolerance levels of different salt concentrations (0, 50, 100, 150 mM NaCl) of 30 pepper genotypes selected from the morphological and molecular characterized pepper genotypes collected from Kırşehir province center and villages after the surveys. The plants have been grown in vermiculite by substrate culture technique. The trial was set up according to the randomized plots design with four replications in Ahi Evran University Agricultural Faculty greenhouse. In order to determine the reactions of different pepper genotypes to salinity, 0-5 scale evaluation for the symptomatic appearance of the plants, 50% flowering time, plant height, diameter of plant, number of leaves, stem and root wet-dry weights, leaf proportional water content, relative growth rate, membrane damage in leaf cells and to classify genotypes as well as chlorophyll and carotenoid according to the cases of salt stress as tolerant and sensitive, measurements and analysis were carried out. It was determined that the growth and development of pepper genotypes studied were inhibited by the effect of salt stress but the responses to the stress factor showed a wide variation. It has been determined that K86, D47, S67, K80 and D20 numbered genotypes have been affected less than the others from salinity. Pepper genotypes that are found to be tolerant to salinity can be recommended for breeding directly to growers or they can be used as gene sources in future breeding trials.

Keywords: Pepper, Genotype, Stress, Salt tolerance

Agronomic Performance of Altinbaş Melon Hybrids Grown in Open Field

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Abstract: In this study Altınbaş melon pure lines developed by haploidisation technique were selected according to their genetic relationship and used to obtain F1 hybrids. A total of 46 hybrids were developed by crossing of 34 pure lines. The agronomic performance of F1 hybrids were compared to their parents and 6 commercial varieties.in terms of yield, plant growth and fruit characteristics in open field and conditions. These characters were first female flower and 50% female flower blooming time, first male flower and 50% male flower blooming time, plant main stem length, main stem diameter, node number on main stem, fruit flesh yield, fruit weight, fruit length, fruit diameter, fruit rind thickness, fruit flesh thickness, diameter and lenght of seed cavity and total soluble solid contents. According to the research results, most of the hybrids showed better performance than their parents and commercial variaties in terms of all investigated parameters. highest yield (3.45 kg/m²) was obtained from SR-1-200Sx82-31 hybrid. In terms of total soluble solids AB-18-200Xx82-31 and SI-6-200SxSR-48 hybrids had higher values (12.09 % and 12.02 % respectively), while commercial varieties had TSS values between 10.07-11.77 %. The number of nodes on main stem was found to be significantly higher in the developed hybrids than the parental lines and commercial variaties. There were no statistical differences in total fruit yield and fruit flesh yield while significant differences was found between hybrids and parents in terms of lenght and diameter of seed cavity.

Keywords: Dihaploidisation, Altınbaş, Agronomic performance, Hybrid

Quality Characteristics of Some Native Grape Cultivars Grown in Van Ecology

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Abstract: Because of the fact that grape is the best evaluating plant for arid and inefficient soil of Anatolia, grapevine has been the most important agriculture branch of all the great civilizations in Anatolia since about 6000 years. The grapevine, which grows in almost every part of our country today, has been able to grow in quite limited area of Van province with the cold climate and within the short vegetation period. Although the Van province is not convenient for the cultivation of late maturing varieties of grapes, it is favorable for growing of wine grape due to the high difference between night and day temperatures during the vegetation period, containing of high acid in must and providing for darker colorization in black varieties. In addition to being the dominant varieties of 'Erciş' grape in Van vineyards, other native and standard varieties of grapes are also grown in this city. Some quality characteristics of various native grape cultivars grown in Van ecology were examined in the study. As a result of the research, some differences in the quality characteristics of the grape cultivars were observed.

Keywords: *Vitis vinifera* L., Quality, Cold climate, Short vegetation, Van

Mineral Profile of Berries in Native Grape Cultivars Grown in Siirt Province

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Abstract: Minerals are essential for grapevine health and sustainable for grape production. Grape berry development and maturation are affected by the minerals that are Potassium, Nitrogen, Calcium, Phosphorus, Magnesium and Sulfur. Some of these elements affect directly berry set and yield, whereas others have indirect effects on the modulating grapevine physiology. Mineral compositions of the berries are affected by environmental factors such as soil, temperature, rainfall, sunshine and wind as well as many other growing conditions. The objective of this study is to examine berry mineral composition of featured eight native grape cultivars in Siirt province. Amounts of Phosphorus, Calcium, Magnesium, Copper, Manganese, Ferritin, Zinc, Boron and Selenium were determined by ICP-OES (Inductively Coupled Plasma Optical Emission Spectroscopy) and K was measured by AAS (Atomic absorption spectroscopy). Our results showed that the mineral composition of grapes were found to be different for cultivars.

Keywords: Grape, Cultivar, Macro and micro nutrients, ICP-OES, AAS

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PLANT PROTECTION



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Ecology-Based Sustainable Agriculture: An Example of Integrating Insect Demography, Consumption/Predation Rate and Computer Simulation

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Abstract: Objective: To introduce the use of demography, consumption/predation rate and computer simulation to achieve sustainable agriculture by using insect life tables and predation rates as examples. Materials and methods: Demographic analysis and computer programming Results and Conclusion: Life tables offer the most comprehensive insights into the dynamics of populations and consumption/predation capacities. Life tables are an inevitable and necessary tool for conducting research on population ecology, population interactions, pest management and sustainable agriculture. A demographic theory which takes age, stage, sex, and uncertainty into consideration is essential for generating accurate life table data, linking the life table with pest consumption, and refining the timing of control measures in pest management.

Keywords: Demographic analysis, computer programming

Using Three-Way Interactions Between Plants, Microbes and Arthropods to Enhance Crop Resistance To Insect Pests; A Case Study of the Colorado Potato Beetle on Potato Plants Inoculated by Arbuscular Mycorrhizal Fungi

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Abstract: Chemical based pest control is not sustainable, and alternative approaches are needed. In this context, enhancing plant growth and resistance are among the key strategies. Diverse groups of soil-borne microorganisms including symbiotic arbuscular mycorrhizal fungi (AMF) exert positive effects on plant growth, health and resistance through direct and plant-mediated mechanisms. Thus, there is potential to reduce pesticide use by enhancing plant growth and resistance if we can improve our understanding and better predict and manage crop-arthropod-microorganism interactions. The overall objective of this study is to determine if AMF increases potato tolerance to Colorado potato beetle (CPB). The study was conducted in climate room providing 25±1°C temperature, 60±10 % RH, and a photoperiod of 16:10 (L:D) h. Development, survival, reproduction and consumption rate of CPB were investigated on potato plants (Vangogh cv) inoculated with a combination of two AMF (Glomus intraradices + G. mosseae). Results were evaluated by using life table because life table parameters reflect the combined effects of numerous biological parameters (development, survival, fecundity, sex ratio etc.) on the growth of a population. We used age-stage, two-sex life table to take stage differentiation and male population into consideration. Results indicated that using AMF resulted in decreased population parameters and consumption of CPB. The information obtained from this study will be useful for implementing ecology-based pest management programs in potato ecosystems.

Keywords: Arbuscular mycorrhizal fungi, Colorado potato beetle, plant resistance

The Effect of Some Cucumber Varieties on The Biology of *Aphis gossypii* Glover (Hemiptera: Aphididae)

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Abstract: The development, reproduction, and population growth parameters of cotton aphid, Aphis gossypii Glover (Hemiptera: Aphididae), were studied on three different cucumber varieties (BT Bursaalpha, Beith Alpha MR, Balıkesir Beith Alpha) under controlled conditions (25± 1 0C, 65±5% RH, and a photoperiod of 16:8 (L:D) h (5.000 lux) conditions) in growth chamber. Life table parameters were estimated according to age-stage, two-sex life table method. Variances and standart errors of population parameters were obtained according to Bootstrap method by using TWOSEX-MS Chart software. In conclusion; The effect of cucumber varieties on the biology of A. gossypii was determined as significant and it was found that cv. Balıkesir Beith Alpha was the most convenient cucumber variety in terms of the life cycle of A. gossypii. Results acquired might be used in pest management program that will be prepared for this aphid.

Keywords: Aphis gossypii, intristic rate of increase, reproduction, life table, cucumber varieties

Life Table and Some Biological Features of *Planococcus citri* (Hemiptera: Pseudococcidae) on Vineyard

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Abstract: Mealybugs are major pests of number of agricultural and ornamental crops, causing direct and indirect crop damage. In this study, life table and some biological features of Planococcus citri (Hemiptera: Pseudococcidae) were determined on vine (41 B - Vinifera x Berlandieri cultivar). The study was carried out in the climate chamber 25±1 ºC temperature, 65-70 % relative humidity 16:8 hours in light: dark conditions. In the experiment, 30 newly hatched mealybug eggs were transferred to 9 mm petri dishes with vine leaves and wet cotton layer on the bottom and all biological periods (eggs, larva stages, development time, life time of males and females) and daily fecundity of mealybug were recorded detaily. The developmental times of males and females of mealybug were found as 26.25 days and 28.31 days, respectively. The intrinsic rate of increase (r) and finite rate of increase (λ) were estimated as 0.092 day-1 and 1.10 day-1, respectively. Net reproductive rate (Ro) was 43.73 offspring. The mean generatin time (T0) was 41.16 days.

Keywords: Twosex ife table, Planococcus citri, vine

Effect of Different Prey Resources on Life Table of The Predator, *Chrysoperla carnea* (Neuroptera: Chrysopidae)

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Abstract: Small walnut aphid (Chromaphis juglandicola (Kalt.) (Hem.:Aphididae) and Dusky-veined aphid (Panaphis juglandis) (Goeze) (Hemiptera: Callaphididae) are important pests in walnut orchards in Lake Van Basin, Turkey. In this study, the life-table parameters reflecting population growth rate of Chrysoperla carnea (Stephen) (Neuroptera: Chrysopidae), which is one of the important predators of the pests, were determined in laboratory experiments at 25± 1 0C, 65±5% RH, and a photoperiod of 16:8 (L:D) h (5.000 lux). Life table parameters were estimated according to age-stage, two-sex life table method. Variances and standart errors of population parameters were obtained according to Bootstrap method by using TWOSEX-MS Chart software. Results obtained might be used in pest management program that will be prepared for the aphids.

Keywords: Life table, Walnut aphids, Population parameters

Life Table of *Simosyriphus aegyptius* (Wiedemann), 1830 (Diptera: Syrphidae) on The Mealy Plum Aphid (*Hyalopterus pruni*) (Geoffroy) (Hemiptera: Aphididae)

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Abstract: Adults are fed with plant pollen and nectar while the larvae of species dependent on the Syrphidae family are predator on many agricultural crop pests. In this study, life table and some biological features of Simosyriphus aegyptius was determined on the mealy plum aphid, Hyalopterus pruni. The study was conducted in a climate of 25 ° C temperature, 65% relative humidity and 16: 8 hour light period. In the experiments, aphids were daily given to newly emerged syrphid larvae in 30x20x20 cm tulle cages and development periods were recorded daily. After completing the development, the adults were kept together for copulation, and then they were taken in separate cages and their eggs were recorded on a daily. The experiments were conducted in 50 replicates. The raw data obtained at the end of the study were evaluated with the by using the Twosex packet program and parameters of development, reproduction, survival and life table of the predator were estimated. According to this, the predator completed its development in 18.69 days, its the intrinsic rate of increase (r), 0.103 d-1; the finite rate of increase (λ), 1.108 d-1; net reproductive rate (R0), 15.0 individuals; mean generation time (T) was found to be 26.37 days.

Keywords: Simosyriphus aegyptius, Hyalopterus pruni, twosex life table

Infestation Rate of *Bruchophagus roddi* Gussakovskiy, 1933 (Hymenoptera: Eurytomidae) in Seeds of Alfalfa and Birdsfoot in Eastern Anatolia, Turkey

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Abstract: The alfalfa seed chalcid, *Bruchophagus roddi* Gussakovskiy, 1933 (Hymenoptera: Eurytomidae) is an important pest insect feeding in seeds of alfalfa (*Medicago sativa* L.) and birdsfoot (*Lotus corniculatus* L.), and reducing their seed production. This study was conducted aiming to determine infestation rate of this pest species at Ağrı, Iğdır, Kars and Van provinces in 2016-2017. During this investigation, 100 plant bundles which covering seeds were collected from per field in different directions. One hundred capsules were harvested from per bundles, randomly and 35681 seeds dissected in laboratory, totally. According to investigation results, alfalfa seeds were infested in the rates of %20.9-13.0 in Ağrı province, %37.1-16.4 in Iğdır province and %14.4-10.5 in Van province. It was determined that the seeds of birdsfoot were infested in the rate of % 16.6-20.3 in Kars province.

Keywords: *Bruchophagus roddi*, alfalfa, birdsfoot, Infestation, Eastern Anatolia region

Determination of Reaction Aganist *Bemisia tabaci* (Genn) (Hemiptera: Aleyrodidae) of Some Soybean Breeding Lines in Second Crop Soybean Field in Cukurova

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Abstract: Çukurova region has largest soybean planting area especially as a second crop area. Soybean is vulnerable to several insect pests. Whitefly is one of the most serious pests in soybean agriculture. The idea of developing 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. The objective of this study was to investigate the potential resistance of 13 soybean breeding line to white fly, Bemisia tabaci (Genn) (Hemiptera: Aleyrodidae). This study was performed at second crop soybean field between 2015-2016. The field experiments were conducted randomized comlete block design with three replicates at breeding studies and plot size chosen 0.70m*5m*4 rows=14m2. After each plot row the susceptible variety Williams seeded. 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 was made. According to results, in 2015,11 lines were found to be higly resistant, 1 variety moderately resistant, 1 variety susceptible. In 2016, 6 variety moderately resistant, 3 variety resistant,3 variety susceptible 1 variety very susceptible were found. Results showed that soybean lines contain resistant genotipes aganist whitefly and use this material for variety development and breeding programs. This work is project number 1013O084; Supported by Tübitak.

Keywords: Bemisia tabaci, soybean, resistance, second crop soybean, Çukurova

Genome Wide SNP Discovery in *Eurygaster integriceps* Using Double Digest RAD Sequencing Approach

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Abstract: Insect population genetic studies offer insights into facets of ecology, dispersal patterns, population dynamics and genetic diversity, all of which are of direct relevance for guiding control programs. In this study, we analyzed the population genetics of Eurygaster integriceps which is still economically most important pest of wheat and barley in Turkey. To carry out population genetic analysis of sunn pest populations, we used a newly developed method, double digest RAD sequencing approach, which is based on next generation sequencing technology. The RAD Seq method has several advantages over previous approaches for marker discovery and can allow us to identify variations even in the absence of any genome sequence information. Using this technique, we identified more than 6,000 putative SNPs (Single Nucleotide Polymorphisms) that are randomly scattered throughout the genome. The SNPs were analyzed using appropriate bioinformatics tools and also were confirmed by using geographically different sunn pest populations in order to determine genetic markers which will be used in E. integriceps population genetics studies. Taken together, our results suggest that RAD sequencing is a powerful approach for studying population structure in field populations of sunn pest.

Keywords: Eurygaster integriceps, Population genetics, Rad sequencing, SNP

Molecular Characterization of Turkish Isolates of Colletotrichum lindemuthianum, the Cause of Bean anthracnose Using ISSR Markers

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Abstract: Bean anthracnose caused by Colletotrichum lindemuthianum, is one of the most destructive diseases in all bean growing areas. Bean plants are susceptible to infection of C. lindemuthianum during all vegetative stages. The pathogen effects above-ground parts of bean including leaves, stem, and pod and causes large damages in yield and quality. Development of resistant cultivars to anthracnose disease is the most practical and effective means of disease control. Thus, knowledge of genetic variability within pathogen population in different bean growing areas is required for resistance deployment. The objective of this study was to determine the genetic diversity of C. lindemuthianum isolates obtained from different bean growing areas of Turkey using ISSR markers. Thirty primers with di- or tri-nucleotide repeats in ISSR analysis were used, out of which ten primers produced the clear scorable bands. Cluster analysis with UPGMA using Jaccard's coefficient showed distinct clusters among pathogen populations. The results revealed the presence of low genetic differentiation among populations of C. lindemuthianum in Turkey.

Keywords: Bean anthracnose, ISSR, genetic variability

Detection of *Pseudomonas tolaasii*, a Causal Agent of Bacterial Blotch of the Cultivated Mushroom by Real-Time Pcr

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Abstract: The Korkuteli district in Antalya province is the largest producer of the cultivated mushroom (Agaricus bisporus) in Turkey due to its suitable environmental conditions. Pseudomonas tolaasii is one of the most important pathogen affecting millions of mushrooms worldwide and causes substantial damage to yield quality. To ensure quick detection of P. tolaasii from both isolated bacteria and macerated A. bisporus tissue fragments without bacterial isolation from infected samples, was submitted to a Real-time PCR carried out using SYBR Green fluorescence dye and a Pt-1A/Pt-1D primer pair. P. tolaasii isolates recovered from the A. bisporus, and the P. tolaasii reference strain included as a positive control, were detected within a Ct range of 13.29 to 21.57. The P. tolaasii pathogen was also detected directly from macerated A. bisporus tissue without bacteria isolation in the Real-time PCR, which yielded mean Ct values of 15.74 and 21.14 for the reference strain and the Turkey's isolate, respectively. The sensitivity of the SYBR Green dye was approximately 10-7 serial dilution suspension, corresponding to the detection limit of 2 cfu/2µl. The detection of P. tolaasii directly from macerated A. bisporus tissue without bacterial isolation, implies that this technique could be used for quick detection of this pathogen from large number of samples within a relatively short period of time, which could save time and cost involved in the bacteria isolation from the infected mushrooms.

Keywords: Pseudomonas tolaasii, Agaricus bisporus, Detection, Real-time PCR

Detection of Citrus Stubborn Disease Using Different Primer Sets

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Abstract: Detection of Citrus Stubborn Disease Using Different Primer Sets Orhan BOZAN(1) Nüket ÖNELGE(1) (1)Cukurova University, Agricultural Faculty, Plant Protection Department, Adana, TURKEY Citrus stubborn disease (CSD) is a widespread citrus disease found in citrus producing regions in the East Mediterranean Region of Turkey. The casual agent of disease is Spiroplasma citri, an insect transmitted and phloem colonizing bacterium. Spiroplasma citri is a limiting factor for citrus production in this region. CSD can cause significant tree damage and result in loss of fruit production and quality in citrus trees. Detection of CSD is difficult because of the inhomogeneous distribution in the tree. In this study, it is aimed to diagnose the disease by PCR analysis in infected trees with CSD in the Eastern Mediterranean Region using different primers. Three sets of primers were used to detect with conventional PCR of CSD. These primers pairs were annotated as spiralin-f/r primers, P89-f/r and P58- 6f/4r. Four CSD isolates identified in previous studies in the Eastern Mediterranean Region have been used in this study. CSD isolates were taken from Adana-Karataş and Kozan, Hatay-Erzin and Mersin-Tarsus. The isolates were collected from the gardens, extracted, then performed PCR studies. PCR studies produced an amplicon 675 bp in size for spiralin-f/r, 707 bp in size for P89-f/r and 450 bp in size for P58-6f/4r. The studies performed with four different isolates, from four different regions, spiralin primer set gave one positive results in four isolates, while the other two primer sets gave positive results in all isolates.

Keywords: CSD, Stubborn, citrus, Phytoplasma, Turkey

Detection and Control of Yellow Patch Disease Caused by Rhizoctonia cerealis AG D on Cool-Season Turfgrasses

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Abstract: Surveys were conducted that composed parks, gardens, golf courses, recreation areas, stadiums, picnic areas and refuges in İstanbul, Antalya, Ankara, İzmir, Kayseri, Bursa, Aydın and Muğla Provinces, Turkey, on January, June and October 2015. During the surveys, It was observed irregular patches or rings up to 15-30 cm in diameter that are yellow or white in color and leaf blight on cool-season turfgrasses. One thousand and four hundred (1400) turfgrass samples were collected from survey areas and total 63 Rhizoctonia cerealis AG D isolates were obtained from symptomatic samples. Disease severity in pathogenicity tests carried out in petri dishes ranged from 82-95%, in the greenhouse ranged from 80-85%. Identifications of fungal isolates were performed by DNA sequencing analysis and hyphal anastomosis reaction. For the control studies, the effects of different combinations of fungicides and plant activators on the disease were investigated in vitro and greenhouse conditions and the two most effective combinations in the greenhouse conditions were found Arthrobacter sp. (Prothioconazole + Spiroxamide 1st dose (100ml / da)] and [Arthrobacter sp. (50ml / 2lt water) - (Prothioconazole + Spiroxamide 1st sub-dose (50ml /da)]. As a result of study, it has been concluded that the application of the 1st sub-dose of fungicide and recommended dose of the activator (Arthrobacter sp.) would be appropriate in terms of both reducing the use of fungicide in the control against disease and positively influencing plant development.

Keywords: Rhizoctonia cerealis, yellow patch, turfgrass, binucleate, control

First Report of *Limonomyces roseipellis* Causing Pink Patch on Turfgrass Areas in Turkey

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Abstract: Surveys were conducted in 9 provinces in January, June and October 2015. Circular pink patches ranging from 10 to 20 cm in diameter were observed on turfgrass areas. Infected leaves were covered with pink, gelatinous fungal mycelium, which resulted in the production of chlorotic lesions. Lesions expanded, became water-soaked, and leaves died basipetally. A pink fungus, was consistently isolated from leaves of infected plants on a potato dextrose agar amended with 50 mg streptomycin sulfate. It was observed presence of clamp connections on hypha. Based on morphological characteristics, the fungus was preliminary identified as Limonomyces roseipellis Stalpers & Loerakker, the causal agent of pink patch of turfgrass. As a result of isolation total 16 Limonomyces roseipellis isolates were obtained. Disease severity in pathogenicity tests carried out in pethri dishes ranged from 92-96%, in the greenhouse ranged from 75-88%. To verify the identity, the internal transcribed spacer (ITS) of rDNA was amplified and sequenced using primers ITS1 and ITS4. Comparison with sequences in the GenBank database revealed that the ITS sequence showed 99-100% homology with the sequence of L. roseipellis isolates. Existence and injury of Limonomyces roseipellis is the first record on turfgrass for Turkey.

Keywords: Limonomyces roseipellis, pink patch, turfgrass, virulens

Innovative Molecular Techniques Used in Identification and Determining of Plant Pathogen Fungi

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Abstract: Fungi are an important group of plant pathogens and cause devastating losses in cultivated plants. Accurate and early detection and identification of plant pathogens is the first important step for reducing yield losses caused by the pathogens and developing the effective disease control methods. The characteristics used in classical identification of fungal pathogens are very variable and these methods based on the morphological characteristics are time consuming and require taxonomical expertise. Thus, many molecular techniques have been developed for the identification of determination of plant pathogens and used widely in surveys, epidemiological studies, plant quarantine and seed certification, breeding programs, and fungicide resistance. The aim of this study was to provide detailed information about routinely used and newly developed molecular techniques (LAMP, MCH-PCR, FISH, Next generation sequencing, qPCR i.e.) in identification and determination of plant pathogen fungi. These results will contribute to the more effective use of these molecular methods in phytopathological studies and the development of innovative methods for reducing economic losses caused by plant pathogenic fungi.

Keywords: Fungal pathogens, İdentification, Innovative molecular tools

Basal Plate Rot and Root Rot Disease of Onion

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Abstract: Onion (Allium cepa L.) is an economically important vegetable crop in Turkey, with a cultivated area of 74.140 ha and a production of 2.255.060 tonnes/year as shallots, green and dry. Onion production is threatened with different kinds of pathogenic microorganisms including bacteria, fungi and viruses. Fusarium sp. are commonly found almost in all agricultural soils, and cause economically significant losses wherever onions are grown. Fusarium sp. cause basal plate rot and root rot disease symptoms on onion plants. In 2017, several Fusarium isolates were recovered on potato dextrose agar (PDA) medium and water agar from the infected onion plants cultivated in Eskişehir. Morphological characteristics of the isolates were examined by light microscopy. Pathogencity tests of the putative isolates were conducted on onion seedlings to fulfil Koch's postulates. Identifications of fungal isolates were carried out by ITS-PCR using the universal primers, ITS1/ITS4, which produced fragment size of approximately 560 bp. The amplified products were sequenced and aligned. BLAST analysis showed 100% homology for ITS region with the isolates of Fusarium from the GenBank nucleotide database. All the sequences were used for phylogenetic analysis using maximum likelihood.

Keywords: Fusarium sp., onion, basal plate rot, root rot diseases, ITS-PCR

Macrofungi Causing Decay Wood in Hakkari Province

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Abstract: Abstract: Fungi which grow on wood are sometimes called lignicolous fungi. But being lignicolous does not define a taxonomic category. Lignicolous fungi are included in many classes and orders. Such fungi have the ability to break lignin, cellulose and hemicelluloses. This ability is often judged negatively on our part. Because, decay wood fungi are destroy either dead woods or living trees. Therefore, the trees used for agricultural purposes and the trees found in the forest ecosystem are seriously damaged. This situation is very important for the country's economy. There are three types of wood decay, soft rot, brown rot and white rot, which are caused by fungi. The wood decayed by brown rot fungi is typically brown and crumbly and it is degraded via both non-enzymatic and enzymatic systems. A series of cellulolytic enzymes are employed in the degradation process by brown rot fungi, but no lignin degrading enzymes are typically involved. White rot fungi are typically associated with hardwood decay and their wood decay patterns can take on different forms. In this study, 30 samples of decay wood macrofungi will be handled in Hakkari province.

