



**PROCEEDINGS
OF
FIRST INTERNATIONAL
BIOLOGICAL,
AGRICULTURAL AND LIFE
SCIENCE CONGRESS**

NOVEMBER 7-8, 2019

LVIV, UKRAINE



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INTERNATIONAL BIOLOGICAL,
AGRICULTURAL AND LIFE SCIENCE
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**7-8 NOVEMBER, 2019,
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WELCOME NOTES

You are welcome to our BIALIC Congress that is organized by Trakya University. The aim of our congress is to present scientific subjects of a broad interest to the scientific community, by providing an opportunity to present their work as oral or poster presentations that can be of great value for global science arena. Our goal is to bring three communities, namely science, research and private investment together in a friendly environment of Lviv, Ukraine in order to share their interests and ideas and to benefit from the interaction with each other.

In November 2019, it will be held the first edition of the BIALIC Congress, with ambition of the organizers to make it a periodical event. We are proud to announce that in the BIALIC 2019 will take part more than 300 scientists and researchers from all over the world. There were submitted 376 scientific papers, of which 226 will be presented as oral talks and 150 as poster presentations. The full author list of all submitted papers comprises 936.

Our congress is a premier international science, technology and business forum focusing on Agriculture, Biology and Life Science. The technical sessions highlight invited and volunteer speakers. We love our nature and care about the environment. We wanted to make our congress as much greener as possible, using less paper. The participants' posters were submitted via congress web page and will be presented on electronic posters. Abstract book is published in electronic version in the web which will be provided on each participant.

Congress Topics:

Agriculture, Forestry, Life Sciences, Agricultural Engineering, Aquaculture and Biosystems, Animal Science, Biomedical science, Biochemistry and Molecular Biology, Biology, Bioengineering, Biomaterials, Biomechanics, Biophysics, Bioscience, Biotechnology, Botany, Chemistry, Chemical Engineering, Earth Sciences, Environmental Science, Food Science, Genetics and Human Genetics, Medical Science, Machinery, Pharmaceutical Sciences, Physics, Soil Science.

Lviv is not only a very nice, lovely and historical city at the edge of Europe, but located just at the heart of Eastern Europe region. We are much pleased to host all of you in Lviv, Ukraine.

We would like to thank all of you for joining this congress and we would like to give also special thanks to our sponsors and collaborators for giving us a big support to organize this event.

We wish you nice stay in Lviv, Ukraine!

Prof Dr Yalcin KAYA

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**(28423) MICROALGAE: A VERSATILE FEEDSTOCK FOR
BIOPRODUCT MANUFACTURING AND ENVIRONMENTAL
APPLICATIONS**

Nurhan Turgut Dunford¹

¹ *Oklahoma State University Biosystems and Agricultural Engineering Department and Robert M.
Kerr Food and Agricultural Product Center, Stillwater, OK, USA*

nurhan.dunford@okstate.edu

Microalgae are micron sized plants that utilize carbon dioxide and solar energy through photosynthesis and produce biomass that can be converted to many bioproducts. Microalgae cells are capable of producing high-value compounds that are widely used in the food, feeds, pharmaceutical, medical, nutraceutical, cosmeceutical, aquaculture and many other industrial product manufacturing. Many algae strains grow in water. Wastewater generated during industrial manufacturing and agricultural production can be used for algae cultivation. Algal biomass grown in wastewater can be converted to biofuels and other bioproducts. In the course of algae growth, excess nutrients (i.e. nitrogen and phosphorous) and some of the contaminants present in wastewater are absorbed by algal cells and removed from the wastewater during biomass harvest leading to water remediation. During the same process, carbon dioxide is sequestered, and oxygen is produced resulting in reduction of greenhouse gas emissions. This presentation will highlight some of the examples of the integrated wastewater remediation and bioproduct manufacturing systems. The effect of algae growth on wastewater quality and characteristics of the algal biomass conversion products will be discussed.