Keywords: Decay wood, Macrofungi, Hakkari

Fungal Agents and Pathogenicity in Tomatoes in Lake Van Basin

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Abstract: This study was conducted to isolation and identification of fungi from the roots of tomato plants in Lake Van Basin in 2014. Pathogenicity experiment was established with isolates belonging to genus which are most frequently isolated in isolations. Sclerotinia spp., alternaria spp., Macrophomina spp., Rhizoctonia spp., Fusarium spp., Phytophthora spp., Aspergillus spp., Trichoderma spp., fungi were isolated from diseased plants collected from Edremit, Gevaş, Tatvan and Erciş districts. Twenty five isolates of Sclerotinia spp. were obtained from roots of tomatoes, 22 of which were identified as Sclerotinia sclerotiorum and 3 as Sclerotinia minor. At the same time, mycelial compatible groups (MCG) of Sclerotinia isolates were identified. According to this, it was determined that there were 4 different MCGs in the S. sclerotiorum population and no discordance between S. minor isolates. The pathogenicity experiment was established by using Toprak and Alsancak tomato varieties, which are the most cultivated in the region with the obtained Sclerotinia spp. isolates. According to the pathogenicity results, the most destructive isolates of S. sclerotiorum isolates were S1, S2, S17 and S25 isolates in S. minor. S23 (S. minor) in the Alsancak variety and S25 (S. minor) in the Toprak variety were identified as the most destructive isolates. Among these two species S. minor was identified as virulant than S. sclerotiorum. The Alsancak variety is found to be more sensitive to the disease than the other variety.

Keywords: Tomato, Sclerotinia minor, Sclerotinia sclerotiorum, mycelial compatible groups

Copper Resistance of the Pathogen *Pseudomonas syringae* Pathovars Isolated from Lake Van Basin, Turkey

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Abstract: Bacterial canker is one of the most important diseases that can affect stone-fruit trees in Turkey and the world. It has been controlled for a long period of time by copper-based pesticides. However, the pathogens have developed resistance to copper which reduced the effect of these products. Therefore, the resistance state and level must be determined to make effective control of bacterial diseases. The aim of this study was to detect the copper tolerance rates in strains of *Pseudomonas syringae pv. syringae* and *morsprunorum* isolated from Lake Van Basin. This resistance was tested by growing the isolates on methanol-glutamine agar (MGY) medium amended with different copper sulfate concentrations along with commercial copper-based compounds (Copper hydroxide, Copper Oxychloride and Copper Oxide) and the minimum inhibition concentration (MIC) was used for comparison. According to the (MIC) values of isolates grown on Copper sulfate, 33% of strains were detected to be susceptible with MIC of 0.3-0.5 mM. 39% and 28% of strains had MIC values of 0.7-0.9 and 1-2 mM respectively. Also, Copper Oxychloride was shown to be the most effective copper form where about 92% of strains had MIC values of 0.5-0.6 Mm. Despite of using copper compounds in low levels in Lake Van Basin, under high copper concentrations some strains have shown possibility to be tolerant. That means the resistance of bacterial strains against copper could be increased in the future.

Keywords: Pseudomonas syringae, copper resistance, MIC

Molecular Phylogeny Based on ITS Sequences of nrDNA of Some Species Belonging to Cuscuta L. Genus in Turkey

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Abstract: Nuclear ribosomal DNA sequence data of *Cuscuta* genus, which have been considered as one of the most popular sequences for phylogenetic inference in plants, have been studied from a phylogenetic perspective in agricultural and non-agricultural lands of Turkey. The stem tissue samples of *Cuscuta* spp. were collected from different geographical regions of Turkey between the years 2013-2015. Some other species, not available locally, were taken from the herbarium samples of some research units. Based on the herbarium specimen examinations, 9 species were identified phylogenetic. In order to determine the phylogenetic relations of species belonging to the genus *Cuscuta*, DNA isolation was made from the body tissue samples. Conserved regions on ribosomal DNA (rDNA) were amplified by universal primers via PCR method and cloned in a proper cloning vector. The cloned DNA fragments were sequenced and analyzed by Vector NTI Advance, CLC Main Workbench software, and NCBI databases. DNA sequences of centain species were recorded to National Center for Biotechnology Information (NCBI) database. The species recorded to Gene bank; were *C. hyalina* (Gen bank accession no. KY020420), *C. monogyna* (Gen bank accession no. KY020421), *C. europaea* (Gen bank accession no. KY020422), *C. palaestina* (Gen bank accession no. KY020423), *C. approximata* (Gen bank accession no. KY020424), *C. kurdica* (Gen bank accession no. KY020427), *C. balansae* (Gen bank accession no. KY020429), *C. kotschyana* (Gen bank accession no. KY020430) and *C. babylonica* (Gen bank accession no. KY020431). The similarity of these sequences with the sequences in data base were ranged between 96-100%.

Keywords: *Cuscuta* spp., molecular phylogeny, classification, Turk

Response of Some Turkish Hungarian Vetch Variety and Lines to Some Herbicides

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Abstract: Hungarian vetch (Vicia pannonica L.) is annual leguminous feed crops, and used for animal feed as both green and hay. This feed crop is well adapted to the Turkish ecological conditions, and its production area has increased year by year. Weeds has come the first rank among the biotic factors at Hungarian vetch production. It has not been registered any herbicide against the weeds in Hungarian vetch in Turkey. The aim of this study is to determine the efficacy of some herbicides may use against the weeds in Hungarian vetch fields, and the response of some varieties and lines of Hungarian vetch to the herbicides. The recommended rate of the herbicide such as imazamox, glyphosate, glufosinate and aclonifen were used in the laboratory trial. The varieties of Hungarian vetch such as Kansur, Erzurum Beyazı, Ege Beyazı, Tarım Beyazı and Budak and the lines such as line 28, line 23 and line 5 were tested in the experiment. Herbicides were applied as post emergence on Hungarian vetch seedling at 2-4 leaves using spray chamber. Treated seedlings were placed in growth chamber at 16-hours light (22±1oC ve 100 µE m-2 s -1 light intensity) and 8-hours dark (18±1oC) conditions. The seedlings were irrigated during the experiment with deionized water as they need. Vetch injury was estimated visually using a 0 to 100% scale, where 0% = no vetches injury and 100% = complete all vetch seedlings death 28 days after treatment. The weight of dry matter of the seedlings were determined.

Keywords: Hungarian vetch, imazamox, glyphosate, glufosinate, aclonifen

Detection of Acetolactate Synthesis (ALS) Inhibiting Herbicides Resistance in Sterile Wild Oat (*Avena sterilis* L.) Using Quick Test

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Abstract: Herbicides resistance is one of the problems in agricultural areas around the world which lead to the great losses to the farmers and companies that produce herbicides. In our study we aimed to detect mesosulfuron-methyl and pyroxsulam resistance in sterile wild oat using agar medium. Seed samples were collected from suspected field that poorly controlled with herbicides. Suceptible samples were collected from the roadside that had never been exposed to herbicides before. Collected seeds were saved at 4 oC to 60 days in order to break dormancy. 14g/l of agar medium was prepared and melted in microwave, 20 ml from agar medium was poured into each petri dishes. Discriminating dose of herbicides 0.05, 0.1, 0.2, 0.4, 0.8, and 1.6 µl for mesosulfuron-methyl and 0.04, 0.08, 0.16, 0.32, 0.64 and 1.28 µl for Pyroxsulam were treated by using micropipet. 10 seeds were placed into each petri dishes and incubated at 10 oC for 15 days. After compleated incubation periode, hypocotyl and coleoptile length was mesured as well as the percentage of germination were recorded. ED50 and resistant index (RI) were calculated. The result showed that the suspected population treated with mesosulfuron-methyl were more resistant to hypocotyl (4.11 folds) than the radicle (2.8 folds), population treated with pyroxsulam were resistant for 3.14 and 2.15 folds to hypocotyl and radicle, repectively. We concluded that the suspected fields has intermediate level of resistant for both herbicides. Thus the method mentioned above is considered as a very fast approch, cost effective and suitable to apply

Keywords: Acetolactate synthesis, Avena sterilis L., mesosulfuron-methyl, pyroxsulam, resistant index

Acknowledgements: This study was supported by Scientific Research Projects Unit (FDK-2017-8186) of Cukurova University.

Assessment of Herbicide Effects on Common Mesquite [Prosopis Juliflora (SW.) DC.] under Greenhouse Conditions

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Abstract: Common mesquite [Prosopis juliflora (SW.) DC.] is an evergreen thorny shrub or small tree belonging to the family Fabaceae. The plant is native to Mexico, Central and Northern South America. Common mesquite was intentionally and/or accidentally introduced to several countries and eventually considered an invasive plant in the subtropical regions of Africa, Asia and Australia. The study aimed to investigate the effects of five different herbicides namely; 2,4-D, glyphosate diammonium salt, glyphosate potassium salt, glufosinate ammonium and 2,4-D + picloram to the emerging seedlings of mesquite under greenhouse conditions. Mesquite seeds were sown in plastic pots (10 cm diam.) filled with fine-textured soil. Two weeks later, the emerging plants were thinned to one seedling per pot and the treatments were arranged in a completely randomized design with six replications. All herbicides were applied at their label recommended, 2/3 and ½ doses when the plants were in the 3-4 leaf stage. Spray volume of 300 L ha-1 was applied by using a battery powered knapsack sprayer. Percentage of control and plant height were regularly taken after herbicide treatment. Finally, plants were harvested and fresh and dry weights were assessed. In the first two weeks, the highest percentage of control was achieved by 2,4-D + picloram, glyphosate potassium and glyphosate diammonium salt treatments, with 100, 97.5 and 89.33 percent control, respectively. Significant decreasing in the dry weight was also observed in these three herbicides. The results highlight that herbicide application can play a substantial role in any strategic approach to mesquite management.

Keywords: Mesquite, Prosopis juliflora, invasive plants

Weed Species in Thyme Ptoduction Area in Manisa

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Abstract: In this study, weeds species, density and frequency of occurrence in Manisa Oriental thyme (Origanum spp.) Production areas were investigated. Surveys; In 2013, in the fields selected randomly, it was carried out in two periods, considering the phenological period and form time of the thyme plant. In 21 fields, 400 decare field reviews have been made. According to field size in weed counts; the field is 5 decares; 5-10 decare areas 6; 10-20 decare field 8; In the areas above 20 decares, 12 times, 1/4 m2 frames were thrown and weed counts of weeds were carried out. In the counts, broad-leaved weeds were evaluated as whole plants and narrow-leaved trees were counted as stalks. Weed density and frequency of occurrence (R.S) in m2 were determined from the obtained data. 39 different weed species belonging to 22 families were detected in the survey areas. Among these species; two species of parasites (Cuscuta campestris L., Orabanche gracilis sm.), 4 with narrow leaves and 33 with broad-leaved weed species. It was found that the weed density was the highest in Convolvulus arvensis L. (59,5 plant/m2) in broad-leaved weeds, followed by Lactuca serriola (41,45 plant/m2), Sonchus asper L. (38,5 plant/m2), followed by Portulaca olereceae (16,2 plant/m2); It was determined that Sorghum halepense L. (35.00 plant/m2) and Cynodon dactylon L. (24.46 plant/m2) were the most Cyperus rotundus

Keywords: Thymus, weeds, weed density, weed frequency

Allelopathic Effect on Some Plants of White Cabbage (*Brassica oleracea* L. var. *capitata* (L.) F. Alba DC)

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Abstract: The aim of this study carried out between 2017-2018 was to determine the effect of white cabbage (*Brassica oleracea* L. var. *capitata* (L.) f. *alba* DC) on the germination of some weed seeds, which causes significant yield loss in agricultural production. In addition to weed plants such like *Amaranthus retroflexus* L., *Chenopodium album* L., *Solanum nigrum* L., cultivated plants such as corn and sugarbeet were used in this study. It has been shown that the seed germination rate was decreased by the increased concentration of cabbage post-harvest leafs extract which were made with different concentrations of aqueous and metanol (30, 40, 50%). In the results, seeds of *S. nigrum* were less affected by the extracts than *A. retroflexus*, *C. album*, sugarbeet and corn. Accordingly, the allelopathic chemicals which is produced by cabbage has shown herbicidal effect. In addition, it could be considered as an important solution which would contribute in integrated management by using it with different concentrations along with different solvents and seeds.

Keywords: *Brassica oleracea*, *Amaranthus retroflexus*, *Chenopodium album*, *Solanum nigrum*, Germination

Acknowledgements: This study is part of the project supported by the grant from Research Fund of Van Yuzuncu Yil University (Project code 6633).

Determination of Weed Seeds Contaminating Wheat Grain in Muş Province

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Abstract: The wheat that is Poaceae family is one of the cultivated annual crops that can be grown in every region of the world. Wheat has varieties that can adapt to all kinds of climate and soil conditions. In addition, because the increasing population is the basic food material, it has an important place in terms of cultivation and production in the world and in our country. Weeds compete against for light, water and nutrients with crops in agricultural areas and reduce the yield considerably. One of the most important factors in the quality and yield of crops is weeds. The fact that there is a wide adaptation area of wheat also increases the competition area with weed species that adapt to all kinds of climate and soil conditions. This study was conducted to determine weed seed contamination and their average distribution in grains. 71 different wheat samples were collected in Muş Province in 2016, and weight and number of weed seeds in contaminated the wheat samples were determined. The samples were taken randomly and mixed in a sample bag. Cephalaria syriaca (L.) found first highest species as the weed seed, which is the most mixed in the wheat product in the province of Muş. *This work was supported by Research Fund of the Inonu University. Project Number: 2016/110Y.Lisans

Keywords: Muş province, wheat, weed seed

Weeds in Tea (*Camellia sinensis*) Gardens in Turkey

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Abstract: Tea (Camellia sinensis (L.) Kuntze) is the most common beverage after water in the world. As well, with its 76.000 ha cultivated lands, it is an important export products of Turkey and one of two important agricultural product of the Eastern Black Sea region together with hazelnut. A total of 114 native or naturalized vascular plant taxa distributed in tea gardens in Turkey were identified and listed. The most common and efficient taxa which compete with tea for nutrients, moisture, sunlight, and space were highlighted. Moreover, these taxa affect the quality of tea negatively while mixed harvested exiles. The followings are the most commonly growing taxa in association with tea at different cultivated sites in the region: Pteridium aqulinum (L.) Kuhn., Smilax excelsa L., Alnus glutinosa (L.) Gaertn. subsp. barbata (C.A. Mey.) Yalt., Crassocephalum crepidioides (Bentham) S. Moore, Calystegia silvatica (Kit.) Griseb, Commelina communis L., Microstegium vimineum (Trin.) A. Camus., Oplismenus undulatifolius (Ard.) P. Beauw., Rubus spp. In the present study, right time of controlling these weeds is recommended which depending on both ecological and biological features of the taxa.

Keywords: Camellia sinensis, herbology, tea gardens, Black Sea

Investigation of the Effectiveness of Different Weed Control Methods Used for Potato (*Solanum tuberosum* L.) Cultivation in Kayseri Province, Turkey

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Abstract: Potato is the fourth most common foodstuff in the world after wheat, rice and corn and is grown in almost all countries. According to 2015 data in Kayseri province, potato production area is 77.007 da, production is 287.835 tons. Weeds are one of the most important factors affecting yield and quality in potato productions. Appropriate weed control methods must also be established and implemented to increase the effectiveness of the weed control and to make necessary interventions on time. This study was conducted in Melikgazi District which have important potato production areas in Kayseri. Effectiveness of different weed control methods in potato growing (Marabel cv) were investigated. In the experiment alone and combinations of herbicides, 1 and 2 tractor hoeing were used in combination with metribuzin (Sencor SC 600), pendimethalin (Herbimat 330 EC), linuron (Aries), fluazifop-P-butyl (Fusilade Forte) herbicides and weedy plots also were created. As a result of the studies, it was determined that the most effective application against weeds in potato cultivation was the application of pendimethalin + metribuzin + fluazifop-P-butyl. The highest yields obtained from the pendimethalin + metribuzin + fluazifop-P-butyl application with 3957.46 kg/da and the lowest yield was obtained from weedy control at 2294.50 kg/da. Similarly, the highest net income was obtained from pendimethalin + metribuzin + fluazifop-p-butyl plot with the 1603.09 TL / da in parallel with the highest yield.

Keywords: Weeds, pendimethalin, linuron, metribuzin, fluazifop-P-butyl

Acknowledgements: The author thanks Research Fund of the Erciyes University (the Project number FYL-2016) for supporting Project.

Investigation and Molecular Characterizatıon of Barley Yellow Dwarf Viruses in Wheat Fields (*Triticum aestivum* L.) of Diyarbakır Province By Multiplex RT- PCR

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Abstract: In order to ascertain the presence of Barley/Cereal yellow dwarf viruses (BYDV-PAV, MAV, SGV, RMV, and CYDV-RPV), in wheat fields, a survey was conducted in the year of 2016 in Diyarbakir province. Presence of BYDV viruses (PAV, MAV, SGV, RMV, and CYDV-RPV) was investigated by using multiplex RT-PCR and RT-PCR methods. A total of 365 wheat leaf samples were randomly collected from wheat fields of Diyarbakir province. As a result of tests the wheat samples were found to be infected by BYDV-PAV, BYDV-SGV and CYDV-RPV with the percentage of (3.5%), (2.4%) and (1.3%), respectively. Detected mix infections of BYDV-PAV+BYDV-SGV, BYDV-PAV+ CYDV-RPV, BYDV-SGV+ CYDV–RPV, and BYDV-PAV+BYDV-SGV+CYDV-RPV were 2.2%, 0.8%, 0.8%, and 0.8% respectively. A virus isolate was selected randomly and its coat protein gene was characterized. Complete coat protein gene of BYDV-PAV virus (Genbank accession no. KX774424) was cloned and sequenced with the universal primers. BYDV-PAV Diyarbakir isolate was compared with 21 isolates from other regions in the world. The nucleotide sequence of BYDV-PAV Diyarbakir isolate was showed 81.43%- 98.3% similarities with the world isolates. The present study is the first report for documentation of BYDV-PAV, BYDV-SGV and CYDV-RPV viruses in wheat fields in Diyarbakir province in Turkey.

Keywords: Wheat, Multiplex RT-PCR, Characterization, Cloning, Turkey

Citrus Psorosis Disease in East Mediterranean Region, Turkey

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Abstract: Psorosis is a very well known citrus disease causing important damage in many countries, particularly in Turkey. In East Mediterranean Region (EMR) of Turkey this disease was recognized in field trees that showed symptoms of bark scaling of trunks and branches and also vein bands on young leaves. The disease is correlated with the presence of Citrus psorosis virus (CPsV) the type member of the Ophiovirus genus, with a genome of three single stranded RNAs. To determine the status of the virus surveys were carried out in EMR of Turkey in 2015-2017.In this area young leaves symptom vein banding was very high of Washington navel, Valencia oranges, Satsuma mandarins and Kutdiken lemons. The numbers of citrus trees showing symptom of bark scaling was high in old orchards but the production was good. To characterization of virus RT-PCR and biological indexing on Pineapple seedling were used. The infected plants showed the expected size of CPsV coat protein fragment (350,514,600) which was absent in the healthy plants. For biological indexing 10 sample were inoculated on Pineapple orange seedlings to see the leaf symptoms of the virus. The first growth flushes of infected indicator plants showed vein banding and shocked reaction of CPsV.

Keywords: Psorosis, CPsV, citrus, Turkey, orange

Deep Sequencing of *Vitis vinifera* L. cv. Narince for Diagnosis of Viral Agents

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Abstract: Next Generation Sequencing (NGS) technologies provides extraordinary solutions for detection of all plant viral agents simultaneously. In the present study, virus symptomatic a local grapevine variety (*Vitis vinivera* L. cv. Narince) sample was collected from Tokat province of Turkey in 2015. RNASeq analysis was performed with Illumina HiSeq 2000 technology and 131.024.652 reads were derived as raw data. After host genome subtraction with CCL Genomic Workbench R11 software, 21.801.636 sequences were remained for *de novo* assembly. At the end of the *de novo* assembly 100.534 contigs were derived with SPAdes assembler by Geneious R11 software and all derived contigs were analysed by blastn against NCBI viral database to detect known viruses and viroids. According to the blastn results, genome mapping analyses were performed against to each reference sequences singly by Geneious R11. As a result of genome mapping; *Grapevine Pinot gris virus* (GPGV) (100%), *Grapevine yellow speckle viroid-1* (GYSVd-1) (100%), *Hop stunt viroid* (HSVd) (100%), *Grapevine satellite virus* (GV-Sat) (84.1%), *Grapevine deformation virus* (GDefV) RNA2 segment (81.5%), *Grapevine yellow speckle viroid-2* (GYSVd-2) (53.2%), *Grapevine leafroll-associated virus-1* (GLRaV-1) (49.8%), GDefV RNA1 segment (28.6%), *Grapevine fanleaf virus* (GFLV) RNA2 segment (26.5%), *Grapevine virus A* (GVA) (18.8%), GFLV RNA1 segment (17%), *Grapevine red globe virus* (GRGV) (16.1%), *Grapevine Roditis leaf discoloration-associated virus* (GRLDaV) (11.7%) genome were recovered as indicated percentage. In addition to this, to our knowledge GV-Sat and GRGV are the first report for Turkey grapevine production areas.

Keywords: Grapevine, Deep sequencing, *de novo* assembly, RNASeq

Acknowledgement: This study was supported by TUBITAK-TOVAG 115O014 in the frame of COST-FA Action 1407.

Serological and Molecular Detection of PVYN, PVYC, PVYO and PVYNTN on Tomato and Pepper in Urmia

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Abstract: Viral diseases are very important on tomato and pepper because of their impact on the quality and quantity of these crops. Potato virus Y (PVY) belongs to the genus Potyvirus and family Potyviridae is one of the most important viruses and has a worldwide distribution on Solanaceous crops. In order to detect of mentioned virus and determine taxonomic status of its strains on tomato and pepper, a total of 88 samples were collected from different fields of Ziveh, Nazloo, Par, Chongharalouye Pol, Balanej and Ali Abad around Urmia during growing seasons of 2015 and 2016and subjected to Indirect-ELISA. The virus was detected in 23 samples. Total RNA was extracted from positive samples in ELISA and synthetized cDNA was used to amplify a part of coat protein (CP) gene in RT-PCR using specific primers. The fragments of 609 and 549 bp were amplified and sequenced directly. Phylogenetic analysis results showed the existence of PVY strains including N, C and O on tomato samples and NTN on pepper. To our knowledge, This is the first report of occurrence of PVY O, C, N and NTN on tomato and pepper in Urmia and West-Azarbaijan province of Iran.

Keywords: Solanaceae, PVY, Indirect-ELISA, RT-PCR, Phylogenetic analysis

The Role of Aphids (Hemiptera: Aphididae) and Weeds on the Spread of Potato Y potyvirus (PVY) Strains on Potatoes in Central Anatolia Region, Turkey

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Abstract: Potato virus Y (PVY), is transmitted by aphids. Besides, PVY can use weeds as host in transmission. In the present study, the role of aphids and weeds on transmission and spread of PVY strains in potato was investigated using DAS-ELISA and Multiplex RT-PCR methods in the main potato growing areas of Turkey. Surveys were conducted between the years of 2014 and 2015 covering Niğde, Nevşehir, Afyon, Bolu, Konya, Sivas and Kayseri provinces. A total of 100 weed and aphid samples were taken from different localities mainly from Central Anatolia Region where the potato is widely grown. The presence of PVY strains were searched in host and non-host weeds collected from potato fields and around by using serological and molecular methods. The potential aphid vectors were identified by classical and molecular methods then the strains were detected molecularly that they carry. In the weed samples tested, the incidence of PVYNTN and PVYN:O strains was 16% and 6%, respectively. The percentage of mixed infections containing PVYNTN and PVYN:O strains was determined as 5%. The frequency of mixed infections containing PVYNTN and PVYN:O strains in weed samples was higher in certain locations of Afyon and Bolu provinces. No mixed infection was recorded in weeds in other provinces. In aphid samples, the mix infection containing PVYNTN and PVYO strains was found only in Myzus persicae, while PVYNTN and PVYN:O strains appeared in Aphis nasturtii. PVYNTN strain was present both in Aphis nasturtii and in Macrosiphum euphorbiae verifying the non-persistent transmission nature of PVY.

Keywords: Potato virus Y strains, potato, transmission, aphid, weed

Acknowledgements: This study was supported by The Scientific and Technological Research Council of Turkey (TUBİTAK), Project Number: 213O108.

Peach and Nectarine Affected with 16SRXII and 16SRIX Phytoplasma Groups in Northern Provinces of Iran

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Abstract: Phytoplasmas are insect-transmitted, phloem-inhabiting, cell wall-less prokaryotes that cause numerous diseases in plants. A survey carried out during 2012-2013 in peach and nectarine orchards in three Northern provinces including Mazandaran (Sari, Neka, Babol, Behshahr and Babolsar), Golestan (Gorgan, kordkooy and Aliabad) and West Azerbaijan (Urmia, Khoy, Salmas, Oshnavieh and Makou) in Iran. A total of 103 Samples showing leaf roll, yellowing, purple colored of edges, leaf stunting and weak shoot growth symptoms were collected and tested by polymerase chain reaction (PCR) and Nested -PCR using primer pairs P1/P7, P1/Tint, PAF/PAR, R16F2n/R2, fU5/rU3 and NPA1F/NPA1R. The amplicons were purified, sequenced and the nucleotide sequences were analyzed by virtual restriction fragment length polymorphism (RFLP). The phytoplasmas associated with the peach and nectarine yellow leaf roll (PYLR) disease were identified as members of 16SrXII (Stolbur group) and 16SrIX (pigeon pea group) groups and were placed in a unique subgroup close to 16SrXII-A (Candidatus Phytoplasma solani) and another one in 16SrIX-C (Candidatus Phytoplasma phoenciium) subgroup, respectively in constructed phylogenetic trees. Present study is the first report of a new subgroup in 16SrXII and first report of 16SrIX-C subgroup phytoplasma associated with peach and nectarine from North of Iran.