Keywords: Microalgae, Feedstock, Bioproduct Manufacturing, Biomass, Wastewater

(28147) CROP IMPROVEMENT AT NIL-COMPETITION FOR RESILIENCE TO CLIMATE CHANGE

Ioannis Tokatlidis

Trakia Democritus University, Greece

itokatl@agro.duth.gr

Crop yield, the average per area grain yield, is essentially the product of plant population density by the mean grain yield per plant (i.e., the genotype yielding capacity per se). Breeding conducted at dense stand usually focuses on the 'strong-competitor' ideotype. Due to the inverse relationship of yielding with competitive ability, the 'strong-competitor' genotype falls short of yielding capacity per se, and in sequence, modern varieties standing out for tolerance to density demand high densities to accomplish the high yield ceiling of favourable agro-ecosystems. However, because today's agro-ecosystem is largely varying across seasons, low densities are necessary at stressful seasons, implying that modern varieties are density-dependent exhibiting erratic optimum density across seasons, a severe thread against sustainability. Resilience to climate change and variable agro-ecosystems heavily relies on an alternative genotype component of the variety, the 'weak-competitor' ideotype, tightly connected with improved plant yield efficiency and high yielding capacity per se. The 'weak-competitor' is detectable only at the nil-competition regime, an ultra-low density that precludes plant-to-plant interference for any input. Breeding at nil-competition fully satisfies the Falconer's general equation of response to selection, i.e., expanded phenotypic expression, improved heritability, and high selection intensity. The nil-competition regime maximizes phenotypic expression and differentiation, with multiple larger grain yield per plant to provide sufficient seed for extensive for progeny evaluation, and wide differences between individual plants to facilitate the single-plant selection. It optimizes the heritability thanks to moderated environmental influences on genotypic expression and decreased environmental share in the total phenotypic variation, as well as to experimental designs of even and systematic entry arrangement that successfully sample the spatial heterogeneity. At the nil-competition regime, genotypes of the 'weak-competitor' ideotype are seamlessly expressed to exhibit their high yielding capacity, thus, they are preferably selected under high selection pressure at the expense of those of low yielding capacity per se. Moreover, contrarily to dense stand that may cause biased evaluation and by error selection of plants that gain acquired advantage of additional inputs when neighboring empty hills, the nil-competition regime takes full advantage of genetic variability since even plants adjoining unoccupied hills can be objectively considered for selection. Key reasons bring to the forefront the 'weak-competitor' ideotype to reach resilience and sustainability in the future via improved plant yield efficiency and crop spacing. The first reason is the necessity to tackle the problem of intra-crop variation (plant-to-plant variability within the crop stand); crop spacing combined with mild intra-species competition, moderates the among plants acquired differences, essential to optimize the crop efficiency in the resource use. Improved plant yield efficiency is also necessary for better compensation for yield loss due to missing plants, a common situation in the field. The same applies for missing genotypes in occasion multi-genotypic varieties are preferred to counteract unpredictable abiotic or biotic stresses and offer a buffer against environmental diversity. Improved plant yield efficiency lowers and stabilizes the threshold of the optimum density, leading to the density-independent variety; under variable growing conditions, such a variety is a mandate to gear crop production at low densities without compromising the high yield levels expected at favourable environments. Another reason is the expected increased interest in the low-input agricultural system, applicable only under low densities, in order to keep growing at degraded soils, to restrict the activity of dynamic erosive agents and protect the natural resources. In addition, crop yield components related to stability such as high harvest index, reduced barrenness, and resistance to lodging, are closely associated with crop spacing and improved plant yield efficiency.

Keywords: crop stability; inter-species competition; plant yield efficiency; response to selection; variable agro-ecosystem

(25068) EVALUATION OF RESIDUE DISTRIBUTION OF SPRAYING NOZZLES PRODUCED FOR THE PREVENTION OF SPRAY DRIFT

Eray Onler ¹, Ilker H. Celen ², Gurkan Guvenc Avci ³

¹ *Namik Kemal University, Turkey*

² *Namik Kemal University, Agricultural Faculty, Biosystem Engineering Department, Turkey*

³ *Tekirdag Viticulture Research Institute, Turkey*

icelen@nku.edu.tr

The widespread use of pesticides has negative impacts on human health and the environment. This situation increases the severity day by day. Especially spray drift is one of the factors that should be controlled. In addition, pesticide costs have led to new solutions. Conventional spraying nozzles and anti-drift spraying nozzles are discussed in this study. The study carried out in viticulture areas. Pesticide residual amounts were determined by sampling surfaces placed in different parts of the plant. The sampling surfaces were placed on the top and bottom surfaces of the leaves. The food color mixed liquid was sprayed by the air-assisted sprayer. Applications were carried out at a pressure of 10 bar and at a feed rate of 6 km / h. Samples were analyzed by a spectrophotometer. Pesticide residue rates were determined in different regions of the plant (top surface of the leaf and bottom surface of the leaf) and statistical analysis was performed and presented. The average pesticide residual amounts on the leaves with the anti-drift spray nozzles AITX 8002 VK and ITR 8002 were found to 63.5% and 49.9% higher than the conventional TX VK12 spray nozzle, respectively, also 44.2% and 32.2% higher than the other conventional spray nozzle TR 8002, respectively. The lowest value of top to bottom pesticide residue ratio for leaves was 2.22 at anti-drift ITR 8002 spray nozzle and the highest value of top to bottom pesticide residue ratio for leaves was 2.95 with the conventional spray nozzle TR 8002. All the type of spray nozzles except anti-drift AITX 8002, produced less residue in the inner parts compared to outer parts. The highest penetration rate was 90% with the AITX 8002 VK spray nozzle and the lowest penetration was 55% with the conventional TX VK12 spray nozzle type.