Keywords: Nested-PCR, Candidatus phytoplasma phoenicium, Candidatus Phytoplasma solani

Molecular Detection of Honey Bee Viruses in Honeybees *(Apis mellifera* L.) and Parasitic Mite (*Varroa destructor*) in Şırnak and Siirt provinces by Real Time RT-PCR

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Abstract: Honeybees and health of honeybees have recently become an important issues worldwide due to vital roles of honeybees in pollination and food production. Honeybees provide an invaluable contribution to agricultural economy and, through pollination, in the production of plants in Turkey and the world. The recent studies indicated that honeybees have been influenced by a variety of viruses. These agents cause sudden death of bees as well as the reduction of their life-span and production, especially when the colonies exposed to parasitic mite; Varroa destructor. In the present study, the sampels of honeybees and V. destructor were collected from nineteen different apiaries of Şırnak and Siirt provinces (Turkey) and analyzed for the detection of Deformed wing virus (DWV), Black queen cell virus (BQCV), Sacbrood virus (SBV) and AKI (Acute bee paralysis virus (ABPV), Kashmir bee virus (KBV) and Israeli acute bee paralysis virus (IAPV)) by real time RT-PCR. The all screened viruses were detected in the samples of honeybee and V. destructor. The presence of all viruses were further confirmed by DNA sequencing. About All of the samples were found to be infected with viruses. The high percentage of mix infections indicates the possible role of V. destructor as vector in transmission of screened viruses among honeybees. This is the first molecular detection of DWV, BQCV, SBV and AKI in this provinces. To our knowledge, the presence of BQCV, AKI(ABPV-KBV-IAPV) in V. destructor is the first record in Turkey.

Keywords: Honey bee virus, Apis mellifera, Varroa destructor, Real Time PCR, incidence, Turkey

Acknowledgements: This study was supported by DİKA: Dicle Kalkınma Ajansı (Project no: TRC3/16/DFD/0010).

Plasmid Profiles of *Clavibacter michiganensis* subsp. *michiganensis* Isolates in Turkey

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Abstract: Clavibacter michiganensis subsp. michiganensis (Cmm) is a causal agent of tomato bacterial canker and wilt disease, which is one of the economically important disease of tomato worldwide. In this study, plasmid content of 128 Cmm isolates from west mediterrenean region of Turkey was analyzed. Erwinia stewartii strain SW2 plasmid, which contains 13 plasmids, was used as a size marker. The Cmm strains are known to contain two plasmids, pCM1 (27 kb) and pCM2 (70 kb), which are responsible for two virulence factors, CelA and Pat-1, respectively. We found only pCM2 by using plasmid isolation method, and the method did not allow to isolate both plasmids. pCM1 was detected by amplification of CelA gene localized in the pCM1 using PCR, which produced amplification products of approximately 562 bp. All the Cmm isolates had the plasmids, pCM1 and pCM2 same as type strains NCPPB 2979. Profiling plasmids of the Cmm isolates in this study greatly contributed to the efforts of genotypic characterization of the Cmm strains in Turkey.

Keywords: Clavibacter michiganensis subsp. michiganensis, Plasmid, pCM1, pCM2,Tomato

Identification and Pathogenicity of Neofusicoccum parvum and Diplodia seriata Causing Bot Canker and Gummosis on Almond Trees in Adana Province

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Abstract: In this study, the prevalence of Botryosphaeria species causing wilting on the canopy, branch dryness, gumming on the trunk and braches and dieback of almond trees in Adana province and districts and morphological and molecular characterization of these genus species were investigated. As a result of the surveys conducted in 30 different almond orchards in 7 different counties of Adana province, it was determined that there were two species of Botryosphaeria (Neofusicoccum parvum and Diplodia seriata) and disease prevalence in Adana province was determined as 26.6%. These pathogens have been identified according to microscopic morphological structures of the conidia in anamorphic pycnidium and BLASTN analyzes of ITS and β-tubulin gene sequences. A total of 12 isolates of both species were obtained. Both stem cuttings and seedlings inoculation test determined necrosis lengths of N. parvum isolates were more virulent than D. seriata isolates on wood tissue according to lesion length caused. When the Maximum likelihood phylogenetics were constructed individually and in combination with the ITS and β-tubulin genes, they formed dendograms as separate groups from each other. Acknowledgement: This study has been supported by The Turkish Scientific and Technical Research Unit (114O048)

Keywords: Botryosphaeriaceae, ITS, Prunus dulcis, β-tubulin

The Investigation on *Eurygaster* (Hemiptera, Scutelleridae) Species and Their Distribution in Eastern Anatolia Region, Turkey

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Abstract: The study was carried out in order to determine *Eurygaster* (Hemiptera, Scutelleridae) species to be harmful to wheat and barley in the cereal areas of Ağrı, Ardahan, Bitlis, Erzurum, Hakkari, Iğdır, Kars and Van provinces in Eastern Anatolia region in the years 2015-2016. *Eurygaster* adults a total of 2112 individuals were collected by sweeping net from 8 provinces and were determined *Eurygaster integriceps* (Put.) ve *E. maura* (L.). The presence rates of *Eurygaster* species were found as: Ağrı, Bitlis, Hakkari and Van *E. integriceps* (100%), Ardahan, Erzurum and Kars *E. maura* (100%), and Iğdır 97.2% *E. maura* and *E. integriceps* 2.8%. Additionally, these species were found to be locally damaged in wheat in Agri and Igdir.

Keywords: *Eurygaster* species, Distribution, Cereal, Eastern Anatolia region

The Morphological Identification and Comparison of *Drosophila (Sophophora) suzukii* (Diptera: Drosophilidae) with the Other Common Species in Turkey

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Abstract: Drosophila suzukii (Matsumura, 1931), is a vinegar fly species and also known commonly as spotted wing drosophila (=SWD) because of only the male wings typically with, sometimes without, infuscated spots at the apical of wing veins R2+3 and R4+5. It is a native fruit pest for Asia and originates especially from Japan. But in the years of 2008 and 2009, the invasion of this species has been nearly reported simultaneously from most of the Mediterranean countries of Europe and North America and spread further to the east and north regions rapidly and finally recorded from Turkey in 2014. While the most species of Drosphilidae are attracted by the smell of the wounded, overripe or rotten fruits, the females of D. suzukii insert their serrated ovipositor into the ripening and healthy fruits and laying eggs. Larvae develop in the fruit flesh and cause it to become both physical damage and provide the access of the secondary pathogens. In the summer of 2017, some larvae and adults of D. suzukii were obtained together with non-fruit pest D. melanogaster and D. simulans in strawberry orchards of Konya, Derbent and peach orchards in Isparta. The aim of the current study to compare these species according to their distinct morphological characters at the species level and to provide the right determination and protect the producers against to the unnecessary control costs.

Keywords: Drosophila suzukii, fruit, identification, comparison, Turkey

The Presence and Population Dynamic of the Spotted Wing Drospohila, *Drosophila suzukii* (Diptera: Drosophilidae) in Çanakkale Province

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Abstract: The spotted wing drosophila, Drosophila suzukii (Diptera: Drosophilidae), is an important invasive pest of berry and stone fruits. D. suzukii is indicated as a major threat to fruit production of especially European and Mediterranean Region. Oviposition of D. suzukii on fruits can not be determined at the end of harvest so that this damage effect the post harvest and shelf life of packaged fruits. Also, this pest cause serious damages on grape vine during the ripening and pre-ripening period. Knowing of the population dynamic of D. suzukii under field conditions is important with regard to pest management of this pest. The present study was carried out to determine the presence and population dynamic of D. suzukii in three different vineyards in Biga district of Çanakkale Province of Turkey. The monitoring was carried out once week using two bait-trap in vineyards between August-2016 and March-2017. Number of male and female individuals of D. suzukii collected in traps were weekly recorded. Totally, 416 male and 389 female individuals were collected during the surveys. The most individuals of D. suzukii were caught between September-2016 and January-2017 in vineyards. The results indicated that D. suzukii started to emerge at the ripening time of grape. Therefore, to determine the population dynamic of D. suzukii in vineyards should be checked the bait-trap from ripennig period to end of the harvest.

Keywords: Spotted Wing Drosophila, Drosophila suzukii, Vineyard, Çanakkale, Turkey

Management of the Hairy Rose Beetle, *Tropinota squalida* (Coleoptera: Scarabaeidae) by Mass Trapping in Apple Orchards

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Abstract: The potential of mass trapping for the management of the hairy rose beetle, Tropinota squalida (Scopoli) was evaluated in commercial apple orchards in Jordan. A funnel trap baited with floral attractants was tested for effective capture of the beetle. Efficacy of the floral attractants compared to apple flowers was tested using an olfactometer. Factors affecting trapping effectiveness including: trap color, placement, and baiting with floral attractants were evaluated in apple field trials. The potential of mass trapping using different densities of traps/h. was examined on large scale field trials over two growing seasons. Results showed that dispensers with flower attractants were more attractive to the beetles than apple flowers. Field trials showed that the beetles were highly attracted to blue, white and yellow traps compared to green and orange ones. Traps placed on the ground attracted more beetles than traps suspended on the tree. Moreover, traps baited with attractants were more attractive than traps with no bait. In the mass trapping trials, percentage of damaged flowers by the beetles was reduced to 3.5% when 50 traps/h were used in the treated field plots compared to 8.3% in the controls with no traps in the first growing season and to 4.7% in the treated plots compared to 15.3% in the control plots in the second growing season. These results indicated that mass trapping technique has the potential to be incorporated in an Integrated Pest Management (IPM) program to reduce the damage caused by the hairy rose beetle in apple orchards.

Keywords: Tropinota squalida, Mass trapping, Floral attractants, Apple

Study on Species Diversity, Zoogeographic Distribution, Distribution in Turkey and Ecological Properties of the Aquatic and Semiaquatic Heteroptera (Hemiptera) from Turkey

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Abstract: This study are discussed the species diversity composition, zoogeographic distribution, distribution in Turkey and ecological properties of the aquatic and semiaquatic Heteroptera (Hemiptera) from Turkey. Result showed there were nine families, 17 genera, 62 species, including four endemic species of Turkey. In the World animal geographical fauna, the composition of Palearctic region was dominant. There were 47 species only distributed there, about 75.80 % of the total known. Studies of ecological properties had shown the most species were distribution 37˚01-38˚ N, the most appropriate altitudinal range was 0-200 m.

Keywords: Aquatic and semiaquatic heteroptera, species diversity, zoogeographic distribution, ecological properties, Turkey

Effectiveness of Entomopathogenic Fungi Beauveria bassiana and Metarhizium anisopliae against *Thaumetopoea pityocampa* Shiff. (Lepidoptera: Thaumatopoeidae)

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Abstract: In this study, two entomopathogenic fungal isolates; Metarhizium anisopliae (TR 106) and Beauveria bassiana (TR 217) were tested against fourth instar larvae of Thaumetopoea pityocampa in laboratory. The experiments were carried out in two different methods. In the first method, conidial suspensions (1×106 and 1×108 conidia mL-1) isolates of the fungi were directly applied on the larvae in the Petri dishes (2 mL per dish), using a Potter spray tower. In the second method, the same spore suspensions were applied on disinfected pine leaves using the same methods, placed in Petri dishes and 5 larvae were released. Only sterile distilled water was sprayed into control dishes. The dishes were incubated at 25±1 °C and 75±5% relative humidity for 6 days. Lethal time values (LT50 and LT90) for both fungi were calculated through Probit analysis. As a result, in larvae applications, the LT50 and LT90 values of 1×108 of M. anisopliae were determined as 2.5 and 2.95 days, respectively, while these values were 3.6 days and 4.11 days at 1×106. In addition, LT50 and LT90 values of B. bassiana at 1×108 were 3.03 and 3.68 days, respectively, in larvae application, while they were 3.31 and 4.29 days on the leaves application respectively at the same concentration. In addition, approximate 100% mycosis was obtained from all treatments. Consequently, the results of this study indicate that M. anisopliae (TR 106) and B. bassiana (TR 217) seem to be a promising environmentally friendly alternative control method against T. pityocampa.

Keywords: Pine processionary moth, fungi, Metarhizium anisopliae, Beauveria bassiana, biological control

Parasitoid opiinae Species (Hymenoptera, Braconidae) of Plant Pest Families Agromyzidae and Coleophoridae (Diptera) determined from Bingöl, Bitlis and Van Provices of Turkey

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Abstract: It is not possible to control agricultural pests without completely revealing biological diversity of Turkey. We cannot decrease our dependence to the External world and increase our level of welfare without increasing agricultural production. We cannot decrease our dependence to the External world and increase our level of welfare without increasing agricultural production. However, a rich country can become a society of science by applying modern education. Therefore, democracy and ethical values improve. Bingöl, Bitlis, Mih and Van cities were studied to reveal Braconidae fauna of Turkey. Braconidae samples were collected using net and light traps from various habitats of Bingöl, Bitlis, Mil} and Van cities in Eastern Anatolia Region. Braconids were separated from other materials with the aid of aspirators and transported in the laboratory inside storage tubes containing 70% ethyl alcohol. The samples were prepared in the laboratory and identified with the aid of relevant literature and comparison material. Materials prepared were identified as a result of the present study. 25 species from 3 genera and 13 subgenera of the subfamily Opiinae were identified. Opius (Apodesmia)reconditor Foerster, 1835; opius (Merotrachys) podomelas Fischer, 1972 from these species are the first records for fauna of Turkey. 70 Agromyzidae and 2 Coleophoridae which are plant pests and become parasitoid by these opiinae species were also given. Thus, basis of biological control studies has been prepared. The number of Opiinae species has increased from 215 to 217 as a result of the present study. Acknowledgements: We would like to express our

Keywords: Agromyzidae, Opiinae, Bitlis, Parasitoid. Hymenoptera

Determination of Mortality Effect of Turkish Dıatomaceous Earth (Acn-1) Against Adults of German Cockroaches (*Blatella germanıca* L.)

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Abstract: In present study, toxicity of Turkish diatomaceous earth (ACN-1) on three different surfaces (concrete, ceramic floor tile and laminate flooring) against adult stages of Blatella gemanica were investigated under laboratory conditions. B. gemanica adults were exposed to concrete, ceramic floor tile, laminate flooring surfaces applied with ACN-1 at the rates of 2.5, 5, 10, 20 g/m2. In all surface applications of ACN-1 diatomaceous earth, exposure time and dose caused significant effect on mortality rates of B. germanica adults. In the case of ACN-1 coded Turkish diatom at 2.5 g/m2, the mortality rates of B. germanica adults were 97.5%, 92.3% and 90.0% on the surfaces of concrete, ceramic floor tile and laminate flooring at the end of the first day respectively. 100% mortality rate of B. germanica adults was obtained at the end of the second day. ACN-1 caused 100% mortality of B .germanica adults at the end of the first day at all other application doses. In conclusion, this study indicated that Turkish diatomaceous earth (ACN-1) on different surfaces to have potential to be used in control of B. gemanica and to be an alternative for conventional synthetic residual insecticides.

Keywords: Turkish diatomaceous earth (ACN-1), Blatella germanica, surface application

Evaluation of the Some Entomopathogenic Fungi Beauveria *Bassiana (Balsamo) vuillemin* (Ascomycota: Hypocreaes) Isolates for Control of *Sitophilus granarius* (Coleoptera: Curculionidae)

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Abstract: The entomopathogenic fungi Beauveria bassiana isolates (F52, F53, and F56) were tested against the stored-grain pest Sitophilus granarius. The fungi were isolated from the soil in Kelkit Valley, Black Sea Region, Turkey, using larvae of Galleria mellonella as bait. Suspensions of 1x103,1x105,1x107,1x108, and 1x109 conidia per ml of B. bassiana were applied by grain deeping methods. Fifty wheat grains were dipped into the appropriate predetermined doses for 1 h. and then placed in a glass vials (10 grains per vial). Ten adults were introduced into each glass vial. Mortality was measured after 5,7,9,11,14, and 21 d of exposure. Dead insects were transferred to moist sterile 90 mm glass petri dishes to determine the mycosis rate. The observed mortality of S. granarius adults during the overall exposure period for the lowest, as well as for the highest, concentrations of B. bassiana ranged from 2% to 96%. The highest mortality rate of 96% was obtained at the end of 21 days incubation period with isolate F53. The mortality rates after 14-day incubation period were recorded 84, 88, and 92% for F56, F52 and F53 respectively. Mycosis rates of isolates were increased with increase in spore concentration. The highest mycosis rate of 94% was obtained with isolate F53 at 1x109 spore concentration followed by isolates F52 (90%) and F56 (88%). The results indicated that isolates F52 and F53 isolates exhibited high mortality and mycosis rates. Further storage trials will be conducted especially with these isolates to see their in vivo performances.

Keywords: Entomopathogen, grain weevil, Sitophilus granarius, Beauveria

Fumigant Effects of Essential Oils Obtained from Some Plants Against Adults of *Rhizopertha dominica* (F.) and *Sitophilus granarius* L. (Coleoptera: Bostrichidae and Curculionidae)

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Abstract: The plant essential oils have toxic effects on many insect pests of the stored wheat grains and could be an important alternative method to classical insecticides. In the present study, the essential oils of Cuminum cyminum L., Mentha longifolia L. and Allivum sativum L. were isolated with hydrodistillation method by using Clevenger apparatus and determined their insecticidal activities against Rhyzopertha dominica (F.) and Sitophilus granarius L. (Coleoptera: Bostrichidae and Curculionidae) adults through fumigant bioassay. The cultures of R. dominica and S. granarius were established on the grain seeds under standard conditions of 25±1°C, 65±5 relative humidity, 16:8 (light:dark) and in the 5, 10, 15 and 20 µl/petri doses. Results demonstrated that these essential oils had various rates (varied from 1.25 to 100%) insecticidal effects on two stored grain pest adults after 96 h of the treatment. Among them, A. sativum essential oil was the most effective on R. dominica and S. granarius adults. However, C. cyminum and Mentha longifolia essential oils were the lowest effective on R. dominica and S. granarius adults, respectively. Separately, the LC50 and LC90 values of essential oils of C. cyminum, M. longifolia and A. sativum against R. dominica and S. granarius adults were recorded. The results indicated that the mortality rates of essential oils obtained from three plant species increased with concentration increase. Considering on all these results, the tested essential oils may be used as potential natural and non-toxic insecticidal agents against adults of R. dominica and S. granarius in the stored wheat grains.

Keywords: Essential oils, mortality rate, Rhyzopertha dominica, Sitophilus granarius

Predation capacity of *Hippodamia (Adonia) variegata* (Goeze) (Coleoptera: Coccinellidae) on *Aphis gossypii* Glover (Hemiptera: Aphididae)

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Abstract: Hippodamia (Adonia) variegata is an important predator species fed with many soft-bodied larvae and eggs and mites, especially aphids. In this study, it was aimed to reveal the predation capacities of H. variegata on Aphis gossypii, which causes damage on numerous cultivated plants, especially cotton. The study was conducted in a climate of 25 ° C temperature, 65% relative humidity and 16: 8 hour light period. The experiments were carried out in 9 cm petri dishes spread on wet cotton at a thickness of a few mm in order to protect leaf vitality. In each petri dish, a cotton leaf which was infested with aphids was placed, and the 1st stage predator larva was released, which all experiments consists of 50 replications. The number of prey consumed by the predator's larvae was recorded with daily observations and replaced with new preys. After completing their development, the adult individuals were taken into groups of 5-10 to provide matings and then transferred to separate petri dishes to record daily predations and hathced eggs. The study lasted until the last individual died. The data obtained at the end of the study were evaluated with the help of the Consume package program and the predation rate was determined. According to this, the predation rate was found as 818.75 individuals.

Keywords: Hippodamia (Adonia) variegata, Aphis gossypii, predation capacity

Biological Control of Tomato Leafminer *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) by Entomopathogenic Nematodes

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Abstract: The present study aimed to determine and compare the virulence of four native; entomopathogenic nematodes (EPNs); Steinernema affine, S. feltiae, S. carpocapsae and Heterorhabditis bacteriophora in biological control of Tuta absoluta. EPNs were isolated from different parts of Turkey and mass produced by using Galleria mellonella (Linnaeus) (Lepidoptera: Pyralidae) larvae in the laboratory. Different developmental stages of T. absoluta were collected from infested tomato fields in Çanakkale province and mass produced on potted tomato plants under climate room conditions (25±1 oC, 65±10% RH and 16:8 L:D). Larvae and pupae experiments were conducted under laboratory conditions at four different temperatures (10, 15, 20 and 25±1 oC). For each nematode species, 30 IJs were inoculated to a single larva and pupa of T. absoluta in the plates. After the treatment, larvae were checked on the 3rd, 5th, 7th day and pupae were checked on the 7th and mortalities were recorded. All nematode species caused high larval mortality particularly at 25°C but S. feltiae was more effective at lower temperatures while H. bacteriophora was more effective at higher temperatures. According to the results of this study, EPNs have significant potential to infect T. absoluta and they can be used in the management of the pest but more studies on the efficacy of EPNs in tomato growing areas must be conducted to support their use in IPM programs.

Keywords: Entomopathogenic nematodes, biological control, tomato, Tuta absoluta

Effectiveness of Five Beauveria bassiana (Bals.-Criv.) Isolates on the Lucerne Beetle [*Gonioctena fornicata* (Brüggemann) (Coleoptera, Chrysomelidae)] Larvae in Laboratory Conditions

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Abstract: The Lucerne beetle, Gonioctena fornicata (Brüggemann) (Coleoptera, Chrysomelidae) occurs in alfalfa fields in Turkey where it causes serious damage to Medicago spp. (Fabaceae) In this study, we evaluated the efficacy of five Beauveria bassiana isolates [GN12-3, GN4, GN8-1, GN8-2, GN8-1(2)], isolated from G. fornicata collected from alfalfa fields in Tokat province, against G. fornicata larvae at five different doses (1x103, 1x105, 1x108 and 1x109 conidia/ml) under laboratory conditions. To test the effect of each isolate, Lucerne beetle larvae were dipped in the prepared suspensions for 10 sec. and placed in a petri dish (10 larvae per plate) containing fresh alfalfa leaves. The experiment was laid out in completely randomized block design with 3 replications and repeated 2 times. Mortalities were recorded on the 1st, 3rd, 5th and 7th days of incubation periods. All isolates had a significant effect at 1x108 and 1x109 conidia/ml three days after inoculation. Effectiveness increased with increase of incubation period. By day 5, all isolates showed over 80% activity at 1x109 conidispor ml-1. At the end of 7th it was determined 100% efficacy in almost all isolates at 1x109 conidia/ml. At the same time, almost all other doses of the isolates (except doses 1x105 and 1x103 conidia/ml of GN12-3, dose of 1x105 conidia/ml of GN4) had an effect of over 70%. According to the results obtained G. fornicata larvae are susceptible to all B. bassiana isolates used in study. With these isolates, more detailed studies should be conducted in greenhouse and field conditions.

Keywords: Entomopathogenic fungi, Beauveria bassiana, effects, Gonioctena fornicata, larvae

Determination of the Natural Enemies of *Lyristes plebejus* (Scopoli, 1763) (Hemiptera: Cicadidae)

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Abstract: This study was conducted to determine the natural enemies of Lyristes plebejus (Scop.) between 2005-2008 in İzmir porvince of Turkey. In addition to observations in the nature, samples of plant infected by L. plebejus eggs were cultured in the climate chamber and checked periodically. As a result of study, a total of 11 insect sepcies belonging to four families of Hymenoptera order were identified. Parasitoids were Eupelmus cicadae Giraud, 1872 from the Eupelmidae family; Archirileya femorata (Boucek, 1952), A. inopinata Silvestri, 1920 from the Eurytomidae family, Homoporus fulviventris (Walker, 1835) from the Pteromalidae family. Predator species were Aphaenogaster simonellii Emery, 1894, Camponotus samius Forel, 1889, Cataglyphis nodus (Brullé, 1833), Pheidole pallidula (Nylander, 1849), Plagiolepis pygmaea (Latreille, 1798), Tetramorium chefketi Forel, 1911, T. semileave André, 1883 from the Formicidae family E. cicadae was recorded for the first time in Turkey and A. femorata, H. fulviventris, A. simonellii and C. samius were recorded for first time in İzmir province.

Keywords: Lyristes plebejus (Scop.), parasitoid, predator, İzmir

Effects of Different Potato Cultivars on Nutritional Indices of Colorado Potato Beetle, *Leptinotarsa decemlineata* (Coleoptera: Chrysomelidae)

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Abstract: The Colorado potato beetle, Leptinotarsa decemlineata (Coleoptera: Chrysomelidae) is a major pest of potato crops. The influence of eight potato cultivars including (Manitou, Ranomi, Natasha, Conestan, Laodin, Agria, Sante and 2532) on nutritional indices of L. decemlineata, (Coleoptera: Chrysomelidae) were determined at 25 ± 1° C, 65 ± 5% RH and a photoperiod of 16:8 (L:D) h. Nutritional indices of overall second to fourth larval instars indicated that, the Sante cultivar of potato is more susceptible among examined potato cultivars which provides nutritionally rich food and even small amount of this cultivar (3.37± 0.24 mg/mg/day) could successfully support maximum relative growth rate (RGR: 0.07±0.001 mg/mg/day) as evidenced by high value of efficiency of conversion of ingested food (ECI: 2.46±.25 %), efficiency conversion of digested food (ECD: 2.47±.25 %) and the lowest value of approximate digestibility (AD: 99.89±0.02 %). In conversely, Natasha and Manitou cultivars were recorded as partially resistant and the least nutritive for L. decemlineata, this is due to the fact that the lowest value of ECD, ECI and RGR were recorded. Clustering analysis based on nutritional indices parameters of L. decemlineata showed that, the Sante cultivar has been grouped as a separate cluster which supported our findings. The results indicate that, Natasha and Manitou cultivars could be a good candidate as some resistance cultivars in integrated pest management programs against L. decemlineata.

Keywords: Nutritional indices, Leptinotarsa decemlineata, Food consumption, Resistance, Biomass

Pre-Studies on Contact Toxicity of Some Local Diatomaceous Earths on Mealworm, *Tenebrio molitor* L. (Coleoptera:Tenebrionidae), Larvae

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Abstract: In this study, we evaluated the efficacy of two local diatomaceous earths (DE) (Turco020 and Turco000) against to larvae of Tenebrio molitor L. (Coleoptera: Tenebrionidae) at doses of 2g/m2 and 4g/m2 in 4,5 cm diameter glass bottles. To test the effect of each DE, 5 larvae were used taken from same colony and treated glass bottles with DE were incubated 25±1oC and 60±5% humidity under laboratory conditions. The experiment was set up in completely randomized block design with 4 replications and replicated 2 times. Mortalities were recorded on the 12nd, 24th, 36th, 48th and 60th hours of incubation periods. Both DEs had an effect more than 70% at dose of 4 g/m2 after 24 hours (Turco020: 74,12% and Turco000: 81,42%). Effectiveness increased with increase of incubation period. This effect reached over 94% at the end of 36th in same dose (Turco020: 94,72% and Turco000: 97,96%). In addition, Turco000 had a significant effect in dose of 2 g/m2 at the end of the same hour (80,84%). After 60 hours the least efficacy was observed in Turco020 at dose of 2 g/m2 (58,01%). The others doses of DEs produced more than 90% mortality at the end of the same hour (Turco020: 98,66% in dose of 4g/m2; Turco000: 100,00% in dose of 4g/m2 and 91,98% in dose of 2g/m2). These results show that DEs could be useful tool for the control of T. molitor.

Keywords: Native diatomaceous earth, effects, Tenebrio molitor, larvae

Effects of Some Plant Extracts on the Adults of *Tetranychus urticae* (Koch, 1836) (Acarina: Tetranychidae) in Invitro Conditions

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Abstract: Spider mites are polyphagous and harmful pests feeding on various kinds of economic crops. Damage of spider mites caused by feeding can lead to the destruction of the plant entirely. Their control is mainly based on acaricides and insecticide/acaricides. But, chemical of them can be failed because of their quick resistance develop features. Beside resistance problem, the accumulation of pesticides on water and soil cause environmental problems. Furthermore, the side effects of pesticides on beneficial organisms disrupt the natural balance. For these reasons, search for alternative control methods has become inevitable. Plant extracts are hopeful candidates because of their quick degradable chemical structure which overcome accumulation problems caused by chemicals. For this purpose, toxic effects of a number of water-based plant extracts obtained against Tetranychus urticae (Koch, 1836) (Acarina: Tetranychidae) were investigated in vitro. Toxic effects of plant extracts at different concentrations (1%, 3%, 6% and 12%) on T. urticae adults were investigated with the bioassay method. As a result, it was determined that the most effective extract against T. urticae adults was walnut with 97.22% mortality rate, whereas the lowest effect was chamomile with 14.14%. These results are promising for the development of harmless and effective biopesticides to the environment and useful for improving the further studies in this field

Keywords: Extracts, Two-Spotted Spider Mite, Natural Pesticide, Biopesticide

Antifeedant Effects of Two Nano-Capsuled Essential Oils Against Wheat Weevil, *Sitophilus granarius* (L.), (Coleoptera: Curcurlionidae)

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Abstract: Novel application methods such as nano-encapsulation of essential oils enhanced their effectiveness and improve the properties of natural insecticides. This work studied effects of essential oils from Cuminum cyminum (L.) and Lavandula angustifolia (Mill) and nanoparticles on nutritunal parameters of Sitophilus granarius (L.) Nano-capsules were prepared using emulsion-solvent evaporation technique and the polymer was polyethersulfone. To evaluate nutritional indices alteration, wheat flour discs were prepared at 27 ± 1 ° C and 65 ± 5% R. H. Each flour disc was treated with 0, 1, 5, 10, 15, and 20 ppm concentrations of each essential oil and nano-capsules. The results showed that the both essential oils and nanoparticles significantly reduced relative growth rate (RGR), relative consumption rate (RCR), and efficiency of conversion ingested food (ECI) in treated adults, In conversely, the feeding deterrence index (FDI) percent increased significantly as the concentration increased. The lowest RGR and ECI at 20 ppm were observed in C. cyminum nanoparticles and the RGR reduced from 0.037 ± 0.003 mg/mg/day in control to -0.176 ± 0.01 mg/mg/day and ECI percent reduced from 16.8 ± 0.99 to -336.31 ± 6.95. The pure C. cyminum at 20 ppm caused the lowest RCR in comparison to L. angustifolia. The highest FDI was reached to 86.13 ± 0.89 %, when S. granarius exposed to C. cyminum. Therefore, both the essential oils and nano-capsules had behavioural effect and encapsulation technique improved the post-ingestive toxicity on treated adults.

Keywords: Cuminum cyminum, Lavandula angustifolia, nutritional indices, nano-encapsulation, stored product pests

Influence of Different Doses of Ozone Gas Application at Egg-larva Parasitoid *Chelonus oculator* (Hymenoptera: Braconidae)

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Abstract: Many factors are used in biological control. One of these factors is parasitoids. Chelonus oculator is a native species in Turkey and can be used in the biological control of many Lepidopteran pests. However, like all organisms, compounds that exist in nature affect parasitoids. In this study, the effects of different doses of ozone on the parasitism behavior of C. oculator and the effectiveness of ozone on parasitized eggs were investigated. As a host, 0-24 hours old potato tuber moth (PTM) eggs were used. 10 host eggs were exposed to ozone of 1,3 and 5 ppm for 3, 4.5 and 6 min, respectively. After one day, the eggs were removed and 2-3 days old female parasitoid was released to each petri dishes for observing behavior for 5 minutes. In all three doses, no parasitism were observed. To observe the effect of ozone on the parasitized eggs, 10 PTM eggs were parasitized by one female parasitoids and put into plastic containers, then exposed to ozone at indicated doses. After 2 days, eggs were allowed to develop in a climate cabinet with 25 ± 1°C, 16: 8 light: dark light regime and 65 ± 1% humidity. Number of emerged PTM and parasitoids were recorded. According to the results, percentage of parasitoid were recorded as 25, 22.5 and 28.75; host adults were 8.75, 7.5 and 13.55, respectively. It could be thought that the results of this study are promising in terms of biological control.

Keywords: Ozone, Chelonus oculator, Phytorimaea operculella, behaviour

Efficacy of Some Acaricides Against Abamectin-Resistant *Tetranychus urticae* Population from Antalya, Turkey

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Abstract: A population of Tetranychus urticae Koch. (Acari: Tetranychidae) was collected from Kumluca (Antalya) in 2016 and reared on potted cowpea at 24 ± 1 ºC, photoperiod of 16:8 h L:D. The LC90 value of this greenhouse population for abamectin (284 mg active ingredient /l) was much higher than that of the recommended dose of this acaricide (4.5 mg a i /l). This abamectin-resistant T. urticae population was used in all bioassays. In this study the efficacy of bifenazate and spiromesifen against this population were investigated in laboratory leaf-dip bioassays. Furthermore, the efficacy of abamectin on adult females of the same population was determined at the recommended dose using both leaf-dip (=residue) and mites-dip (=contact +residue) bioassays. Bifenazate was assayed on adult females and spiromesifen was tested on larvae. The LC90 values for bifenazate and spiromesifen were 304, 457 mg a i /l, respectively. These values were higher than that of the recommended doses of these two acaricides (144 mg a i /l for bifenazate and 120 mg a i /l for spiromesifen). These results suggest that the efficacy of bifenazate and spiromesifen may be low in the collection site of this T. urticae population. Mortality values from leaf-dip and mites-dip methods were significantly different at the same dose of abamectin. Mortality rate was 41 % in leaf-dip bioassay, however, mortality was increased up to 93 % in mites-dip bioassay. These results with two methods suggest that data from several different bioassays should be considered for correct evaluation of pesticide effectiveness.

Keywords: Tetranychus urticae, acaricides, bioassays, efficacy, Antalya

Lethal Effects of Vacuum + Phosphine Combination on Eggs of Callosobruchus maculatus

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Abstract: Agricultural products are attacked heavily during storage by various pests such as insects, mites, rodents and microorganisms and significant crop losses can be experienced unless necessary control measures are taken. Phosphine fumigation is the main control measure worlwide against stored product pests. In this communication, in controlling Callosobruchus maculatus, a serious detrimental pest of pulse crops during storage, to shorten the exposure period efficacy of phosphine applications under low pressures were investigated. At 15oC, complete mortality in 48-72 and 72-96-h-old eggs were observed with the application of phosphine together with 50 mmHg or 100 mmHg. At 15oC and 20oC, 24-48-h-old eggs were more tolerant than the others. At 20oC and 25 oC, complete mortality were observed in 72-96 hours of eggs in the binary combinations of phosphine and vacuum at the levels of 1000 ppm PH3 + 50mmHg and 1000ppmPH3 + 100mmHg.

Keywords: Callosobruchus maculatus, egg, phosphine, vacuum

The Role of Different Concentrations of Salicylic Acid on Nematode Development and Function

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Abstract: Plant parasitic nematodes infect many flowering plants including agricultural crops that they cause decreasing plant growth even plant death. Root knot nematodes, which are important genus within the plant parasitic nematodes, cause significant damages to plant roots and caused galls. Meloidogyne incognita is one of the most common and damages nematode species in the world including in the Turkey. Most of the plant species do not have defence mechanism against the root knot nematodes. Salicylic acid induces the mechanism of the plant defence including the plant growth and development during the biotic stress conditions. The effect of the different concentration of Salicylic acid on root knot nematode infection has not been fully understood. For this aim, this study was aimed to determine the different concentration of Salicylic acid effects on nematode infection and plant development. Results revealed that the lowest galling index was determined as 3,6 in 1000 µM concentration whilst gall index was 5 in non-treated plant roots. The nematode reproduction rate was lowest in the concentration of 500 µM. In general, higher concentrations caused to increase the dry weight of the plant. It may conclude that placing the tomato roots in the Salicylic acid concentrations of 500-1000 µM decrease the nematode number and galling index.

Keywords: Salicylic acid, nematode, root -knot

Pre-Studies on Insecticidal Effect of Native Diatomaceous Earth against Potato Tuber Moth, [*Phthorimaea operculella* (Zeller) (Lepidoptera: Gelechiidae)], Larvae

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Abstract: The insecticidal effect of native diatomaceous earth (DE) Turco004, which has a particle size of 10-30µ, was tested against larvae of the Potato Tuber Moth, [Phthorimaea operculella (Zeller) (Lepidoptera: Gelechiidae)]. The bioassays were carried out at 25±1oC and 60±5% humidity with four concentrations of Turco004 (0.25, 0.5, 1 and 2g/m2) in 3.5 cm diameter plastic dishes. To test the effect of DE, P. operculella larvae were placed in plastic dishes (5 larvae per dish). The experiment was set up in completely randomized block design with 4 replications and replicated 2 times. Mortalities were recorded on the 4th, 8th, 12nd, 16th, 20th and 24th hours of incubation periods. Mortality has been observed from the 8th hour and increased with increase in incubation period. In the 8th hour, the highest effect was determined as 77, 74% at dose of 2g/m2. Doses of 0.5, 1 and 2g/m2 showed an effect of approximately 100% at the end of 16th hour (each 99,66%). It was followed by dose of 0.25g/m2 (88,39%). After 24 hours all doses of DE produced almost 100% mortality (99,66% at doses of 0,25 and 0.5g/m2, 100% at doses of 1 and 2g/m2). According to the results of obtained data P. operculella larvae are susceptible to all doses of Turco004 used in study. More detailed studies are required in order to be able to fully explain effective dose and duration.

Keywords: Native diaomaceous earth, effects, Phthorimaea operculella, larvae

A Recipe for Success: Microsatellite Marker Development Yields a Protocol for Detecting Thousand Cankers Disease in Walnut Tree Bark Samples

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Abstract: A complex disease known as Thousand Cankers Disease (TCD) involves Juglans and Pterocarya (Juglandaceae) spp., a fungal pathogen, Geosmithia morbida, and a primary vector, Pityophthorus juglandis, walnut twig beetle. The disease was reported first from dying J. nigra trees in the western United States (USA), and subsequently from the eastern USA and northern Italy. Identification of the disease is a challenge due to the absence of symptoms or signs on the bark surface of the host. Moreover, the signs of the disease might be misleading with those caused by other biotic and abiotic factors. As disease progresses, trees become weakened and can result in mortality within four to five years. To expedite disease confirmation, we developed a molecular protocol for the detection of G. morbida and P. juglandis using species-specific microsatellite DNA markers. A total of 1600 drill cores were captured from branch sections collected from three regions (n = 40 trees for each location): California - J. hindsii (heavy disease incidence); Tennessee-J. nigra (mild disease incidence); and outside the known TCD zone (Missouri-J. nigra, no record of the disease). California samples had the highest incidence of the TCD organisms (85%, 34/40). Tennessee had an intermediate occurance (42.5%, 17/40), whereas neither the fungus nor the beetle was detected in samples from Missouri. The rapid molecular protocol developed here has a high degree of sensitivity and specificity, and it significantly reduces sample-processing time, making the protocol a robust tool for rapid detection of TCD.

Keywords: Thousand Cankers Disease, molecular detection, microsatellite markers, Geosmithia morbida, Pityophthorus juglandis

Endophytic Bacteria Performance to Control of Cucumber Fusarium Wilt in Situ

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Abstract: Cucumber fusarium wilt caused by Fusarium oxysporumf.sp. cucumerinum is an important vascular disease throughout the world. In recent years, the use of endophytic bacteria (EB) for the biological control of pathogenic pathogens has attracted much attention. The purpose of this study was to determine the efficiency of endophytic bacterial strains in controlling the pathogen, and also to investigate the factors of vegetative and reproductive growth of cucumber in the growth chamber and greenhouse. To this end, 24 strains were selected based on their biocontrol and plant growth promotion capacities. The interaction of the strains with the pathogen was examined through the two methods of cucumber seed coating as well as the rhizospheric amendment in the first true leaf stage. 106 conidia of the pathogen were added per gram of the turf growth medium soil, where the cucumber plants at the 2-leaf stage were planted after partial root scratching. The experiments were performed based on random block design with 10 replications, and the means were compared using Duncan's test (P= 0.05). Based on the obtained results, 25% of the strains reduced the disease severity by 32%-62%, from which the strains 83 and 99 were chosen for the greenhouse tests because of their biological control and plant growth promotion potentials. The results of the greenhouse experiments indicated that the strains 99 and 83 not only reduced the disease severity by 49% and 52% but also increased the yields by 37% and 24%, respectively. These results demonstrated that the strains applied under greenhouse

Keywords: Cucumber, Biocontrol, Fusarium oxysporum f. sp. cucumerinum, sustainable agriculture, soil borne diseases

Effect of Nano Calcium Polysulfide Against Powdery Mildew (*Leveillula taurica*) on Pepper

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Abstract: Many organic and inorganic compounds are known to exhibit widespread anti-fungal activity with successful usage in agricultural applications. The action mechanism of sulfur agents is that sulfur interacts with organic substances and forms sulfides and pentatonic acid having anti-microbial and anti-parasitic activities. Nowadays elemental sulfur is widely used in plant growing as a fungicide and acaricide. In recent years great considerable attention has been paid to the synthesis methods of antifungal properties of nanoscale sulfur due to the development of nanotechnology. Micronized sulfur and sulfur nanoparticles have antifungal and inbition effects of sporulation against pathogenic fungi. In this study, the antifungal activities in vitro of nano calcium polysulfide were investigated against Leveillula taurica (Lev) Arn (anamorph: Oidopsis taurica) which caused powdery mildew on pepper. Different concentrations of nano calcium polysulfide (0,0.5, 1, 2%) were tested to Leveillula taurica. The study showed that all concentrations of nano calcium polysulfide (0, 0.5, 1, 2%) significantly reduced powdery mildew on pepper with more than 80% effectiveness. At the doses tested, no phytotoxic effect was detected.

Keywords: Nano calcium polysulfide, Leveillula taurica, pepper, biological control

Investigation Effect of Some Plant Activators Against Gray Mould and Black Mould (Botrytis cinerea and Aspergillus niger) on Grapes in Postharvest

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Abstract: Blue mould, caused by Penicillium expansum and black mould caused by Aspergillus niger are common postharvest fungal disease of grape. Nowadays, because of increasing concerns about chemical usage in food and environment, there is renewed interest in nonchemical approaches to postharvest control. This study was coducted to evaluate the efficacy of harpin protein and Lactobacillus acidophilus fermentation product and active ingredient with boscalid and azoxystrobin+metalaxyl M+fludioxonil fungicides in postharvest control of grey mould (B. cinerea) and black mould (A. niger). The conidial suspensions of the pathogens with a density of 1x105 spore/ml were applied to the wounds opened on the surface of the grapes with the help of micropipettes. Both of plant activators were sprayed on grape clusters one hour before pathogen inoculation. Fungicides were sprayed on grape clusters one hour after pathogen inoculation. Twenty grape clusters were used for each treatment had five replicates. Following the treatment, plastic boxes with treated grape clusters were covered with plastic lids to maintain high relative humidity in the 24 (± 1) ℃ for 15 days in climate room. According to the results of the research, harpin protein in the ratio of 65.00 %, L. acidophilus fermentation product in the ratio of 66.25 % and boscalid in the ratio of 47,50 % have been successful against B. cinerea. Harpin protein in the ratio of 71,43 %, L. acidophilus' s fermentation product in the ratio of 60.00 % and azoxystrobin+metalaxyl M+fludioxonil in the ratio of 89,75 % have been successful against A. niger. Keywords: Post harvest, grapes, Botrytis cinerea, Aspergillus niger, plant activators, control

Keywords: Post harvest, grapes, Botrytis cinerea, Aspergillus niger, plant activators, control

Effects of Arbuscular Mycorrhizal Fungus Glomus Mosseae on Population Dynamics of Some Criconematids in Green House Condition

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Abstract: There are several reports of increasing the performance of different plants by mycorrhizal fungi. By increasing the amount of root surface level, these fungi increase the absorption of the plant material and thus improve the performance of the plants. On the other hand, it has been argued that these fungi can reduce the damage to plant pathogens, including plant parasitic nematodes. Mesocriconema xenoplax, M. antipolitanum and Criconemides informis are identified in different regions in the world and many plants reported as host for this nematodes. In order to investigate the effect of Glomus mosseae as mycorrhizal fungus on the population dynamics of these nematodes on alfalfa, pure nematode populations were collected of the Dulamper area in Urmia and identified based on morphological and morphometrical characters. The initial population for nematodes and fungus were counted and considered some treatments; alfalfa with fungi, alfalfa with nematode, alfalfa with fungi and nematode and alfalfa without fungi and nematode in completely randomized plan in greenhouse conditions. Final population of nematodes and fungi and the root surface were determined after five mounts. The results showed that increasing the population of nematodes were visible in the presence of fungus. It seems that the fungus has increased the surface level of roots, which has created more feeding surface for nematode activity.

Keywords: criconematids, population dynamics, mycorrhiza, root

Effects of Plant Growth Promoting Rhizobacteria Against *Sclerotinia sclerotiorum, Fusarium oxysporum* and *Phytophthora infestans*

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Abstract: This study is aimed to observe the effects of plant growth promoting rhizobacteria (PGPR) against Sclerotinia sclerotiorum, Fusarium oxysporum and Phytophthora infestans under in vitro conditions. Eleven PGPR isolates were used in this study. PGPR isolates were isolated tomato production areas in Tokat. PGPR isolates were planting in form hoop to the most end part of the King's B medium in 90 mm diameter sterile plastic petri dish. Also, the 5 mm diameter mycelial disc of the pathogen were placed in center of the medium. As control, the mycelial disc of the pathogen were placed on medium without PGPR isolates. The petri dishes were incubated at 26°C. The experiment was ended when pathogens were coated on the control petri dishes. The mycelial growth diameters of pathogens in control and PGPR were measured. The experiment was repeated twice with three replication. The effects of PGPR were determined as percentage inhibition ration. Based on the results of the study, when PGPR isolates weren't effective on F. oxysporum (%15,94-25,04) and P. infestans (%15,59-58,84), they were effective on S. sclerotiorum in 88.79 to 100% growth inhibition. Of the tested PGPR Pseudomonas thivervalensis, P. monteilii and P. koreensis were inhibited in 88,59%, 67,48% and 62,84% mycelial growth of S. sclerotiorum, respectively. As a result, in this study researched in vitro activities of PGPR isolates, in vivo activities in greenhouse and field of hopeful isolates need to research.

Keywords: Plant Growth Promoting Rhizobacteria, PGPR, Plant pathogens, Biological control

Study on effect of some Trichoderma species in Biological Control of Potato Dry Rot Caused by *Fusarium sambucinum*

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Abstract: This study was carried out in two phases: In vitro and In vivo conditions. In first phase, the effect of thirteen Trichoderma isolates (T. asperellum ÖT 1; T.viride VG 18; T. harzianum TZ16, LO52; T. gamsii VG47; T. virens KB31; T. strigosum LO43, LO8; T. neokoningii A15; T. atroviride VG3; T. tomentosum VG2; T. İnhamatum KEB12; T. hamatum ÖT 16) were studied against three isolates of F. sambucinum (Fs2, Fs3 and Fs4) in vitro conditions in PDA medium by dual culture technique and incubation at 22 ± 24ºC. Results showed that the most effective isolates were T. virens KB31, T. gamsii VG47, T. hamatum ÖT16, T. asperellum ÖT1, T. harzianum LO52, T. atroviride VG3, respectively. In the second phase, Potato tubers, CV. Desire were wounded and inoculated with 500 µl of Trichoderma isolates suspensions (107 spores mL-1), 24 h prior inoculation by F. sambucinum and reductioa rate of dry rot in tubers recorded 5-6 weeks incubation at 20-24 ºC in comparison with control treatments. Results showed that tuber dry rot was also reduced by the antagonistic fungal isolates with different rates. The most effective isolates were T.viride VG18, T. asperellum ÖT1, T. harzianum TZ16, T. virens KB31, T. inhamatum KEB12, respectively.

Keywords: Potato, Dry rot, Fusarium sambucinum, Trichoderma spp. biological control

Use of Domestic Bacillus and Fluorescent Pseudomonas Isolates in Biological Control Against *Fusarum cerealis* (= *Fusarium crookwellense*) Causing Root and Root Rot of Turfgrass

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Abstract: In recent years, it was observed an increase in fungal diseases of grass fields due to increasing of parks, gardens as well as recreation areas in Turkey. Root and crown rot of turfgrass caused by Fusarium cerealis is one of these important diseases in different regions of Turkey. In this study 30 fungal isolates collected from different regions of Turkey during the year 2015. The pathogenecity test was carried out and one fungal isolate showed 92% pathogenecity rate on turfgrass used in this study. Then, the ability of five bacterial isolates belonged to Bacillus and fluorescent Pseudomonas collected from tomato and cucumber rhizospheres in biological control of F. cerealis was studied on turfgrass seed inoculation (108 cfu/ml) in pot cutures. Results showed that two bacterial isolates Stenotrophomonas rhizophila 88 bfp and Paenibacillus sp. 215 had the most inhibitory effects on F. cerealis with 85.25% and 75.77%, respectively.

Keywords: Turfgrass, Fusarium cerealis, biological control

Leaf Spot Diseases in Persimmon Orhcards in the Eastern Mediterranean Region of Turkey

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Abstract: Persimmon (Diospyros kaki) leaf spot disease causes leaf fall and early fruit maturity. This study was carried out in the persimmon growing areas of Adana, Hatay, Kahramanmaraş, Mersin and Osmaniye in the spring and summer of 2010 and 2011 with the aim of determining fungal disease factors causing persimmon leaf spot in the Eastern Mediterranean Region. Results of survey investigations from 10.500 trees of leaves revealed that alternaria sp., Aspergillus sp., Botryodiplodia sp., Cladosporium sp., Epicoccum sp., Fusarium sp., Mycospharella sp., Penicillium sp., ve Pestalotiopsis sp. were determined. Among these fungi, Mycospharella sp. was detected with the most and the prevalence was 40.60%. The disease was most commonly observed in the areas of persimmon grown in the Sumbas district of Osmaniye province. It was found in the orchards Kozan district of Adana province; Central and Tarsus districts of Mersin province with the rates of 32.50%, 30.40% and 29.00% respectively. Pathogenicity studies were carried out in the climatic rooms of Biological Control Research Institute with 2 years old persimmon seedlings. In the pathogenicity studies done with Mycosphaerella sp. isolate, leaf spots were observed on the leaves from the 15th day of inoculation and leaves drops were observed from the 30th day of inoculation. Mycosphaerella nawae is the main cause of Persimmon leaf spot disease.

Keywords: Mycosphaerella nawae, Diospyros kaki, Leaf Spot Disease, Eastern Mediterranean Region

Determination and Identifications of Major Fungal Disease Agents Isolated from Dried Peppers in the Province of Hatay in Turkey

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Abstract: To investigate contamination of dried red pepper with fungi, we obtained 30 different lots of dried red pepper samples from 19 local spice retailers in Hatay province of Turkey. The collected samples were incubated in moist chamber under laboratory conditions. A total of 40 different fungal colonies were recovered from dried pepper samples on nutrient media The fungal isolates were identified as morphogical and miscroscopical and the accurate species identification of fungal isolates were realized matrix assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS) analyses. In the samples, the different species of Aspergillus had the highest incidence. The next most frequent genera were Fusarium, alternaria, Penicillium, Cladosporium and Rhizopus. Relative occurrence of different fungal species disclosed ranges between 2.5 to 20.0%. The most encountered three fungal species were Aspergillus niger (20.0%) followed by Fusarium incarnatum (15.0%) and alternaria alternata (12.5%), respectively. The pathogenicity tests were performed with all isolated fungal isolates obtained from dried pepper under laboratory conditions. Fusarium incarnatum, alternaria alternata, Aspergillus niger were proved to be pathogenic as they caused similar symptoms observed on naturally infected pepper fruits. Although these fungal species are known as potentially mycotoxigenic fungi, neither dried pepper nor the fungi were evaluated for the presence of mycotoxins.

Keywords: Dry pepper, natural contamination, spoilage fungi, mycotoxins, MALDI-TOF MS

Verticillium Wilt Caused by *Verticillium dahliae* (Kleb.) in Olive with Emphasis on Symptomalogy and Genetic Diversity/Pathotypes

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Abstract: Abstract Olive (Olea Europaea L.) the oldest cultivated plants in the Oleaceae family is the only species of edible fruit. Olive, long-living and economic importance is beyond the legendary tree. Olive plantations and tree nurseries are economically and ecologically important agricultural sectors. Verticillium wilt in olive is considered the most serious biotic threat to this crop. This disease has been detected in almost all regions where olive is cultivated, causing serious concern to growers, nursery companies and the olive-oil industry. Two syndromes have traditionally been distinguished in olive: namely, an acute form ('apoplexy') and a chronic form ('slow decline'). It is characterized by rapid dieback of shoots and branches, eventually leading to death of the entire tree in a relatively short time which occurs mainly in late winter to early spring Symptoms of slow decline appear in spring, develop slowly towards early summer characterized by necrosis of inflorescences. Olive trees affected by slow decline, the chronic form, may recover, leading to a progressive reduction in disease incidence over several years. V. dahliae isolates infecting olive can be classified as defoliating (D) and non-defoliating (ND) pathotypes according to their ability to defoliate the plant. While infections by the D pathotype can be lethal to the plant, olive plants infected with the ND pathotype can recover from symptoms. D pathotype may have originated independently in different geographic locations and multiple times and presumably from different hosts. Another way to characterize genetic diversity in fungi is to classify individual isolates in vegetative compatibility

Keywords: Verticillium dahliae, Olea Europaea, VCG, Pathotype

Pathotype of *Zymoseptoria tritci* (Desm. Quaedvlieg & Crous) Isolates Collected from Central Antolia Region in Turkey

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Abstract: Abstract: Zymoseptoria tritici (formerly known as Mycosphaerella graminicola) is that casual agent of Septoria Leaf Blight (SLB) currently the most important foliar diseases of wheat in many region of the world. Z. tritici isolates were obtained from field survey in Ankara, Konya, Eskişehir and Kırşehir provinces of Central Anatolia which is the most important wheat growing areas in Turkey during the 2013 and 2014. A total of 61 single spore isolates were obtained from single spore isolatation. Pathotype of the isolates were identified using 12 wheat genotypes with different resistance genes to SLB (SLB 1 –SLB12). A total of 22 pathotypes were obtained to determine the virulence of the isolates. The most common pathotype has been the 1- pathotype showing Avirulent reaction in all genotypes. The highest virulance K-5 was from Konya province and took place in patotype 22. The genotypes including Stb-6 and 12 resistance genes with the highest avirulant reaction had the lowest diseases severity and Stb-7,10 was shown to have the highest virulance reaction. These results revealed which genes should be (Stb-6, 12) and not be (Stb-7, 10) carried by the material that is used against to Septoria Leaf Blight.

Keywords: Wheat, Zymoseptoria tritici, Pathotype, Differential Set

Antibacterial Effect of Twenty-Eight Plant Extracts on Pectobacterium Betavasculorum; The Causal Agent of Bacterial Vascular Wilt And Necrosis of Sugar Beet in Iran

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Abstract: It has been proved that various plants extracts have bactericidal effects, and most of these plants contain many active compounds. In this study in order to control soft rot and vascular wilt disease of sugar beet caused by Pectobacterium betavasculorum in Iran, twenty-eight plant extracts of Pimpinella anisum, Rosa hybrida, Lactuca serriola L, Brassica oleraceae, Eucalyptus globulus, Syzygium aromaticum, Rosmarinus officinalis, Delphinium zalil Aitch, Coriandrum sativum, Chaenomeles japonica, Nerium oleander, Robinia pseudoacacia, Petroselinum sativum, Elaeagnus angustifolia, Ricinus communis and thirteen other plant extracts with three different concentrations (0.01%, 0.1% and 100% (v/v)) were evaluated under laboratory and greenhouse conditions. Isolate C3 of Pectobacterium betavasculorum was used in this study. In laboratory assays using agar diffusion method, among 3 different concentrations of plant extracts, Rosa hybrida extract with 7.25 mm inhibition zone exhibited the most antibacterial activity followed by Lactuca serriola L, Brassica oleraceae, Eucalyptus globulus, Syzygium aromaticum and Rosmarinus officinalis. The efficacy of plant extracts from other plants was insignificant in the in vitro test. The efficacy of effective plant extracts on seed germination and seedling growth in vivo also were tested. The seed germination was inhibited at the pure concentrations used. Plant extracts of Rosa hybrida, Brassica oleraceae, Lactuca serriola, Rosmarinus officinalis, Eucalyptus globulus and Syzygium aromaticum in 0.1% concentration had no inhibition on seed germination and could improve seedling growth.

Keywords: Pectobacterium, inhibition zone, seed germination

Weed Control with Hot Water in Non Agricultural Areas

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Abstract: Non-chemical weed control methods become prominent due to the increased awareness about the health effects of herbicides. This makes non-chemical weed control more effective than herbicide spraying for total vegetation management of non-agricultural areas. Weed control by means of hot water causes less wear on the surface in contrast to mechanical weeders among non-chemical weeding techniques, As a termal weed control method, hot water also eliminates the fire hazard associated with flaming and penetrates better into the vegetation than convective heat such as hot flames and hot air. Thermal weed control is a non-selective postemergent, which is a total vegetation control based on transferring heat energy to the plant. It is known that solar collectors can reach over 100 ºC. Applying this one of nature's best energy carriers, water at low pressure to a heat-insulated tank can provide sufficient level of weed control and can prevent emission of carbon dioxide to avoid extreme climate change. Some comparative studies have shown that the hot water weed control was not the cheapest method when compared with the use of herbicides. However, if water could be heated by solar collectors could be more effective, cheaper and environmentally-friendly method in controling weeds. The purpose of such treatment to ensure greater protection of the environment, human and animal health.

Keywords: Weed control, Solar energy, Hot water, Non-agricultural areas

Investigation of the Effectiveness of Some Plant Extract Against Potato Tuber Moth (*Phthorimae opreculella*) (Zeller) (Lepidoptera:Gelechiidae)

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Abstract: Potato tuber moth (Phthorimae opreculella) (Zeller) (Lepidoptera: Gelechiidae) is important pest and the most common, is widely distributed in the world. It is mostly nocturnal and attracted to light. PTM attacks solanaceous crops with potato being favored and quarantine pest. Infested potato tubers become completely unmarketable. Chemical control of this PTM is a costly input that contaminated the environment, increase resistance to insecticides and can also cause health hazards for humans. There is some research has been conducted on the effectiveness of plant products against insect stored potato. Experiment has been carried out at 2018, in laboratory at GOP Unniversity Department, Plant Protection, to evaluate the inscticidal effect of plant extract of Sage (Salvia officinalis L.) and Lantana (Lantana camara L.) against PTM egg at different concentrations,(%1, %3, %5, and %10). As a result of the study, it was determined that L. camara was the most effective plant. After the for days on insecticidal effect of %5 concentration of sage and lantana were found as 25% and 50% respectively. The insecticidal effect and of the seven days were showed 5% dose of extract of sage and lantana inhibited eggs hatching of PTM 62.5% and 87.5%.

Keywords: Phthorimae opreculella, lantana, sage, egg, extract

Determination of Fungi Species and Their Potential for Biological Control of Weed Species of Vineyards in Diyarbakır, Turkey

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Abstract: This study was performed to determine the fungi species on weed species of vineyards in Diyarbakır province, Turkey. Surveys were conducted during vineyard growing season, 2016-17. A total 78 vineyards were surveyed, and 25 different fungi species were observed on 24 different weed species. The obserevd fungi species were; Blumeria graminis (DC.) Speer, Erysiphe cichoracearum DC. ex Merat, E. convolvuli DC., E. cruciferarum Opiz Ex L. Junell, Melampsora gelmii Bress., Peronospora cephalariae Vincens, P. lallemantiae Kolymb., Podosphaera dipsacacearum (Tul. & C. Tul.) U. Braun & S. Takam., Schrad., Puccinia aristolochiae (DC.) Winnt., P. bromina Eriks, P. calcitrapae DC., P. cirsii Lasch., P. crepidicola Syd., P. falcaria (Pers.) Fuckel, P. malvacearum Mont., P. montana Fuckel, Puccinia sp., P. xanthii Schwein, Pyrenophora chaetomioides Speg., Sphacelotheca reiliana (J.G. Kühn) G.P. Clinton, Sphaerotheca dipsacearum (Tul & Tul) Junell., Sphaerotheca ferruginea (Schlecht: Fr.) Junell, Sporisorium cruentum (J.G. Kühn) Vánky, Uromyces haussknechtii Tranz. and Ustilago cynodontis (Pass.). Three microfungi species viz., P. bromina, P. calcitrapae and P. chaetomioides were detected on host species i.e., Bromus sterilis, Serratula cerinthifolia and Avena sterilis. These three fungi were most commonly observed in the vineyards. The observed fungi species could be potential biological control agent of respective weed species; however, thorough investigations are needed in this regard.

Keywords: Fungi, biological control, vineyards, weed, Diyarbakir

Effects of Meteorological Factors on Incidence of Rice Blast Disease and Sporulation of *Pyricularia oryzae*

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Abstract: Pyricularia oryzae Cav., the causal agent of rice blast, is one of the most important diseases in rice growing areas due to its spreading over large areas under favorable environmental conditions and its destructive effect. The climatic factors occurring during the production stage significantly affect the host-parasite relationships. In this study, effects of air temperature (°C), relative humidity (%), amount of precipitation (mm), duration of daily leaf wetness (hour) and speed of wind (m/s) on incidence of rice blast disease and sporulation of causal agent Pyricularia oryzae, which is a problem in paddy field in Çukurova region, were investigated in 2011-2012. The average climatic data in 2011 and 2012 were as follows; 27°C and 27.7 °C; 77.6% and 67.6%; 31 mm and 28 mm; 14.1 hours / day and 13.5 hour/day; 0.8 m/s and 1.2 m/s, respectively. In the same years, the number of fungus spores and disease severity (%) were 21 spores and 24 spores; 10.8% and 17.% respectively. In two year field studies; it has been determined that duration of leaf wetness is important for the formation of the disease and relative humidity is important for spores formation and spreading.

Keywords: Pyricularia oryzae, Volumetric spore trap, Climatic parameters, Sporulation

Oral Presentation

SOIL SCIENCE AND PLANT NUTRITION



I. International Agricultural Science Congress
09-12 May 2018
Van/Turkey

A Research of Walnut Growing in Bingöl-Sarıçicek Region

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Abstract: Juglans regia is a natural plant of a wide area including the countries beyond the Himalayan mountains from the east of the Carpathian mountains to the east of Eastern Europe, Turkey, Iraq and Iran. Turkey, which is one of the countries of Juglans regia, is in third place in world walnut production after China and USA with its potential and has a share of 7.93 % in world walnut production with 177.000 tons production value. Walnut (*Juglans regia*) is a species that can adapt to different climatic conditions. The need for cooling ranges from 400 to 1800 hours, and it also grows economically in areas with an altitude of 1700 m. Economically meaningful production in fruit growing can be achieved by the establishment of enclosed gardens. The most important issues in gardening is to consider the phenological, pomological and plant characteristics of the varieties or types to be used and to choose the varieties or types in this direction. For this purpose, walnut (*Juglans regia*) seedlings growing in the recent years in Bingöl / Sarıçicek region ecological conditions have examined the growth rates in the region. The results obtained from Bingöl / Sarıçiçek region ecological and soil conditions in terms of walnut (*Juglans regis*) growing and fertilizing in terms of the inclusion of the proposal are important. The result obtained from this study that will shed light on the walnut (*Juglans regia*) seedlings growing and breeding which will be done in Bingöl province and near province that located near Bingol.

Keywords: Walnut Growing, Soil condition, Sarıçiçek Region, Growth, Environment

Plant Nutrient Management in Sustainable Agriculture

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Abstract: The challenge to increase food production in an economically applicable way while managing food systems in the ecological perspective is the main aim of sustainable agriculture. Although there are numerous descriptions of sustainable agriculture, most put emphasize on an intense need to meet demands for production uncompromising the natural resources upon which agriculture depends. Although there are several definitions of sustainability, in general, there is a recognition upon common thought for the attributions that characterize it. Its multi-dimensionality is one of the most important characteristics. It means that sustainability does not cover only one dimension (e.g. social, economical, or environmental) in isolation, but rather all of them at the same time. Grouping the social, economical or environmental dimensions as capital in five categories, one effective way of interpretation the multiplicity of resources involved in the functioning of agriculture: Natural capital, social capital, human capital, physical capital, and financial capital. According to effect of agricultural systems on gains described above, their sustainability of can be determined. Agricultural applications and technologies that guide to a flexible growth in natural, social, human, physical, or financial capital can be approved to be sustainable. 4R Nutrient Stewardship is a scientific nutrient management approach accepted broadly. Since application of the 4R Nutrient Stewardship might have diversified positive effects on the assets mentioned above, it is accepted as an essential tool in the development of sustainable production systems.

Keywords: Sustainable agriculture, Nutrient Stewardship, 4Rs

Effect of Selenium Application on Nutrients Content of Grain Maize in Turkey

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Abstract: Selenium is an essential element for both humans and animals, and must be taken with nutrients in sufficient amount. Concentration of selenium in the food for both humans and animals is desired between 100 and 1000 µg kg^{-1}. This study was conducted as field experiments on the Harran Plateau to investigate: the effect of soil applications in form of selenite on maize grain yield and Se content; the efficiency of soil application; the relationship between Se content in maize grain and Se application rate; and the effect of Se fertilisers on macronutrients and other micronutrients in grain maize. In this study, DKC 5783 F1, which is grown intensively in the area as a grain maize variety and sodium selenite were used as selenium source with eight levels (0-5-10-15-25-50-75-100 g Se ha^{-1}). Sodium selenite was applied to the soil in liquid form before sowing. Sodium selenite application didn't affect grain yield, as well as the total content of Ca, Mg, S, Zn, B, Mo and Se of grain, but it affected N, P, K, Fe, Cu and Mn content, statistically.

Keywords: Maize, Selenium, Soil application, Sodium Selenite, Yield

Determination of Soil-to-Plant and Plant-to-Milk Transfer Factors of Heavy Metals in Soil-Plant-Milk Cycle

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Abstract: It is called toxic metals in the metals which are harmful to it when it enters the living organism. Toxic metals enter living organisms from air, water and especially from foods taken. Toxic metals are among the most harmful environmental pollutants in our time. Elements found in rocks, soil and water go to plant metabolism through the roots of plants. Besides, the heavy metals in the air are held by the leaves of the plants when they come along with the precipitation. During the grazing, dairy cows also take up toxic metals on the soil into the body. With the consumption of plants by animals, these toxic elements indirectly enter the human body. The transport of pollutants containing heavy metals in the soil-plant system is assessed by the soil-to-plant concentration ratio expressed as transfer factor (TF). This ratio defines the amount of possible elements from soil to vegetation and is used to assess the transport of elements throughout the food chain. In this study, the concentrations of heavy metals in the samples taken along the food chain (water-soil-plant-milk) and soil-to-plant and plant-to-milk transfer factors depending on these concentrations determined. The water, soil, plants and milk samples in different farms were taken in three different seasons and were prepared to analyse in the laboratory. Heavy metal measurements in all samples were made on the ICP-OES instrument. The levels of chemical pollution were found below the limit values and it was determined that transport of animal products by nutrition was weak.

Keywords: Plant, Soil, Milk, Heavy metal, Transfer factor

Tomato Response to Different Applications of Boron of Antalya-Manavgat (Çakış) District

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Abstract: Fruit shape, yield and shelf life of tomato were affected by boron deficiency. Because of the intensive agriculture, the incidence of boron (B) toxicity and deficiency have risen in tomato growing in greenhouse. This study was carried out to determine different boron application shapes. For this purpose, Etidot-67 (20.8 %) was applied with soil (0 and 4 kg B/ha), foliar (0.025B %) soil (4 kg B/ha)+foliar (0.025B %). Experiment was conducted by a factorial combination with 5 replications in Manavgat-Çakış district of Antalya province. Boron application did not affect yield and quality of tomato.

Keywords: Tomato, Boron, Yield, Quality

Plant Nitrogen and Yield Relationships in Corn Grown in Cukurova Region

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Abstract: This research was conducted to evaluate the influence of nitrogen fertilizers applied by the farmers on plant nitrogen and yield of first crop corn grown as a major crop in Cukurova region between 2007-2009. Soil and plant samples were collected from different farmers' field, analyzed, and the results were statistically evaluated. Nitrogen concentrations in shoots and grain were measured as 0.7-1.1% and 1.3-1.5%, respectively. Nitrogen uptakes by shoots and grain were determined as 227 - 307 and 156 - 202 kg N ha^{-1}, respectively; whereas 13.739–13.994 and 10.450–12.015 kg ha^{-1} grain and shoots dry matter were obtained, respectively. Statistical analysis between yield and nitrogen uptakes for grain yield and shoots were done; there were positive relationships between the uptake and grain yield values.

Keywords: Corn, N concentration, Shoots, Grain, Cukurova

Effects of Maternal Antioxidant Feeding on Feed Consumption and Hatchability in Japanese Quails

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Abstract: Plant Growth Promoting Bacteria (PGPB) play an important role in agricultural systems, and contain broad range of bacterial genera. Therefore, in this study seeds of wheat (*Triticum aestivum* L.) were inoculated with 18 rhizobacteria strains belonging to Azotobacter chroococcum (14SPI, 44SP-2, 16SP-2, 14SP2-1), Pseudomonas sp. (24A-1, 34A-2, 34SPIII, 35SP-2), Agrobacterium sp. (14A-4, 22SP-1), Rhizobium sp. (12A-3), Sphingomonas sp. (37SP), Stenotrophomonas sp. (16SP7-2), Citrobacter sp. (44A-4S), Achromobacter sp. (14SPIII), Klebsiella oxytoca (4A-1), Beijerinckia sp. (2SP-5) and 36A-2L isolate, to determine the effects on growth and yield of spring wheat under greenhouse condition. Totally, 21 treatments were used in this study, 18 carrier based PGPB treatments along with one negative and two positive controls. The negative control was included carrier without any bacteria and the positive controls were contained urea equal to 50% (B0N50) and 100% (B0N100) of fertilizer recommendation. The results showed that inoculation treatments had no significant effect on some plant parameters (e.g., chlorophyll index, spike length) compared with the un-inoculated control, in contrast, wheat inoculation with isolates revealed a significant difference ($P<0.01$) in other parameters such as seed weight, seed number, total dry weight and N uptake of grain. B0N100 and B0N50, Agrobacterium sp. 14A-4, significantly enhanced the total dry weight (shoot, root, spike and leave) by 35%, 32.4% and 28.5% as compared to the control respectively. These trends were observed in seed number and seed weight, too. Highest content of grain N uptake and Zn uptake were in A. chroococcum 14SPI, content of P was in A. chroococcum

Keywords: PGPB, Nitrogen uptake, Azotobacter, Grain yield

The Effects of Mycorrhiza and Biochar Application on Dehydrogenase Enzyme Activity in Soils Grown in Pak Choi (*Brassica Rapa* L. *subsp. Chinensis* L.)

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Abstract: This Experiment was conducted to assess the effects of mycorrhiza and mycorrhiza+biochar applications on soil biological properties of a clay textured soil grown with pak choi (*Brassica rapa* L. *subsp. Chinensis* L.) plants. Experiment was designed as three replications according to randomized block experimental design. Seedlings became 3 to 4 true leaves (20-21 days for pak choi after seed sowing) they were planted to places in cold greenhouse with 10×10 cm intervals and 10 plants in each parcel. Beginning of the experiment, 300 g/m^2 parcel biochar applied to the each parcel one month before seedling planting and at the same time increasing mycorrhiza doses were applied to the parcels undergoing biochar application which doses (I. dose: 0 mLplant^{-1}, II. dose: 15 mLplant^{-1}, III. dose: 20 mLplant^{-1}, IV. dose: 30 mLplant^{-1} and V. dose: 40 mLplant^{-1}). As per the results, significant increases in soil biological properties were determined with increasing mycorrhiza and mycorrhiza+biochar applications. Biochar+mycorrhiza applications the highest dehydrogenease activity, CO_2 production and microbial biomass-C were determined 66,7 µg TPF gkt^{-1}, 16.34 mg CO_2/100 g-1gün-1; 3.7 mg biomass-C 100 gkt^{-1} respectively. Mycorrhiza applications the highest dehydrogenease activity, CO_2 production and microbial biomass-C were determined 75.64 µg TPF gkt^{-1}, 26.78 mg CO_2/100 g^{-1}gün^{-1}; 3.24 mg biomass-C 100 gkt^{-1} respectively. The effect increasing mycorrhiza and mycorrhiza+biochar applications were determined on soil CO_2 production, microbial biomass- C for I. dose and dehydrogenase enzyme activity for IV dose, respectively. Mycorrhiza applications have increased the biological properties of soils.

Keywords: Dehydrogenase Activity, Biochar, Mycorrhiza, Pak Choi (*Brassica rapa* L. *subsp. Chinensis* L.)

Importance of Remobilization in Fruit Nutrition and Fertilization

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Abstract: Mineral nutrients are translocated from leaves back to main branch, trunk and roots during senescence in deciduous plants and before dormant period in evergreen plants. The process defined as remobilization. In this context, roots serve as reservoir organs. Mineral elements and nitrogenous compounds are translocated from roots to the branch, leaves and fruits at the beginning of bud break/spring period. This process contribute to flower viability, fruit set and nutrient requirement of spring flushes. Researches revealed that 70-80 % N requirement of spring flushes in fruits can be provided by remobilization process. Remobilization differently take places in evergreen and deciduous plants. It is reported that through remobilization, the enrichment of fruit buds particularly with Ca plays an important role in prevention/reduction of physiological disorders related to Ca deficiency.

Keywords: Remobilization, fruit, nutrient elements, fertilization, nutrition

Plant Nutrition Potential and Soil Quality of Tomato Greenhouses of Antalya-Kumluca District

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Abstract: Kumluca is an important greenhouse production area with 43.955 decare glass and plastic greenhouse. This study was carried out in order to determine the soil characteristics of the greenhouses and the nutritional status of the plants grown in the Kumluca district of Antalya province. In the study, only 45 samples of soil and leaf material were used to represent the region from tomato greenhouses during the 2013-2014 production season. In soil samples; pH, EC,% lime, texture,% organic matter, available P, Fe, Mn, Zn, Cu B and exchangeable K, Ca and Mg were analyzed and the analysis results were evaluated. According to the results of the soil analysis, the pH of the soil samples was slightly alkaline and alkaline. 24.5% and 42% of soil samples was medium and slightly salty, respectively. 88.6 % of soil samples was medium and highly calcereous; 56.8% of soil samples enough and 36.4% medium in organic matter content. Phosphorus, calcium and magnesium concentrations were high for all of the samples. 17.8 % and 52.3 % of soil samples were medium and high in K concentrations. Micro elements concentration of samples 75 % Cu, 81.8 % Zn, 93.2 % Mn and 84.1 % B were enough and high. In leaf samples N 88.9, %, P 95.6 %, K 93.3 %, Ca 82.2 and Mg 93.3 % are sufficient. Mn of 97.8 %, Fe of 91.1 %, Cu of 91.1 %; B of 26.7 % and Zn of 35.6 % were found to be in the adequate class.

Keywords: Soil fertility, Plant nutrition

The Effect of Liming on Cadmium Uptake Reduction by Durum Wheat Varieties Grown in Acidic Reaction Soil

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Abstract: Interaction of lime ($CaCO_3$) and cadmium (Cd) on growth, Cd accumulation in fifteen durum wheat varieties in without lime (control) and lime application were studied in greenhouse experiment. The study carried out with the 5 and 10 mg Cd kg^{-1} applications without lime 0 g $CaCO_3$ kg^{-1} and with lime 5.36 g $CaCO_3$ kg^{-1}. The responses of the cereals varieties to Cd were determined without lime and with lime applications. The Cd accumulations of the varieties at increasing Cd doses were determined nil lime and with lime conditions. While the Cd application in the increasing doses increased significantly ($P<0.01$) Cd content of shoot and genotypic differences in all cereals were found significant, statistically. Without lime and Cd 5 applications, the difference between the lowest and highest Cd concentrations in all varieties were found to be 4.5 fold. Eminbey variety were lowest 3.83 Cd concentration in shoot and highest 9.46 mg kg^{-1} Cd concentration Imren variety. With lime and Cd 5 application, Eminbey variety were found to decreased 61.6 % Cd concentration from 3.83 to 2.36 and Imren variety was also to declined 68% Cd concentration in shoot. In without lime and Cd 10 applications, the difference between the lowest and highest Cd concentrations in all varieties were found to be 2.15 fold. In lime 5.36 and Cd 10 application in Imren variety, shoot Cd concentration was found to decreased 62.2 % from 25.90 to 9.78. Lime addition caused remarkable reductions in Cd concentration shoot of all durum wheat varieties.

Keywords: Durum Wheat, Cadmium, Lime

Effects of Humic Acid and Leonardit Applications on Structural Developments of Soil

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Abstract: Soil structural development is under the influence of many internal and external factors. One of the most important factors positively affecting on aggregate formation and stability is to apply organic-sourced materials. The objective of this study was to determine the effects of humic acid and leonardite applications at different doses on structural developments of soil initially poor-structured. A composite soil sample taken from Çukurca region of Konya Karapınar district under severe wind erosion problem was treated with 2 different doses of humic acid and leonardite on w/w basis and incubated for 45 days. Changes in structured parameters were determined on the samples taken at 15th, 30th and 45th days of incubation period. The results indicated that humic acid and leonardite applications reduced the proportion of soil particles <0.42 mm in diameter but increased the proportion of soil particles >0.84 mm. In addition, humic acid and leonardite applications increased mechanical stability, aggregate stability and organic matter content significantly ($p < 0.05$).

Keywords: Structure, Mechanical stability, Aggregate stability, Humic acid, Leonardite

Changes in Soil Physical Quality Induced by the Reduction of Soil Tillage in a Long-term Experiment in Eastern Mediterranean Region

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Abstract: Conservational tillage is a proven management option to improve soil functions, but its impact on soil physical quality (SPQ) is uncertain. This study was investigated to determine the effects of long-term (2006-2016) two conventional (CT-1 and CT-2), three reduced (RT-1, RT-2 and RT-3), no-till or zero tillage (NT) and strategic tillage on physical quality of soils representing the Vertisols in Çukurova Region, Turkey. No-till plots were divided into two sections, and half was plowed by a moldboard plow in November, 2015, and this practice was defined as strategic tillage (ST). Disturbed and undisturbed soil samplings from 0-10, 10-20 and 20-30 cm depths were carried out in November 2016. Soil samples were analyzed for the indicators of aggregate stability (AS), bulk density (BD), available water content (AWC) and water filled pore space (WFPS). Penetration resistance were also measured in sampling locations. The values were converted to unitless scores by using nonlinear scoring curves within the Soil Management Assessment Framework (SMAF) and Cornell Soil Health. Tillage, depth and tillage x depth interaction had significant effect on SPQ. The SPQ under ST was significantly higher compared the rest of the tillage systems at three soil depths. The SPQ values under RT-3 and NT systems were significantly reduced with depth. The lowest SPQ was %45 (CT-1), %43 (RT-2) and %39 (NT) in 0-10, 10-20 and 20-30 cm depths, respectively. Strategic tillage is a viable option to improve the SPQ of soils under long-term no-till management.

Keywords: Soil quality, SMAF, Scoring, Quality index, Strategic tillage

Acknowledgements: This study was supported by TUBITAK (TOVAG 115O353).

An Evaluation of Drainage Waters Regarding the Availability for Agricultural Irrigation in Igdir

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Abstract: The mineral contents of waters used in irrigation in arid and semi-arid areas have great importance for both environment and agriculture. Iğdır, which has annual rainfall of 260 mm and an evaporation of 1115 mm has an arid climate and crop production in this region is almost impossible without irrigation. However, current increase in the production of crops such as corn and alfalfa, has led to both water shortage in the region, and higher use of water by the farmers for irrigation in the drainage channels, especially in the eastern part of the plain. The purpose of this study is to evaluate the Na^{+}, Ca^{++}, Mg^{++}, K^{+}, $SO4^{--}$ and Cl^{-} contents. For this purpose, 19 sampling points were determined from the main drainage channels at a distance of 80 km in the east-west direction of the Igdir plain and water samples were taken. Ion contents of water samples taken in final weeks of July, August and September were determined by Ion Chromatography. According to the results, contents of Na^{+}, Ca^{++}, Mg^{++}, K^{+}, $SO4^{--}$ and Cl^{-} in waters were 16.3-435.8 ppm, 19.4-82.6 ppm, 7.4-90.9 ppm, 2.7-14.5 ppm, 1-179.7 ppm and 30.6-423.9 ppm, respectively. In traditional flood irrigation, these values might deteriorate the situation for Iğdır Plain, where the production is already limited due to salinity affecting near the half of the lands. It is necessary to take immediate precautions to solve the problem of irrigation water and raise the awareness of the farmers about this issue.

Keywords: Soil salinity, Irrigation, Water quality, Salt ions

Effects of Gully Head Slop and Drainage Basin Area in Development of Gully Erosion (A Case Study: Alimardan Watershed-West Azerbaijan-Iran)

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Abstract: Gully erosion is a widespread environmental problem in Iran. One of the main causes of soil loss is gully erosion in Alimardan region. There has been no comprehensive study of the topographic threshold conditions of gully initiation in this region. The aim of this research is to investigate topographic threshold conditions for initiation of gully erosion. For this reason first, 15 gullies were selected in the study area. Gullies drainage-basins were delimited using aerial photographs (1:40000), topographic maps (1:25000) and global positioning system (GPS). Gullies drainage-basins areas (A, m^2) and mean slope of gullies drainage-basins (S, %) were determined by Arc-GIS 9.3 software using topographic maps. Results showed that in Alimardan region surface runoff processes are responsible for gully initiation. However in this region there were direct relation (S=175.76 A- 0.212) between mean slope of gullies drainage-basins and gullies drainage-basins areas (S-A). Therefore it can be implied that exponent in S-A relation is controlled by surface runoff erosion process

Keywords: Gully head, Surface runoff, Topographic threshold

Soil Carbon Storage Potential as Affected by Long Term Conventional and Conservational Tillage Practices

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Abstract: Sequestration of carbon in agricultural fields is one of the major agricultural strategies to reduce increased atmospheric carbon concentration and improve sustainability of agricultural production. Total loss of soil organic carbon (SOC) with the intensive agricultural activities is estimated 60 to 75% of SOC in virgin soils. The objective of this study was to determine the long-term tillage effects on SOC storage of a Typic Haploxerert soil in Adana, Turkey. Long term tillage experiment was initiated in 2006 with six different tillage systems which were moldboard plowing stubbles retained (CT-1), moldboard plowing stubbles burned (CT-2), heavy tandem disc harrowing (RT-1), rotary tilling (RT-2), heavy tandem disc harrowing, direct planting in second crop (RT-3) and no-till (NT). In November 2015, half of no-till plots were divided into two sections, and half was plowed by a moldboard plow that was defined as ST. Soil sampling from each experimental plot was carried out in November 2016 at upper 10 cm depth following the harvest of soybean. The results indicated that long term tillage systems had significant effects ($P<0.01$) on SOC storage potential of soils. The total SOC stock after 10 years under NT treatment (18203 kg C ha^{-1}) was 47 and 39% higher than conventionally tilled CT-1 (9588 kg C ha^{-1}) and CT-2 (11091 kg C ha^{-1}) treatments. The results revealed the conservational agricultural practices sequestered significant amount of C under Mediterranean climate.

Keywords: Tillage, C storage, C sequestration, No-till

Acknowledgements: This study was supported by TUBITAK (TOVAG 115O353).

Soil Penetration Resistance as Related to Water Content and Bulk Density in Semi-Arid and Semi-Humid Grasslands

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Abstract: Soil penetration resistance (PR) is strongly correlated with water content and bulk density. The PR can be used as an indicator of limiting factor for plant root development. The objectives of this study were to determine the relationships between soil penetration resistance (PR) and physical soil properties of bulk density, filed capacity, wilting point and plant available water content on a semi-arid and semi-humid grassland. Penetration resistance (PR) was measured at 0-10 cm soil depth and soil samples were taken to determine bulk density and soil water content at the PR measurements. The field measured PR-values were adjusted to soil water content at the measurements. The data were analyzed by ANOVA test. The results showed that influenced the PR and soil water content were significantly different between the grasslands ($p<0.05$) and soil bulk density had no significant effect on PR in either of the grasslands. PR was significantly higher in semi-humid grassland. Mean of the PR was greater than 3.0 MPa, indicating that soil compaction may impact plant rooting seriously in 0-10 cm depth of both grasslands.

Keywords: Soil penetration resistance, Soil compaction, Grassland, Bulk density

The Potassium Fixation Capacities of Different Textural Soils

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Abstract: The objective of this study was to determine the potassium fixation capacities of clay, loam and loamy sand soils by Langmuir and Freundlich isotherms. The soil samples were shaken with 1:5 soil:KCl solutions (2, 4, 8, 16, 24, 32, 40 and 60 meq/L) for 24 hours. Adsorption of K ions by soils was lower at the low K concentrations of initial solution, but adsorption of K by soils increased as the K concentration of initial solution increased. Potassium adsorption capacities of soils defined by Langmuir and Freundlich isotherms were ordered as clay > loam > loamy sand. The lowest K fixation values in soils were determined as 0.22 me/100g loamy sand < 0.79 me/100g loam < 1.46 me/100g clay, while the highest K fixation values occurred as 12.35 me/100g clay > 9.69 me/100g loam > 3.81 me/100g loamy sand. The estimated K adsorption values at low K concentrations using both isotherms fitted very well with the experimental K adsorption values. However the estimated K adsorption values using Freundlich isotherm at high initial K concentrations fitted very well with the experimental values better than the estimated K adsorption values using Langmuir isotherm.

Keywords: Potassium, Fixation, Texture, Langmuir, Freundlich

Effects of Zeolite (Clinoptilolite) on Soil Aggregation

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Abstract: Soil aggregation is not only essential for the sustainable agriculture but also for increasing the productivity of the soil. Several organic and inorganic soil conditioners are used for this purpose, however, information on the use of zeolite is very scarce. This study was carried out to determine the effects of zeolite applications (0, 1, 3 and 5%) on aggregation in soils with different textures [clay (soil I), loam (soil II) and sandy loam (soil III)]. Zeolite was passed through 0.5 mm sieve. While zeolite applications increased the rate of soil aggregates smaller than 6.4 mm, it decreased the rate of soil aggregates greater than 6.4 mm in soils I and II. However, the effect of zeolite application on soil III showed different effects. While the rate of soil aggregates smaller than 12.7 mm showed decrease, aggregates greater than this fraction increased. Mean weight diameter of soil I decreased from 9.24 mm to 5.06 mm with zeolite application. These values were obtained as 5.16 mm to 4.14 mm and 2.61 mm to 2.77 mm for soils II and III, respectively. Zeolite applications significantly increased aggregate stability of all aggregate size fractions of the soils as compared to the controls. Dispersion ratio of soils amended with zeolite showed significant decreases. Whereas the aggregate stability of the control was 26.64%, it increased to 43.51% with 5% zeolite application. While the dispersion ratio of the control was 38.46%, it decreased to 30.20% with 5% zeolite application. Results obtained in this study have shown that zeolite can be used as an amelioration material to improve soil aggregation.

Keywords: Zeolite, Aggregate size distribution, Aggregate stability, Dispersion ratio

Factor Analysis of Hydropedological Variables on a Semi-Arid Cultivated Landform

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Abstract: Soils are highly spatially variable due to natural and management factors. Numerous of methods are used in evaluation of soil variability, each method has its advantages and disadvantages. We evaluated soils variation in a 82-ha cultivated semi-arid area in Cankırı by factor analysis. We used 27 soil parametric and morphometric variables, described on 486 sites at different positions of hillslopes with various aspects, with factor analysis. We selected nine factors based on scree analysis. The nine factors explained 75.4% of total variance in dataset. The factor 1, in which quantity, size, shape of roots and pores were loaded, explained greatest percent of variation (18.1%) in data, and this suggested the pore and root propertied were the most important variables controlling variation of hydropedological properties in the study area.

Keywords: Factor analysis, Semi-arid hillslope, Spatial variation, Soil morphologic properties

Evaluation of Some Soil Fertility Status in a Hazelnut Orchard by Geostatistical Techniques

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Abstract: The objective of this study was to determine spatial variability of some soil fertility properties such as: texture, bulk density (ρb), soil reaction (pH), salt content (EC), organic matter content, total nitrogen (N), available phosphorus (P) and DTPA-extractable microelements (Fe, Cu, Mn and Zn). Soil fertility properties at the same transect of different landscape positions in 1.35 ha hazelnut orchard in Ordu-Altınordu-Akçatepe were determined using some soil properties. Fifty-six surface soil samples (0-20 cm) were collected and analyzed. Selected soil properties were evaluated and mapped using geostatistical techniques. Comparison of variation coefficient of each soil property revealed that soil reaction (pH) was the least variable property while the available phosphorus was the most variable. The results of this study indicated that almost all soils in the hazelnut orchard area based on soil fertility properties were "no having problems". Semivariograms for fertility properties exhibited spatial dependence with a range of influence approximately 3,2 m to 187,5 m.

Keywords: Soil fertility, geostatistic, site-specific management, hazelnut orchard

The Effect of Coniferous Forest Age on Some Soil Organic Carbon Fractions in a Semiarid Ecosystem

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Abstract: Soil organic C content in forested area creates a greater attention for carbon sequestration and removal of atmospheric CO_2 back into soil. The aim of this study was to evaluate the effect of different age of pine forest (*Pinus nigra*) plantation on soil organic C content and some biological carbon fractions in a semiarid ecosystem of northern Turkey. Soil samples were taken from 0–5, 5–15, and 15–30 cm depths of different age (7, 14, and 40 years) of adjacent forested area with three replications. Soil organic C content significantly increased in 14yr forested area compared to 7 and 40yr forested area ($p<0.05$). Similarly, mineralize C content was greater in 14yr forest up to 15 cm depth. Microbial biomass carbon (MBC) varied depending on forest age and the greatest MBC was observed in 7yr forest at 0–5 cm and 15–30 cm depths. The greater soil organic C in 14yr could be the effect of both pine forest and arable plants compared to 40yr forest where high intensity of tree cover inhibits arable plant growth. Most of the organic materials in pine forest stay as litter debris on the soil surface and lower amount of organic C transfers in mineral soil.

Keywords: Organic carbon, Carbon management, Biological carbon fractions

Estimation of Soil organic Carbon Content Using Century Model in an Arid Grassland of Sivas District

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Abstract: The objective of this study was to estimate the long-term changes in soil organic carbon content using Century model in a grassland, Şarkışla, Sivas under arid climate condition. This study will indicate the effects of management systems on soil organic carbon over a long time period. The estimated carbon contents will compared with the 9 year land measurements in order to present the effectiveness of the model. Hence, the long term projection of this management systems on soil carbon will be evaluated under arid climate conditions. The model developed for estimation of soil organic C content in different ecosystems using soil and climate data such as soil texture, bulk density, soil management systems, precipitation, and temperature.

Keywords: Organic carbon, Century model, Grassland, Global warming, Climate change

Acknowledgements: Thanks for Rasim Koçyiğit and İrfan Oğuz.

Effect of Organic Waste Application on Urease Enzyme Activity in Outflow of Soil Column

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Abstract: The objective of this study was to investigate the effects of hazelnut husk (HH) application on urease enzyme activities in outflow of sandy clay loam soil column. Hazelnut husk as an organic waste was incorporated with four different rates (0, 2, 4 and 6%) into soil columns. Changes in soil properties were determined at four different incubation periods (1, 2, 4 and 8 weeks) under the laboratory conditions. HH application increased organic carbon (OC) content, basal soil respiration (BSR), aggregate stability (AS), total porosity (F), and decreased soil bulk density. Urease enzyme activities in a pore volume (PV) of outflow increased from 0.93 µg N/PV in control treatment to 11.37 µg N/PV in 6% HH application doses at the 8th week. Urease enzyme activities in outflow had significant positive correlation with AS (0.947**), saturated hydraulic conductivity (0.654**) and a significant negative correlation with outflow EC (-0.586*). Although it was not a significant statistically, urease enzyme activity in outflow had a positive relationship with BSR.

Keywords: Urease, Enzyme, Hazelnut husk, Outflow

Effects of Municipal Wastewater Treatment Sludges on Heavy Metal Contents of Soil and Wheat Stalk and Grain in Field Experiment

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Abstract: In order to determine the impact of the sewage sludges on heavy metal contents, one year field experiment was conducted in Ankara city. Dewatered anaerobically digested sewage sludge were collected from Ankara municipal treatment plants. The sludge doses are adjusted according to the nitrogen requirement of the wheat plant. Within this scope, sewage sludge were individually used in doses of approximately 500, 1000, 2000, and 4000 kg/da with and without chemical fertilizer. Bread wheat (Tosunbey variety) followed its normal pattern and plants were harvested. In the all of treatments, total and available Cd, Pb, Ni, Zn, Cr, Cu contents of soil and wheat stalk and grain were determined. As a result of the field study, increases in total and available heavy metals (Ni, Pb, Cu, Cr, Zn) in the soil were determined and these increases determined in other metals except for Ni that can be taken were not statistically significant. Total Cd showed a statistically significant decrease with increasing sludge dose. Despite these increases due to sludge applications, the heavy metal content of the soils was determined below the limit values specified in the regulation. The amounts of Cd and Zn in the stalk and grain of the wheat plant did not show a statistically significant increase with different applications. According to the calculated transfer coefficient, the amount of heavy metal carried from the soil to the grain was found to be more than that from the soil.

Keywords: Sewage sludge, Soil, Heavy metal, Wheat grain, Wheat stalk

Investigation of Desertification Risk in a Rural Watershed

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Abstract: This study was conducted to determine desertification risk in a rural/ small watershed with an area of 5.91 km^2 in Tokat-Artova Ekinli Village. To evaluate desertification risk for the watershed, classic statistical methods of variation coefficient is used. The topsoil soil samples were collected from 150 locations and the analyses carried out indicate presence of clay, silt, sand, organic matter, pH, EC, $CaCO_3$, hydraulic conductivity, coarse material percentage, aggregate stability, phosphorus, potassium and soil erodibility. As a result, the sand and pH values showed low variation with low desertification risk. However the silt and soil erodibility values of the basin soils showed medium variation with medium desertification risk. The high variation showed clay, organic matter, EC, $CaCO_3$, hydraulic conductivity, coarse material, aggregate stability, phosphorous and potassium contents in the basin. The study area is a grassland and is not exposed to agricultural applications, such as tillage and fertilization. However, steep slope and excessive grazing have caused land degradation.

Keywords: Soil degradation, Soil properties, Grassland, Ekinli basin

Effects of Aggregate Sizes on Soil Properties in a Fine-Textured Soil

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Abstract: Soil quality and sustainability are significantly affected by soil aggregation. This research was carried out to determine the effects of particle size distribution of aggregate size fractions on soil properties in a fine-textured soil. A clay textured soil sample was dry sieved in a set of sieves with 2; 1; 0.5 and 0.25 mm sieve openings to prepare <2 mm; <1 mm; <0.5 mm and <0.25 mm fractions. Physical and chemical analyzes were performed on these fractions. Among the physical properties, particle size distribution, moisture characteristics, drying curve, consistency limits and dispersion ratio were determined. From the chemical properties, soil reaction, organic matter content, lime content and cation exchange capacity were determined. Aggregate size distributions were found to be similar in the first three fractions with regarding to sand content (2-0.05 mm) and higher than the other fractions in the <0.25 mm fraction. The fine and very fine sand content increased with increases in size fractions. It has been determined that this condition affects bulk density and consistency limits. The bulk density increased with increasing aggregate size except for the fraction of <0.25 mm. Increased values were recorded in the fractions of <2, <1 and <0.5 mm respectively for plastic and liquid limits. Aggregate fractions showed significant differences in moisture content ($p < 0.01$) in the drying process from saturation to dry state. The same was also noted for soil moisture characteristics. The aggregate fractions were found to be significantly different ($p < 0.01$) in terms of soil reaction and organic matter

Keywords: Aggregate size, Particle size distribution, Soil moisture, Consistency limits

Use of Remote Sensing and Geographic Information Systems to determine the Amount of Water used for Agricultural Purposes at the Downstream Point in HEPP Projects

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Abstract: While Hydroelectric Power Plants are ideal sources for power generation, they may have various impacts on the environment as a result of diverting water from its bed and carrying it in the conveyance lines at river-type hydroelectric power plants in particular. In order to prevent or minimize these impacts, it is necessary to calculate the amount of water also called "prior water rights" and used for the natural habitats, people, and irrigation on the downstream side at the projecting stage of a power plant. In this study, an integrated approach with remote sensing and geographic information systems which included the studies of data collection, data generation, mapping, and calculation was presented to calculate the water to be used for agricultural purposes at the downstream point that constituted part of the Environmental Impact Assessment report – the fundamental basis for the projecting of Hydroelectric Power Plants. In the field practices of this approach, great success was obtained in the generation and evaluation of the data about the topographical information, land characteristics, soil properties, and land use types of the HEPP areas and– considering this information – in the calculation of the water used for agricultural purposes and the approach was found feasible.

Keywords: Satellite images, Digital elevation model, Blaney-Criddle, Irrigation water

Assessment of Soil Quality Index for Tea Cultivated Soils in Micro Catchment of Rize Province

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Abstract: Soil quality evaluation is a tool to improve soil management and land use system. A large number of different physical, chemical and biological properties of soil, known as soil quality indicators, are used to soil quality assessment. These properties, that are sensitive to stress or disturbance, are synthesized using numerical quality indices obtained by several different types of methods. The aim of this study was to determine soil quality by using Integrated Soil Quality Index (SQIw) model in agricultural lands used for tea cultivation in micro catchment located in Rize province. In this SQIw model, the Analytical Hierarchy Process (AHP) method was used to assign indicator weights and because of different indicator units, a standard scoring function (SSF) was used to score soil indicators. A total of twenty two soil quality indicators were included in SQIw model by grouping in four classes which are; i-physical indicators (aggregate stability, erodibility ratio, structure stability ratio, clay ratio, percentage of sand, silty and clay), ii-chemical indicators (soil reaction, electrical conductivity, organic matter and lime content), iii- Macro nutrient elements (nitrogen, phosphors, potassium, calcium, magnesium and sodium), iv- Micro nutrient elements (iron, zinc, copper, manganese). Twenty eight soil samples were collected from tea cultivated lands in micro catchment including dominantly Alisol-Acrisol great soil groups based on FAO/WRB classification. According to obtained results, 25% of soils were classified as weak quality level whereas, %75 of the total soils has moderate soil quality property in terms of tea requirement soil quality in the study area.

Keywords: Soil quality index, Analytical hierarchy process, Tea plant, Soil properties

The Possibilities of Using Stereo Satellite Datas on Soil Surveys

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Abstract: Topographic maps, air photos and satellite data are cartographic material for the soil mapping, which is important arm of the soil science. This material varies or changing depend on current and available technology. Although air photos was used in previous years, satellite data have been using in recent years due to technological advantages. Satellite data, which has high resolution and stereo image providing significant ease for the interpreting the physiographical unit. In this study, WorldView-2 satellite data, Microstation V8 and Leica Photogrammetry Suite (LPS) PRO600 softwares were used and evaluated for the possibilities of using stereo satellite images of detailed soil survey in Adana Yumurtalık province. Using 3D view obtained by stereo satellite data, different soil series and different soil phases especially slope drawn by researcher by determining physiographic unit in large area before soil survey. Significant similarity between temporary boundaries using a stereo data and certain soil boundaries was observed. It was concluded that, WV-2 satellite datas which have high spatial resolution and stereo view are important cartographic materials that can be used in a detailed soil survey.

Keywords: 3-D satellite imagery, WorldView-2, Detailed soil survey and mapping

Investigation of Adsorption of Methylene Blue on Van Pumice

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Abstract: Coloring expressed in terms is dyes of objects. The materials used in the coloring of the surface of objects to protect them from external influences or to gain a beautiful appearance are called 'paint'. The paints are insoluble ie are insoluble in water. The paint is applied with a brush or paint gun with oil that dries to a surface. The painted surface is covered with a very thick new layer of oil. Thus the surface is covered with paint. Generally, the paints are of inorganic structure. However, there are also organic ones. (Eg. phthalocyanines etc.). They do not make any changes to the surface they are applied to. They can be removed from the surface in large pieces by digging (Başer ve İnanıcı 1990, Seyitoğlu, 2011). The pumice is magma cooled very quickly during contact with cold air and the gases in its structure abruptly leave the building. The abandonment of the gases allows the pumice to have a porous structure. Since the pores are generally void free (especially micropores), the permeability is low and the heat and sound insulation is very high (Tuncer, 2001). In this study, the adsorption of Methylene Blue on the Van pumice was investigated. Work was done with Van pumice at 293 - 318 K temperature. The dynamic equilibrium between the solid phase and the liquid phase was determined to be 80 min for 293 K, 60 min for 303 K and 50 min for 318 K.

Keywords: Van pumice, Methylene blue, Dye, Thermodynamic, Isotherm

Effect of Drought Stress on Sensitivities and Yields of Chickpea (*Cicer arietinum* L.) Cultivars

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Abstract: In the selection researches, under the changing climatic conditions, it should be studied in which growth stages of plants and how they will react to drought. The yield of cultivated plant is one of the most important parameter affected by drought. With this study, it was aimed to determine the sensitivities of eleven chickpea cultivars against drought and to compare their yield parameters in different growth phases by establishing two field experiment in 2007-2008. A group of cultivars were grown under natural rainfall conditions, while the other was irrigated before the blooming stage due to early drought in 2007, and in the blooming stage due to late drought in 2008. The morphological parameters and drought susceptibility index of cultivars were investigated. In experiments, yields of cultivars decreased substantially and their susceptibilities changed according to the growth stages exposed to drought. The bean and seed numbers of plants, grain yield and biological yield parameters of cultivars gave more reliable results than 100 grain weight and harvest index parameters in selection of susceptible and resistant cultivars. According to these results, a parameter among selection criteria accepted for a plant species or variety can prevent from reaching a clear judgment due to the severity and duration of stress exposed in different growth stages, and also due to the genetic characteristics of plant, even if it is the same kind. It is recommended to make description of susceptible/resistant plant species/variety, according to growth stage of plants exposed to the stress in following selection studies.

Keywords: Drought, Chickpea, Drought Susceptibility index, Morphological parameters, Selection criteria

Determination to Carry-Over Nitrogen of Legume on Succeeding Crop Using 15N Isotope Technique

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Abstract: A field experiment was conducted using 15N methodology to estimate the biological nitrogen fixation capacities of winter and summer lentil (*Lens culinaris Medic*.) varieties and soil nitrogen conserving effect was observed following the cultivation of wheat under dryland conditions in Central Anatolia. First year, biological nitrogen fixation capacities of winter and summer lentil varieties were estimated by using 15N methodology. Second year, carry-over of N from the legume residue to wheat was determined. According to first year results, the average of fixed nitrogen were found as 70.0 and 45.0 kg N/ha for winter and summer varieties, respectively. Second year, the average of carry-over N derived from soil values were found 43.0 and 17.0 kg N/ha for succeeding wheat when the previous legumes were winter and summer lentil varieties, respectively.

Keywords: 15N Isotope Technique, Lentil (*Lens* culinaris medic.), Biological Nitrogen Fixation, Carry-Over Nitrogen

Effects of Exogenous Nitric Oxide on Cobalt Phytotoxicity in Curly Lettuce (*Lactuca sativa* L. *var. crispa*)

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Abstract: In this study, individual and together effect of cobalt (Co) and sodium nitroprusside (SNP), as a nitric oxide (NO) donor, were investigated in curly lettuce (*Lactuca sativa* L. *var. crispa*) plant. Four-week-old lettuce seedlings were exposed alone Co (200 µM $CoCl_2.6H_2O$) or SNP (200 µM) and in combination with Co and SNP (Co+SNP), during 21 days by using complete randomized design with three replications. The Co exposure caused reducing in plant growth, as well as water content (WC), the contents of photosynthetic pigment, shoot and root bio-concentration factor (BCF) of Co and net accumulation of iron (Fe) via root. Besides, membrane permeability (MP) of the leaves, proline accumulation, hydrogen peroxide (H_2O_2) content, lipid peroxidation (MDA), the Co concentrations in shoot and root, and total accumulation rate (TAR) of Co were increased by Co exposure. The MP of the leaves, proline accumulation, the root BCF of Co, the TAR of Co, net accumulation of Co and calcium (Ca) via root were decrease with the combination of Co+SNP according to Co exposure, whereas translocation factor (TF) of Co, the concentrations of Fe and zinc (Zn) in shoot and root, the WC and H_2O_2 contents were increased. Although the changes are not significant in the contents of photosynthetic pigments [chlorophyll (Chl) a, b, and a+b, carotenoids (Car)], these parameters augmented with the combination of Co+SNP according to Co exposure, except for Car. In conclusion, supplying SNP to growth media might be beneficial for alleviating imbalances of physiological parameters and metallic cations accumulation.

Keywords: Bio-concentration, Metallic nutrient ions, Plant growth, Photosynthetic pigments, Translocation

Some physical-Chemical Properties of the Product Formed by Composting of Plant and Animal Wastes by Windrow Method

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Abstract: The amount of plant and animal wastes, which are the resulting from agricultural production activities, is increasing day by day and this creates some environmental problems. Some study is being done to reuse these wastes in agriculture, and composting is one of them. In order to make composting, the process of the formation of two different organic fertilizers, consisting of poultry chicken manure and vegetal wastes, has been followed for about four months. Composting was carried out by windrow method on aerobic conditions. During composting, the stacks were ventilated with a compost mixing machine, temperature and C/N ratios were monitored at cdifferent times. At the end of composting, the C/N ratio of the chicken compost (CC) was found to be 10.22 and the vegetable compost (VC) was found to be 13.54. When the properties of the materials obtained at the end of composting were examined, the amount of organic matter in the CC and VC was 24.07 % and 29.04 % respectively, while the total NPK amounts were for TK, which decreased from 9.39 % to 6.41%, for BK 3.50 % to 2.55 %, respectively. The pH values were 7.62 for CC, 7.51 for VC, EC values were 1.99 and 0.27 dS /m, respectively. It was determined that the free carbonate levels were high and the values were 27.51 % and 15.05 % respectively. The germination index values, which are one of the indicators of compost maturity, are 91% and 93% respectively. Water soluble nutrients, maximum water retention capacities and heavy metal contents were also investigated.

Keywords: Composting, Organic waste, Windrow method, Soil quality

Economical Assessment of Soil Losses Caused by Sugar Beet Harvesting in Turkey

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Abstract: Soil loss due to crop harvesting usually ignores as a soil erosion type. whereas, all soil erosion processes are closely related to the sustainability of natural resources for human interests. In this study, it was aimed to investigate soil loss rates due to sugar beet harvesting from the 25 different sugar factories throughout Turkey. And, economic assessments of these losses were made in term of the transporting plant nutrients. Findings showed that annual average soil loss rate was the 3.41 ton/ha for the studied factories. If taking the consideration all sugar beet production sites in Turkey, more than one million ton soil was removed from the three hundred twenty-two thousand hectares of sugar beet production areas in 2016. When soil losses caused by sugar beet harvesting is compared to the average annual suspended sediment yield value from rivers (more than one hundred and twenty one million tons). Obtained soil loss rate due to sugar beet harvesting corresponds to only 0.9 per percent of the transported suspended sediment yield from the 25 river basins all counrty. But, within a general approach, the economic value of plant nutrients transported along with the harvesting of the sugar beet leads to an input requirement of more than ten thousand dollars per year in factories. As a result, harvest erosion as an ignored erosion type should be emphasized for the economically sustainability of natural resources in fragile ecosystems.

Keywords: Harvest erosion, Sugar beet, Plant nutrient losses, Economic assessment

Acknowledgements: I would like to acknowledge the scientific guidance, supplying database and support of Hakkı Yoraz, Dr. Erkan İçöz and Dr. Ahmet Pişkin from GeneralDirectorate of the Turkish Sugar Corporation (Türkşeker, Türkiye Şeker Fabrikaları A.Ş.).

The Effect of Hazelnut Husk on the Nutrient Content of the Pepper Plant

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Abstract: Hazelnut husk is an organic waste which is released after harvest of hazelnut. It is an important source for cultivation with high organic matter content. On the other hand, it must be used composted due to its high C / N ratio; however, the non-widespread use of compost making practices. When the husk keep under natural conditions at least, will play an important role in evaluation as the soil organic material source. In this study, the effects of hazelnut husk applications under natural conditions with different particle sizes on the growth of pepper plant and some plant nutrient elements contents were investigated. Trial was carried out according to randomized parcels experimental design and two periods (1 and 2 years), two particle sizes (2-4 mm), four doses (0 ton da^{-1}, 3 ton da^{-1}, 6 ton da^{-1} and 8 ton da^{-1}), a four replicates. Plant growth was positively affected by the decomposition period and application doses of husk. 2-years husk mixed with soil and 6 and 8 ton da-1 applications increased root and shoot dry weights (1.41 g, 6.83 g). The applications were not affected on plant phosphorus and zinc content. The total nitrogen ranged from 2.51 to 3.31 % and the plant potassium content 1.26 to 1.41 %, and 6 ton da^{-1} application to the soil was sufficient. Plant Fe content was higher in 1-year husk applications, while Mn and Cu contents were higher in 2-year husk applications.

Keywords: Hazelnut husk, Nutrient elements, Decomposition time

The Effect on Nitrogen Uptake and some Growth Parameters of Common Vetch (Vicia Sativa L.) of Rhizobium leguminosarum L. Bacteria Inoculation and Mycorrhiza Application

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Abstract: This research was conducted under controlled greenhouse conditions in order to determine the effect of bacterial and mycorrhiza inoculation on nitrogen fixation and grain yield of common vetch plant in 2017.For this purpose, Rhizobium leguminosarum bacteria and Glomus Mosseae mycorrhiza were inoculated to common vetch seeds. In addition, different nitrogen fertilizers at 3 kg N/da dose (Ammonium sulphate, ammonium nitrate and control) were applied to pots. In the experiment, 12 different treatments were applied separately to 72 pots. The study was carried out with 3 replications according to randomized plot design. Tamkoç-2000 and SZF-1 common vetch varieties were used as experimental material. Plant weights, plant roots and stem weights (g) were determined at the harvesting time. After harvesting, inoculation rate in the plant roots and hypha (%), vesicle and arbuscle numbers, crude protein content in the root and stem, $NH4^{+}$, $NO3^{-}$ and total N contents remaining in the soil, the amount nitrogen fixed nitrogen were determined in the plants. When the results obtained from the experiment are examined; bacterial inoculation in common vetch affected nitrogen fixation; it was observed that the number of nodules in roots and root weight of both common vetch varieties were very high in applications inoculated with bacterial and mycorrhizal. The stem weight were observed in the highest B-M+AS application in the SZF-1 and Tamkoç-2000 varieties (8.76 g and 10.43 g, respectively).

Keywords: Common vetch, Rhizobium, Nitrogen fixation, Mycorrhizal inoculation

Effects of İncubation and Organic Materials on Soil Macro and Micro Element Concentration

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Abstract: Application of organic material improves soil physical, chemical and biological properties as well as increase crop pruduction. The organic materials provide the nutritional requirements of plants. The investigation was conducted to determine the effects of three different organic materials including hazelnut husk, farmyard manure and biochar on soil pH, organic matter, soil macro and micro nutrient concentrations. Organic materials were applied in three different levels 0-3-6 tons da^{-1}, and the treatments were incubated for 30, 60, 90 and 120 days in a greenhouse condition. The trial was conducted according to the completely randomized design experiment with 3 replicates. The soil organic matter, total nitrogen, soil available phosphorus, extractable potassium contents of soil were increased by increased levels of organic materials, and also soil pH was increased except for hazelnut husk application. While plant available cupper was decreased by organic matter application, plant available iron was also decreased with 6 ton dose. Soil available zinc and manganase were decreased by biochar applications. While the total N and organic matter content of the soil were generally decreased by incubation times, organic matter content was increased during 90 and 120 days incubation by applications of manure. Available micro element contents of soil were regularly decreased during incubation period, however available phosphorus and extractable potassium content were increased during 60 and 90 days of incubation period, respectively. In conclusion, it was found that macro and micro element concentration of soil were the highest in hazelnut husk application, exception pH and nitrogen.

Keywords: Decomposition Times, Organic Material, Nutrient Content

Acknowledgements: This study has supported by Ordu University Scientific Research Project AP-1711 fund.

Soybean Breeding Program Concentrating on Seed Iron Content

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Abstract: Soybean is the most produced oil seed crop in the world, and the top second plant species with the highest iron content. Iron is deposited as conjugated to ferritin protein in soybean seeds. Therefore, incorporation of soybean in human diet should be favored because the absorption of ferritin conjugated-iron and its availability in bloodstream is much higher in soybean seeds than other forms of iron. Iron is one of the essential micronutrients in human diet, and iron deficiency is among the most widespread nutritional deficiencies. It is the most important cause of anemia. Increasing the iron levels in soybean via bio-fortification is vital to prevent the anemia. In order to develop soybean varieties with higher iron content, the seed iron content of 20 soybean varieties were determined by ICP-MS analysis. According to the results, the varieties were separated into 4 groups depending on iron concentration. Among these groups, two of the highest iron accumulating varieties were selected to be used as parents in order to start a soybean breeding program. Near infrared spectroscopy will be used in offspring screening. The goal of this program is to develop new soybean lines bio-fortified with iron.

Keywords: Soybean, Iron, Biofortification, Breeding, Seed

Determination of Potassium Content of Plant with Quick Test Techniques in Protected Pepper Cultivation

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Abstract: Pepper production in the greenhouse vegetable sector has a special significance in Turkey. Rapid determination of the nutritional status of the plant is especially important for the greenhouse crop production. As a quick and easy method, petiole sap K analysis for diagnostic purposes has been practiced in recent years and has gained considerable popularity. This study was carried out to determine the relationship between K content of petiole sap and K value of soil and leaf. Soil and plant samples were collected from greenhouses grown pepper in Antalya Region. The plants (petiole sap, leaf) and soil samples were taken at three different periods; flowering, first fruits ½ size and the harvesting period. Total K in leaf samples were analyzed. Potassium in petiole sap was determined with K ion meter and test strips as rapid and quick test techniques. Also water soluble K and available K in soil samples were determined. According to the results, the correlations between leaf K and petiole sap K were found significant at the 1st and 3rd sampling periods. Also, a significant relation between K in soil and leaf K were obtained in all three sampling periods. As a result; rapid test techniques can be used as a tool to determine the nutritional status with K of pepper grown in greenhouse conditions, since the relationship between the K content of the petiole sap and the leaf that used as a standard method to determine the plant nutritional status, was obtained significant.

Keywords: Petiole sap analysis, Potassium, Pepper

Effect of Vermicompost Application on Growth of Seedlings and Seedling Quality in Tomato Seedling

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Abstract: This study was conducted to determine the effect of vermicomposting on growth of tomato seedlings. In the study, the classical seedling mixture (3 peat / 1.5 perlite) constitutes the control group of the study. For this control group, cucumber seedlings were cultivated by adding vermicompost (10%, 20, 40, 60, 80, 100) at different doses. Alcapone F1 tomato (*Solanum lycopersicum* L.) cultivar was used. Macro nutrients were 100 ppm N, 50 ppm P, 100 ppm K, and the appropriate nutrients were given in the appropriate amount. Leaf number, stem diameter, leaf dry matter, root height, root weight and root dry matter contents were determined in the study. At the end of the study, it was determined that some of the properties examined by the vermicompost application were increased.

Keywords: Vermicompost, Tomato, Quality, Leaf number

Effects of Different Carbonization Processes on Pyrochars and Hydrochars Characteristics

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Abstract: Biochar is a by-product of the thermal decomposition of organic feedstocks, such as crop residue and manure, that are occurred in high amounts. Biochar as a solid material shows a growing interest due to their properties such as waste management, soil amendment and carbon sequestration. The aim of this study was to indicate the effects of two different carbonization metod on some physicochemical characteristics of biochars generated from organic wastes occurred in high quantities in Turkey. Some physicochemical properties of pyrochars and hydrochars derived from sewage sludge (SS), poultry manure (PM) and olive waste (OW) through pyrolysis and hydrothermal carbonization (HTC); water holding capacity (WHC), pH, electrical conductivity (EC), organic matter content (OM), the amounts of N, P and K, cation exchange capacity (CEC), C/N ratio, lime, total heavy metals (Cd, Cr, Ni and Pb) and effective thermochemical conversion (ETC) were determined. Our findings indicated that WHC, EC, total P content, OM and C/N ratio in hydrochars were higher than pyrochars. But total K content, CEC and lime were found to be lower. Pyrochars had a more alkaline nature than hydrochars in pH value. Generally, total heavy metals were found to be lower in hydrochars than in pyrochars. In terms of loss total N; SS hydrochar was found to be higher than pyrochar (50%). SS, PM pyrochars were more affected by ETC (%60). The findings showed that the pyrochars from pyrolysis were different in some physicochemical properties compared to the hydrochars from HTC.

Keywords: Hydrochar, Hydrothermal carbonization (HTC), Pyrochar, Pyrolysis

Effect of Mycorrhiza in Fruit Tree Nursery Production

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Abstract: Mycorrhizae; is defined as a mutual life style between plant roots and certain fungus species. In this collaboration, plant supply carbon to mycorrhizal fungus and mycorrhizal fungus supply plant nutrients, hormones and water to plants. More than 90 % of plants in the nature are dependent to mycorrhiza. Fruit species (citrus, avocados, vineyards, apples, peaches, apricots etc.) which are widely used in agricultural production in Turkey are also involved in mycorrhizal cooperation. For this reason, the use of mycorrhiza in the nursery production of the fruit tree species affects the development of nursery positively. Mycorrhizal infection in nursery production to protect the nursery from transplant shock, increases plant diameter, height, root growth and ensures that the scion get early to grafting time. Mycorrhiza-infested perennial plants that are mycorrhizal dependent are infected with mycorrhiza before planting then they carry mycorrhizal infection for the rest of their lives. For this reason, in orchards established with seedlings infested with mycorrhiza, significant positive developments in flowering, fruit set, earliness, yield and quality characteristics are provided. In the light of the previous research with this study, the effect of mycorrhizae usage on the plant nutrition, root and canopy development in the nursery production of fruit trees grown widely in our country has been discussed in detail.

Keywords: Mycorrhiza, Nursery growing

Invisible Beneficials in Rhizosphere: Plant Growth Promoting Rhizobacteria

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Abstract: Various studies have been carrying out for many years to combat with biotic and abiotic stress factors of which plants're exposed in agricultural production. PGPRs (Plant Growth Promoting Rhizobacteria) takes an important place in these studies with a rising interest. Plant growth-promoting rhizobacteria (PGPR) are a group of free-living saprophytic bacteria that can be found in the rhizosphere in association with the root system and which enhance the growth and development of the plant either directly or indirectly. It's known that application of Plant Growth Promoting Rhizobacteria (PGPR), has positive effects to augment growth and development of several crop plants with direct (atmospheric nitrogen fixation, solving the phosphorus, producing phytohormones, inducing water uptake capacity etc.) and indirect (producing seconder metabolites such as antibiotics, siderophore, enzyme secretion, competition for space and nutrition, inducing systemic resistance etc.) actions. PGPRs are economically and environmentally beneficial for plant growth promotion. PGPRs may act as biofertilizer, biotic & abiotic stress resistance inducers, co-inoculants and other growth promoting activities. New concepts and development strategies regarding PGPRs need to be developed; i. Research in rhizosphere biology (molecular & biotechnological approaches) ii. Application of multi strain bacterial over single inoculation iii. Harmful effects of PGPRs iv. Biosafety data required for the registration of PGPR v. Cost and effectiveness of PGPRs vi. Adaptation to environment.

Keywords: Boost, Plant, Growth, Soil, Bacteria

The Qualities of the Harran Plain Soils under Different Cropping Systems

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Abstract: Assessing the quality of soils is crucial in assuring the suitable use of agricultural areas and sustainability of soil productivity. Because of intensive agricultural activities combined with unsustainable management methods and cropping designs degredation of soils started in the Harran plain, which in turn resulted in the loss of the production potential. The goal of this study (The study was supported by TUBITAK (Project number: 111O706)) was to evaluate the effects of different long term cropping managements; cotton and wheat-corn cultivation and soil types on the qualities of soils under long term cultivation. For this purpose, more 400 soil samples from 7 common soil series were collected at 0-30 cm depth and analyzed for 39 potential soil quality indicators. The best representative soil quality variables forming Minimum Data Set (MDS) were selected using Principal Component Analysis (PCA) and soil quality indexes were obtained using both linear and non-linear scoring functions. Bulk density, hydraulic conductivity, agregate stability, organic matter, microbial biomass, dehidrogenase and catalase enzyme activities, soluble Ca, Mg and Na, exchangeable K and Ca, available Cu and Fe were selected and included in MDS. Overall, the soil qualities were low with average soil quality indexes obtained using two scoring functions ranging from 31.7/100 to 48.4/100. According to ANOVA test, both soil series and different cropping managements were found statistically significant ($p < 0.05$) in impacting qualities of soils. Cotton fields had the lowest soil quality indexes as a result of an intensive cultivation without any organic residue contribution.

Keywords: The Harran plain, Soil quality, PCA analyses, Scoring functions, Land use

Effect of Different Plant Growth Media on Number of Leaves and Number and Shelf Life of Flower in Ornamental Plant of Ghazania

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Abstract: Today, the use of different biological and organic substrates is considered as the most appropriate solution for keeping the plant vital system active. The intensification of vital activities, improving the quality and maintaining environmental health and reducing the use of fertilizers are among the most important reasons for the use of these Cultivating substrates. In this research, we tried to study the effect of different plant growth media on some of the features of the Gazania splendes as an ornamental plant in the green area. For this purpose, a completely randomized design with 6 treatments and 5 replications was used. The growth media used included cocopeat, vermicompost, garden soil, forest soil and perlite. After flowering, indices of leaf number, shelf life of flower and number of flowers per plant were measured and the results were compared. The results of analysis of variance showed that the effect of 50% soil + 50% garden soil and 50% vermicompost + 50% garden soil on all traits were significant. The comparison of the mean of traits based on Duncan test showed that vermicompost + garden soil had superiority to other treatments in all of the Gazania characteristics.

Keywords: Gazania splendes, Plant growth media

Effects of Different Zinc Applications on Plant Growth in Some Watermelon Varieties Commonly Cultivated in Çukurova Region

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Abstract: In this study, five different doses of zinc were applied in two watermelon varieties grown in Çukurova Region and the effect of this element on plant growth and some pomological characteristics was investigated. Zinc doses of 0, 0.5, 2.5, 5 and 20 ppm were used. The main body size, main body diameter, number of knots, leaf width, leaf length, leaf stem length, number of plant arms, plant age weight was examined in the observations during plant development. After harvest plant root length, plant dry weight, zinc content of plant, dry matter yield, phosphorus content of pot soil was examined. It has been observed that different zinc doses applied to pots have significant effects on plant growth. According to the pot experiment results, the highest values in terms of the main body size were observed between 0.5 ppm and 10 ppm of the Crisby variety. The highest value in terms of the main body diameter was observed at a dose of 0.5 ppm zinc applied to the Crimson Tide variety of pots set up from Tuzla soil with a maximum value of 8.49 cm. The plant number was 39.66 and the Tuzla soil was 0.5 ppm of Crisby variety. The differences between the doses in the maintenance of the number of nodules in the plant were statistically significant. Similar results were observed in plant age, plant root length, plant dry weight and dry matter yield measurements. According to the results of this study, it was observed that different zinc doses affected.

Keywords: Zinc, Watermelon, Zinc dose application

Different Textured Soils Quality Scores: Cornell Soil Health Assessment and Soil Management Assessment Framework

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Abstract: The sustainable use of soil, which is an important factor in determining the future situation of the country's prosperity, is only possible through accurate understanding and monitoring of quality. In this study soil properties of land were determined by using scoring functions Cornell Soil Health Assessment (CSHA) and Soil Management Assessment Framework (SMAF) for land with different textures from Çumra region and the usability of these functions for our region are assessed by comparing them with each other. To determine differences in both soil scoring functions; texturing, bulk density, aggregate stability, available water content, penetration measurements from the physical properties in the soil; pH, electrical conductivity, extractable phosphorus, magnesium and potassium, available elements iron, zinc and manganese from chemical properties; activated carbon, potentially mineralized nitrogen, root health and organic matter from biological properties are analyzed. When the results of different textural groups were examined according to CSHA and SMAF, the average quality score of clay-textured soils was found to be 44-81 and the sandy clay loam textured soils were 40-72, respectively. While the soil CSHA total quality score was 41.93, the SMAF total quality score was 76.82.

Keywords: Cornell Soil Health Assessment, Soil Management Assessment Framework, Soil quality, Soil texture

Effects of EDDS Application on Decontamination by Canola of Soil Contaminated with Multi Metal

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Abstract: Cadmium (Cd), lead (Pb) and zinc (Zn) contaminations of soils is a serious worldwide problem which is affecting the human health and the environmental quality. Phytoremediation, the use of green plants to remove, sequester or detoxify contaminants offers an environmentally-friendly alternative to soil treatment methods for remediation. The effect of a biodegradable chelate, ethylenediamine dissuccinate (EDDS) on phytoremediation of a soil contaminated with multi metal (Cd, Pb and Zn) by canola (*Brassica napus*) was investigated in this study. In the pot experiment, plants were grown on five soil mixtures obtained by mixing an uncontaminated soil sample with contaminated soil (0, 25, 50, 75, and 100% multi metal contaminated soil) for two months. The addition of multi metals to the soil in all plants led to the increase of multi metal contents in plants. The biomass of the whole plant were weighed, and the uptake of Cd, Pb and Zn in the shoot were determined using ICP-MS. Consequently, EDDS significantly enhanced the translocation of metals (Cd, Pb and Zn) from soil to shoot. Furthermore, EDDS resulted in a sharply biomass loss.

Keywords: *Brassica napus*, EDDS, Phytoremediation, Multi metal, Contaminated soil, Decontaminatio

The Effect of Multimetal Accumulation on the Chlorophyll Concentration of *Ricinus comminus* and *Carthamus tinctorius*

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Abstract: Phytoextraction of heavy metal is more attractive than conventional treatment methods of soil due to advantages such as low cost, large application areas, and the possibility of in situ treatment. In this study, castor (*Ricinus comminus*) and safflower (*Carthamus tinctorius*) plants were grown increasing dose (0%, 25%, 50%, 75% and 100%) of multi-metal (Cd, Pb, and Zn) contaminated in the climate chamber for 12 weeks. The effects of increasing multi-metal concentrations on plant total chlorophyll concentrations and multi-metal accumulations were investigated. The total chlorophyll concentration of both plants was measured every week. The total chlorophyll concentration of plants was increased in control and 25% multi-metal dose. On the other hand, the increasing multi metal doses (50%, 75% and 100%) were inhibited total chlorophyll concentration of castor and safflower plants. The Cd, Pb and Zn concentrations of the leaves were significantly higher than control plants. The results showed that there is a significant difference between the total chlorophyll values of the groups in each of the samples, resulting in a significant toxic effect by the metals in the castor and safflower.

Keywords: *Ricinus comminus*, *Carthamuc tinctorius*, Phytoextraction, Multi-metal, Contaminated soil, Chlorophyll

Chromium Removal by Washing from Contaminated Soil

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Abstract: Soil contamination is a world-wide problem, with chromium (Cr) being a major part of the concern. When released into the environment, Cr exists mainly as hexavalent and trivalent forms. While trivalent Cr is an essential element for living beings, and its deficiency causes disturbance to the glucose and lipid metabolism in humans and animals, hexavalent Cr is very toxic, carcinogenic and mutagenic to human and animals. This study aims to remove from the soil of Cr by assessing the effect of citric and tartaric acid can be used to enhance to Cr removal efficiency in two different soils consist of Cr at an extremely high level (2515 mg/kg Cr) and normal level (235 mg/kg Cr). Three g of Cr contaminated soil sample was incubated for 24 hours at room temperature (~ 25 °C) with 0 (control), 0.01 and 0.05 M citric acid and tartaric acid in a ratio of 1:10 solid-liquid (w/v) were subjected to the washing process at 180 rpm. The pH and the EC of the washing solution were measured and recorded. Then to determine the total Cr concentration, about 10 mL of the supernatant were acidified to about pH 2 with dilute HNO_3, analysed directly for total Cr by ICP-MS and in residue supernatant, Cr(VI) in solution were determined with the diphenylcarbazide colorimetric method by UV/VIS Spectrometer (PG Instruments T90+ UV-Visible Spectrophotometer) at 540 nm wavelength. Results showed that the removal efficiency of Cr from soil increased in the order citric acid ≥ tartaric acid.

Keywords: Chromium, soil washing, heavy metals, soil contamination, citric acid, tartaric acid

Agricultural Usage of Sludge from Urban Wastewater Treatment Plant

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Abstract: As a result of rapidly increasing population, urbanization and industrialization, wastewater production and sewage sludge generation have increased manifold. Issues concerning the treatment and the recovery of sludge derived from the wastewater treatment plants are gaining importance both in Turkey and abroad. Environmental preservation is a major issue in almost every aspect of life, greater emphasis will have to be placed on making sludge and compost hygienically acceptable with minimum contamination from pathogenic organisms and heavy metals. Sewage sludge can be used instead of fertilizer because it contains large amount of organic matter and plant nutrients. Although the use of sludge as fertiliser presents potential resource and environmental advantages, it can have negative effects on people and soil productivity. The presence of heavy metals and pathogens poses a major problem for such utilization of sludge. It is very important for the quality of the environment that the amounts of heavy metals in the sludge sludge are below the values given in the standards. The advantages of using sludges as fertilizer for improving and sustaining soil fertility and crop production are many. To ensure the application of sludge onto agricultural lands in a beneficial and environmentally acceptable manner, stabilization is a must. Laws have been introduced and guidelines prepared for proper and safe use of these materials by farmers.

Keywords: Sewage sludge, Agricultural use, Heavy metal

Effect of Soil Moisture on Heat Diffusivity under the Different Phase Change Conditions

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Abstract: The objective of this study was to determine the effect of soil moisture on heat diffusivity under the different phase change conditions. Phase change in soil temperature is an important parameter for the application of heat conductivity equation to different soil layers. In this study, applicability of the solution of heat conductivity equation in daily soil temperature change was showed with consideration of phase change in the equation. Statistical parameters such as; root mean square error, absolute error, maximum relative error, mean bias error, and conformity index between measured and estimated temperature values of the solution of heat conductivity equation, and efficiency of the model were estimated at 10, 20 and 50 cm depths of soil. The results showed that solution of heat conductivity equation within the given boundary conditions, including phase change, can be used for the prediction of daily temperature change through soil depth. Soil heat diffusivity showed declining increase with increasing soil moisture content, and the relationship between heat diffusivity and moisture can be showed by the second order linear equation.

Keywords: Soil temperature, Heat conductivity equation, Heat diffusivity, Moisture

Effects of Humic Acid on the Growth and Yield of Plants in Saline Soil Condition

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Abstract: Base actosol (12% humic acid) material produced by TKİ and known soil regulator. This study was carried out to investigate the effects of base actosol material on the growth and yield of plants in saline soil condition. We tried to determine agricultural use possibilities and its effects compared with soil leaching application as an important classical method. For this purpose, a factorial pot experiment was conducted in greenhouse as randomized plots design with 3 replications and maize (*Zea mays*) plants was grown in saline soil. The pots fulled with saline soil which its salinity (EC) was 16,87dS/m. Three leaching levels (LFo:0.00; LF1:0.15 and LF2:0.30) and six humic acid levels (Ho:0.00; H1:1500; H2:3000; H3:4500; H4:6000 and H5:7500ppm) were applied. As a control subject was considered YoHo (only irrigation water applied but not humic acid). Irrigation water was applied with weighted the pots. We measured some plant growing criteria. The highest biomass were obtained from the treatments in which humic acid doses of H3 and H2, H4, respectively, were applied with leaching fraction 30% of irrigation water. Similar results were found for other parameters. Statistical data showed us that interaction of humic acid and leaching factors on growing criteria (except plant length) was not significant. But their independent effects was significant with level 99% probability. This study was conducted in greenhouse of Soil Fertilizer and Water Resources Central Research Institute (TGSKMAE-SFWRCRI) under sponsorship of General Directorate Of Turkish Coal Enterprises (TCE-TKİ).

Keywords: Saline soil, Humic acid (HA), Leaching fraction (LF), Soil regulator (Actosol), Growing criteria

Soil Moisture Estimation from Radarsat-2 Data in Semi Arid Regions

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Abstract: Spatially and temporarily distribution of soil moisture is a key parameter for agricultural watershed applications such as drought, crop irrigation scheduling, yield forecast in arid and semi-arid regions. Moreover, radar remote sensing has been used to provide understanding soil and vegetation distribution as a spatially and temporarily for various region. Determination of surface soil moisture detecting using active microwave sensor systems (SAR) is one of useful information for researcher, conservation planners, and decision makers pursuing sustainable natural resources use. This study was carried out Altınova State Farm soils at the selected sixty-four square kilometers test site. It was exerted to determine the relationship between the surface soil moisture and the backscatter values of SAR images using four different times. Radarsat-2 images were gathered on the 13th of December 2011, 26th of April, 28th of August, 4th December in 2012 respectively from Altınova State Farm, Konya. Simultaneously, soils were sampled with 250 m interval at 730 different locations and surface soil moistures were determined using gravimetric methods across study area. Surface soil moisture layers, for each sampling period, were produced using ordinary kriging methods. According to the soil moisture distribution layers August data showed highest surface soil moisture variations compare to other sampling periods through the study area. Hence, it was found the better correlation the relationship between backscattering (obtained from August 2012 Radarsat-2 data) and soil moisture content through the study area than the other SAR data results ($r= 0,506$, $p< 0,000$).

Keywords: Soil moisture, Radarsat-2, Spatial Variability

Classification and Distribution of Different Soils Formed under Arid Terrestrial Ecosystem Based on ST/WRB

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Abstract: The objective of this research was to determine different soils classified according to Soil Taxonomy and World Reference Base formed on different parent material and topographic positions under arid terrestrial ecosystem their distribution map. The study area was carried out Ayrancı district of Karaman province is about 687 km2 and coordinated between 577076m-596768 m east and 41541331m-4174001m north. Elevation of the study area locates between 229 m and 1468 m from sea level and long term annual average precipitation and temperature are 330.8 mm and 12 oC. According to soil taxonomy, soil temperature and moisture regime are mesic and aridic. Topographic map, satellite images, ortophoto, geology maps were used as base data. After examination of topographic, land use, geologic and geomorphologic maps and land observation, 47 profile places were excavated and soil samples were taken from each profile according to genetic horizon and their some physical and chemical analyses were done in the laboratory. By assessing the results of analyses and field studies, six different soils were determined as sub group level according to Soil Taxonomy. Three of them were classified as Entisols due to their young age located on alluvial deposits and steep slope while, half of them are classified as Aridisols. In addition, these soils were also classified basing on FAO/WRB system as Regosol, Leptosol and Fluvisol. In addition, it was produced their maps. According to map, Aridisols have the lowest land (28.1%) whereas, 71.9% of the study area is covered by Entisols.

Keywords: Physiographic units, Soil survey and mapping, Soil classification

Evaluation of Salinity of Irrigation Waters Used in Agricultural Production in Muğla Dalaman Region by Geostatistical Methods

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Abstract: In this study, it is aimed to determine salinity which has become a major problem in irrigation waters used in agricultural areas in Muğla-Dalaman region in recent years and to examine regional changes. In this context, water samples were taken from the regions where agricultural production was common in the region and electrical conductivity (EC) analyzes were carried out in these samples. At these sampling points, which are known to have coordinates in the study, geostatistical analyzes were carried out with the aim of demonstrating the spatial distribution of irrigation water ECs in the region. In geostatistical analyzes; semi-variogram analysis and Ordinary Kriging methods were applied in order to analyze the EC values obtained from sampling points with descriptive statistics. As a result of the research, by creating EC distribution models of the region, accuracy analysis and comparisons of the models were performed.

Keywords: Salinity, Irrigation water, Geostatistical analysis, Electrical conductivity

Determination of Spatial Distribution Pattern of Soil Quality Indices Using Different Interpolation Models in Çorum-Alaca Watershed

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Abstract: Soil quality is not only important for sustainable soil fertility but also has vital role in soil degradation and desertification (incomplete). The objective of this research was to determine and map spatial distribution of the Geometrik (SQIg) and Nemoro (SQIn) soil quality indices models using different interpolation models. This research was carried out in Çorum Alaca watershed located at north part of the Central Kızılırmak Region in the Central Anatolia. Total study area covers about 2754.5 km^2 with different topographic features and the altitude changes from 825 m to 1726 m. In total 312 surface soil samples from 0-20 cm depth were collected at the intersections of a 2.5 x 2.5 km grid system. Some physicochemical properties were determined and soil erodibility factor was calculated. IDW enterpolation model was found as suitable model for two soil quality indices. While 81.1% of the total study area was determined as moderate soil quality class based on SQIg, 96.8% was also found moderate class according to SQIn model. In addition, it was determined that small part of the watershed was classified as weak and good quality classes in both soil quality models.

Keywords: Soil quality, Interpolation models, Çorum Alaca watershed

Assessment of the Relationship Between Some Physico Chemical Properties of Soil and Erodobility Parameters in Micro Basin Scale

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Abstract: In many parts of the World, after carried top fertile soil layers from in suit, erosion causes not only lost functional properties of soil in ecosystem, but also gives environmental, economic, and agricultural damages by means of transporting along the slope and accumulating process. Resistance of soils against to erosion in terms of their structural and durability shows a tendency for vulnerability of erosion, thus, it is possible to determine the direction and size of the erosion. It can me say that determination of soil erosion characteristics is an important approach to detect tendency erodibility of soils. The aim of this study was to evaluate relationships between the some erodibility factors that are dispersion ratio (DR) aggregate stability (AS) and some physico-chemical properties of soils have been used for tea cultivation in micro basin located at Rize province at Eastern Black Sea Region of Turkey. For this purpose, 28 soil samples were taken from different location points of tea cultivated land in micro basin. After laboratory studies, the data obtained were tested statistically. According to the analysis, results shows variability against erosion of the soils taken from tea cultivated land in micro basin. It was found that DR values of soils changed between 3.85% and 18.14% while, AS values were determined between 55.52% and 92.02%. Also, there was detected significantly negative relationship between DO and AS in the correlation test.

Keywords: Dispersion ratio, Aggregate stability, Soil physicochemical properties

The Effect of Excess Cadmium on Growth and Tolerance in Two Purslane (*Portulaca oleracea* L.) Varieties

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Abstract: Cadmium (Cd), one of the highly toxic environmental pollutants of widespread occurrence in both terrestrial and aquatic environments, is toxic to humans and animals after accumulating over decades in the kidney cortex. Cd released into agricultural soil from phosphate fertilizers, wastewater, sewage sludge, cement factories, metal-working industries, power stations and urban traffic. We studied the effects of excess Cd on plant growth, as well as the physiological parameters and accumulation and distribution of some metal nutrient ions with two purslane (*Portulaca oleracea* L.) varieties (cv. Istanbul and wild genotype) in greenhouse at natural light conditions. For this purpose, six levels of Cd (0, 0.05, 0.10, 0.20, 0.40 and 0.80 mM $CdCl_2$) were treated to the soil. The results revealed that Cd exposure progressively depressed plant growth and caused the reduction in contents of photosynthetic pigments (chlorophyll a, b, a+b, and carotenoids), relatively water content (RWC), the shoot and root bio-concentration factor (BCF) and the uptakes of potassium (K), calcium (Ca), zinc (Zn), and sodium (Na) in shoot for both varieties. Moreover, the concentrations of Cd, Zn, K, Na and the uptakes of Cd in shoot and root, total accumulation rate (TAR) of Cd and net Cd accumulation via root was increased by Cd exposure. The root length, membrane permeability (MP) of the leaves, translocation factor (TF) of Cd and the concentrations and uptakes of Ca was different according to varieties. Based on these results, Cd toxicity was more obvious in wild genotype (Cd-sensitive) than in cv. Istanbul (Cd-tolerant).

Keywords: Bio-concentration, Nutrient ions, Plant growth, Photosynthetic pigments, Translocatio

The Effects of Biochar and Increasing Mycorrhiza Applications on Some Mineral Content of Pak Choi (*Brassica Rapa* L. *subsp. Chinensis* L.) Plant

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Abstract: This study was done to determine the effect of biochar and increasing mycorrhiza applications on some mineral material content of pak choi plant. Beginning of the experiment, 300 g/m^2 parcel biochar applied to the each parcel one month before seedling planting. Increasing mycorrhiza doses (0, 15, 20, 30 and 40 mL /plant) were applied to the parcels undergoing biochar application plants were harvested 54 days after seed sowing. According to the experiment results, important increases in some macro and micro nutrient element contents of Pak Choi plant were determined with biochar and increasing mycorrhiza applications. The contents were determined as P (0.41 %, 0.46 %, 0.47 %, 0. 49 % and 0.56 %), K (4.33 %, 4.19 %, 4.06 %, 4.17 % and 4.59 %), Ca (2.03 %, 2.24 %, 2.17 %, 2.25 % and 2.47 %), Mg (0.15 %, 0.16 %, 0.17 %, 0.17 % and 0.20 %), Fe (569 mg/kg, 973 mg/kg, 1016 mg/kg, 1016 mg/kg and 1094 mg/kg), Cu (5.02 mg/kg, 6.26 mg/kg, 6.58 mg/kg, 7.04 mg/kg and 13.16 mg/kg), Mn (62.73 mg/kg, 74.03 mg/kg, 78.00 mg/kg, 85.96 mg/kg and 114.10 mg/kg) and Zn (37.23 mg/kg, 41.36 mg/kg, 42.03 mg/kg, 43.53 mg/kg and 52.83 mg/kg), respectively. Some macro (P, K, Ca and Mg) and micro (Fe, Cu, Zn and Mn) element contents were determined significant at the level of 5 %, statistically. The highest nutrient element contents of pak choi plant were obtained V. dose: 40 mL /plant mycorrhiza applications.

Keywords: Biochar, Mycorrhiza, Macro-micro elements, Pak Choi (*Brassica rapa* L. *subsp. Chinensis* L.), Exotic vegetable.

Spatial Variability of Soil Properties for Precision Management of Yield Limiting Soil Processes

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Abstract: Determining the source of variation in soil properties can help achieve more effective site-specific management of problems threatening the sustainable crop production. The objectives of this study were to characterize the spatial variability of soil properties across a 557 ha farmland in the south of Kırklareli province and determine site specific management zones to improve soil functions. The land was divided into 150m*150m size grids and soil samples were collected at 0-20 and 20-40cm depths from the nodes of 127 grids. The penetration resistance (PR) was also measured at each sampling location. Soil samples were analyzed for sand, clay and silt content, pH, electrical conductivity, organic matter, lime content, available phosphorus (P) and extractable potassium. Soil pH ranged from 4.46 to 8.20 in surface and 4.01 to 8.30 in subsurface layers. Sand content was the least variable (CV=11.5 and 13.9% in surface and subsurface) soil property, while variability of P (CV=105.9 and 119.8%) was higher than the rest of soil properties. The lowest range value was obtained for P content (113 and 134 m) and the longest-range value was for available K content (5899 and 6099 m). The PR values in subsurface exceeded the critical limit of 2 MPa. Spatial distribution maps helped to identify and delineate the zones need to be limed, deficient in available P and compacted zones within the study area. Sustainable management strategies in a farm can be planned and implemented using the information obtained from spatial structures and maps of major soil characteristics.

Keywords: Geoistatistics, Spatial variability, Agricultural practices, Soil acidity

Effects of Zinc Application Against Cadmium Toxicity on Growth and Antioxidative Enzyme Activity in Lettuce

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Abstract: This experiment was conducted to investigate the effects of increasing zinc application against cadmium (Cd) toxicity on growth parameters, as well as superoxide dismutase (SOD), glutatyon reduktase (GR), glutatyon peroksidase (GPX), glutatyon S-transferase (GST) in lettuce, cultivated in sewage sludge amended growth medium. In pot experiment a fixed radio of %10 sewage sludge and various doses of Cd (Cd1:50 mg Cd kg^{-1};Cd2:100 mg Cd kg^{-1}) and of zinc (Zn1:250 mg Zn kg^{-1}; Zn2:500 mg Zn kg^{-1}) were applied. Results showed that, in comparison to control, Cd1 and Cd2 applications decreased fresh and dry shoot weights, plant height, zinc content, SOD and GPX enzyme activities in both shoot and root of lettuce. Moreover, compared to control, Cd1 and Cd2 applications significantly increased the amount of Cd content in shoot and root of plant and the amount of DTPA-Cd in soil. Zn1+ Cd1 and Zn2 + Cd1 applications increased fresh shoot weight, zinc content, SOD and GPX enzyme activities in both shoot and root of lettuce and decreased the amount of DTPA-Cd in soil compared to Cd1 alone application. In comparison to Cd2 alone application, Zn2+Cd2 application increased fresh and dry shoot weight, zinc content, SOD and GPX enzyme activities in both shoot and root and, at the same time, decreased Cd content in shoot and the amount of DTPA-Cd in soil. These results indicate that zinc application may be beneficial for ameliorating the toxic effects of Cd in lettuce.

Keywords: Cadmium, Zinc application, Lettuce, Antioxidative enzymes

The Limitation Effect of Stress Damage by Leonardite on Wheat Plant Exposed to the Salt Stress

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Abstract: The aim of study is to determine that the effect of leonardite material applied to the wheat plant on early grown season. In the climate chamber condition, salt solution (100 mM NaCl) was added to wheat plant a pot experiment, and leonardite material was applied in increasing doses, 10, 20 and 30 g/pot, to reduce the stress of the salt to the plant. The study was carried out on 1 kg of pots under controlled conditions. The experiment was conducted in four replicates according to the factorial trial design. According to the results, the salt applying has negatively affected on the some plant grown parameters. The applied leonardite material has decreased the effect of salt on the wet and dry weight of plant root.

Keywords: Salt stress, Leonardite, Wheat, Pot experiment

Effects of Different Iron Forms and Doses on Plant Growth Criteria in Soybean (*Glycine max* L.

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Abstract: In this study determination of effects of different iron forms and doses on plant growth criteria in soybean (*Glycine max* L.) was aimed. The experiment was conducted according to factorial experimental design with three replication under controlled conditions in chamber room. Soybean (*Glycine max* L.) cultivar named Atakişi were used as experimental plant. Three soybean seed were sown each plastic pot having 1.3 kg soil:sand mixed in 1:1 ratio. Three different doses (0-15-30 mg Fe kg^{-1}) of $FeSO_4.7H_2O$, FeEDDHA and nanoFe were used in different applications. The experiment was ended after five weeks following seed sowing. Plant length, plant fresh weight, plant dry weight, root length, root fresh weight, root dry weight and number of compound leaf were determined in harvested plants. The highest plant fresh weight, plant dry weight, root fresh weight, root dry weight means and compound leaf number were found in 15 mg kg^{-1} nano Fe applications as 3.56 g, 0.83 g, 2.30 g, 0.33 g and 5 number, respectively. The lowest plant fresh weight and plant dry weight means were found as 1.84 g and 0.33 g in 15 mg kg^{-1} $FeSO_4.7H_2O$ applications while the lowest root fresh weight, root dry weight means and compound leaf number were determined in 30 mg kg^{-1} nano Fe applications. Generally, plant growth criteria were decreased by increasing iron doses.

Keywords: Soybean (*Glycine max* L.), Soil, Iron, Plant growth, Nano iron

Determination of Annual Agricultural Areas by High Resolution Satellite Data and Object-Based Classification Method

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Abstract: In this study conducted in Karacalli town of Aksu District in Antalya province, it was aimed to determine annual agricultural areas and to introduce different parcel-based production models by using high resolution satellite data and object-based classification method. For this purpose, the study area was analyzed by object-based classification method using normalized vegetation difference index (NDVI) and green normalized vegetation difference index (GNDVI) calculations. The study consists of three basic stages. These are data collection and preparation, segmentation and classification, accuracy analysis and evaluation. In the first phase of the study, high resolution Sentinel 2A satellite data for the area, Google Earth Pro data, and vector data for annual agricultural areas were provided. Sentinel 2A satellite data was used with blue, green, red and NIR bands with a spatial resolution of 10 m. The multiresolution segmentation algorithm was used in the segmentation phase of the study. In this phase, the most appropriate scale parameter, shape and compactness criteria were applied. In the classification, classes were assigned to the annual agricultural areas according to production models. In the last stage of the study, the accuracy analysis and evaluation stage, the classification results were evaluated by comparing with the ground truth data. As a result of the study, it was revealed that the parcel-based distributions of the annual agricultural areas distributed in the region and the differences in the production models of the same parcels can be determined with extremely high accuracy by using the object-based classification method and the index calculations.

Keywords: Remote sensing, Object-based classification, Segmentation, Annual agricultural areas, High-resolution data

Soil Characteristics of Oriental Tobacco Cultivation Fields in Eşme Province, Uşak (Turkey)

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Abstract: Oriental tobacco (*Nicotiana tabacum* L.) farming is practised intensely in Eşme province of Uşak and plays a crucial role in the regional economy. This study was carried out to determine the basic fertility properties of tobacco growing soils, and to contribute knowledge on this topic which needs even further investigation. For this purpose, 513 soil samples were taken and their pH, electrical conductivity, total organic matter, particle size distribution, total N, extractable macro and micronutrients (P, K, Ca, Mg, Na, Fe, Cu, Zn and Mn) analyses were realised and interpreted. Besides, area information of cultivation fields was determined to comprehend the agricultural structure of the region. According to the results obtained, pH values of these soils were determined as between 4,85 and 7,85. As a convenient result, a positive effect of relatively low pH values on extractable Fe and Mn were observed (pH-extractable Fe as -0,672**; pH-extractable Mn as -0,638**). After an evaluation on particle size distribution, sand fraction was determined as the dominant particle type. Negative correlations between this fraction and plant nutrients were also verified by statistical analyses. The average area of cultivation fields was found as 9.88 da, while 24 % of this total area is smaller than 5 da.

Keywords: Oriental tobacco, Soil properties, Plant nutrients, Turkey

Formation and Classification of the Soil Found in Different Physiographic Units affected by Lake Van

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Abstract: The objective of this research was to determine soil formations at the different physiographic units affected by Lake Van and to classify soils according to Soil Taxonomy. Seven soil profiles in the research area were defined and some soil physical and chemical properties were determined. Soils do not show a good profile development due to their too young formation, and they have moderate and shallow profile depths. Drainage problems were observed locally, and also increments in lime and sodium contents at the subhorizons were determined. Soils at the different physiographic units formed by the effect of Lake Van were included to Entisol and Inceptisol orders. Profiles were classified in the subgroups as follows; profile 1- Oxyaquic Xerorthent, profile 2- Typic Haploxerepts, profile 3- Calcic Haploxerepts, profile 6- Typic Xeropsamments, and profiles 4, 5 and 7- Typic Xerothents.

Keywords: Physiographic unit, Soil formation, Soil classification, Lake Van

Acknowledgements: This work was supported by Research Fund of the Van Yuzuncu Yil University. Project Number: 2011-FBE-YL015.

Effects of Different Growing Media on Nutrient Contents of Petunia (*Petunia hybrida*)

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Abstract: The objective of this study was to investigate the effects of different growing media on nutrient contents of petunia (*Petunia hybrida*). The experiment was conducted in a randomized experimental design with three replication in a chamber room under controlled conditions at Department of Soil Science and Plant Nutrient Laboratory. Petunia (*Petunia hybrida*) were used as experiment plant in this study. Seven different media (soil, 3:1 soil: barnyard manure (BM1), 2:1 soil: barnyard manure (BM2), 3:1 soil: peat (P1), 2:1 soil:peat (P2), 3:1 soil: sugar beet pulp (SBP1), 2:1 soil: sugar beet pulp (SBP2) were used as plant growing media. Soil and organic materials were mixed according to volume basis. The experiment was ended after three months following transplanting of seedlings. Macro and micro nutrient contents were determined in harvested plants. The highest potassium, magnesium and zinc means of plants were obtained as 6.6 %, 2.2 % and 32.50 mg kg^{-1} in soil: barnyard manure (2:1) growing media while the highest phosphorus and calcium means of plants were found as 0.27 % and 4.5 % in soil and peat growing media respectively. The highest iron and copper means of plants were determined as 231 mg kg^{-1} and 32.50 mg kg^{-1} in ratios of 2:1 and 3:1 of soil: sugarbeet pulp growing media respectively. Generally nutrient contents of plants obtained in growing media having organic material were higher than those obtained in control.

Keyword: Petunia (*Petunia hybrida*), Growing media, Nutrient content

Acknowledgements: This study was financially supported by Van YYU Scientific Research Project Coordination Unit (Project no: FHD-2017-6147).

Some Soil Properties of Walnut Gardens in Hizan (Bitlis) Region and Relationships with Nutrient Status

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Abstract: This study was carried out in Hizan district of Bitlis province, in order to determine some soil proporties of some local walnut gardens by soil and leaf analysis. Representing the study area, soil sample taken from 0-30 cm and 30-60 cm depth of 20 walnut gardens, and leaf samples taken from the same trees were analyzed. In soil samples (pH, $CaCO_3$, electrical conductivity, texture, organic matter, available phosphorus, total nitrogen, potassium, calcium, magnesium, iron, zinc, manganese and copper) were analysed, also, in leaf samples (N, P, K, Ca, Mg, Fe, Zn, Mn and Cu) were analysed. The results of analysis of leaf and soil samples were compared with the limit values, and some soil proporties problems of the examined gardens were tried to be determined. According to the results, it has been found that the soils of experimental area were sandy clay loamy in texture. The soils did not had salinity and carbonate content problem. It was determined that almost allof the soils reaction is slightly alkaline. Fifteen percent of the soil contains very little, 60 % of the soil contains little, 25% of the soil contains moderate organic matter. It was also found that walnut orchard soils had sufficient levels of magnesium and iron as 80%, phosphorus and copper as 90%, mangan and zinc as 20%, nitrogen as 65%, potassium as 70%. According to the results of leaf analysis were determined phosphorus 10 %, potassium 25%, magnesium 40 %, iron 15%, calsium 10 % and zinc 85% as insufficient levels of minerals, Mn and Cu were sufficient levels.

Keywords: Walnut Gardens, Soil properties, Nutrient