Keywords: Pesticide, Pesticide Drift, Residue, Spray Nozzle, Penetration, Viticulture

(27305) GLOBAL CLIMATE CHANGE: A CHALLENGE TO THE GENETIC DIVERSITY AND UTILIZATION FOR SUSTAINABLE FOOD SECURITY

Shri Mohan Jain

University of Helsinki, Department of Agricultural Sciences, PL-27, Helsinki, Finland

jain.mohan70@gmail.com

Global climate is continuously changing, that may have adverse impact on sustaining food production and food security. Recently erratic climate change has been recorded worldwide that has affected sustainable food production. Both climate change and ever-growing human population are major factors for the loss of genetic resources, arable land deletion and water shortage. Rise in global temperature may develop new insect and pests, and disease that may devastate agriculture; and some of them may disappear. Availability of sufficient water is scarce, which is a matter of concern to sustainable agriculture. Genetic diversity is the key for the survival, evolution of species, and utilization for crop improvement. Genetic variation within a species is important for its ability to adapt to a changing environment. Species having larger levels of genetic diversity have a better chance of adaptation, survival, and deployment over a wide range of environmental conditions. Appropriate levels of genetic variation should be maintained in the populations of a species for conservation planning and prevent genetic erosion. The conservation of genetic resources should be based on the genetic architecture and phenology, and how genetic and phenotypic variation is organized and distributed within and among populations of a species. The rate of spontaneous mutations is very low that hampers in utilizing in plant breeding programs. In order to enhance mutation rate, induced mutations are induced with radiation and chemical mutagens in most of the major crops, and used for developing new varieties with useful traits. Over 3500 mutant varieties of different crops have been officially released in over 60 countries and have helped in sustaining agriculture and food security by using conventional and innovative breeding tools, e.g. in vitro culture, transgenic, and molecular markers. Plant genetic diversity is conserved by cryopreservation, cold storage, seed banks and field gene banks, for exchange and utilization. Plant regeneration from somatic embryos and embryogenic cell suspension is necessary for cryopreservation. In cold storage, shoot cultures are preserved at 4-50 C, however subcultures are needed even though their number is reduced. Examples from vegetative and seed propagated crops would be discussed.

Keywords: global warming, genetic resources, gene filtration, in vitro conservation, seed banks

(27480) IMPACT OF VERMICOMPOST TO DENT CORN (*Zea mays L. indentata*)

Ayse Gulgun Oktem¹, Abdullah Oktem²

¹ *University of Harran, Faculty of Agriculture, Turkey*

² *University of Harran, Turkey*

gulgunoktem@harran.edu.tr

Corn is the most cultivated cereal plant in the world after wheat and rice. Grain yield of corn depends of genetic factors but the application of various nutrients to the soil is also effective for increasing yield. Vermicompost is used for increasing grain yield at some plants recently. Worm fertilizer which is known as vermicompost is an organic fertilizer which fertilizer is digested by worms and converted into fertilizer. Vermicompost includes all enzymes, soil antibiotics, vitamins, growth hormones and humic substances for plant growth. In this study, it was aimed to determine the effects of various levels of vermicompost on the yield and some characteristics of corn plant. The study was conducted in 2017 growing season of Harran Plain Second Crop conditions. In the study, DKC-6120 corn variety was used as plant material. Different levels of vermicompost were applied as a supplementary to standard inorganic fertilizer. Vermicompost dosages were 0, 50, 100, 150, 200 kg/da. The research was conducted according to the randomized complete block design with three replicates. Row spaces were 70 cm and intra row space was 20 cm. Seeds sown in 2-4 cm depth. Each parcel was built from 14 m². In the study hectoliter weight, ear weight, ear diameter, ear length, grain numbers of ear and grain yield values were determined. The highest hectoliter weight (80,37 g), ear weight (302,67 g), ear length (23,33 cm), grain number of ear (802.47 number) and grain yield (976.67 kg/da) values were obtained from 200 kg/da vermicompost applications while the lowest values were seen at control parcels (77.87 g, 260 g, 21,79 cm, 710.27 number, and 895.24 kg/da, respectively). Variance analysis was made with obtained data and the differences between the averages were compared according to the LSD test.

Keywords: vermicompost, dent corn, grain yield, Sanliurfa

**(27859) IMPROVING SILAGE FEED QUALITY OF MAIZE BY
INTERCROPPING WITH SOME LEGUMES**

Mustafa Kizilsimsek¹, Tugba Gunaydin², Ahmet Aslan², Kubra Keklik², Hamit Acikgoz²

¹ *Kahramanmaras Sutcu Imam University, Turkey*

² *Kahramanmaras Sutcu Imam University, Agriculture Faculty, Turkey*

mkizil@ksu.edu.tr

Maize is the most cultivated plant for silage making in all over the World due to its many advantages such as producing high yield, suitable for mechanization and easy to ensile. However, the most important shortcoming property of maize silage is insufficiency of protein content. This study was planned for resolving this problem to a certain extent by growing maize with legume in the field as intercrop without any decrease in maize stand. Silage pH was significantly decreased in all intercropping patterns, regardless to legume, compared to sole maize, however, all pH values were enough low indicating a sufficient fermentation has occurred in the silo. Intercropping maize with soybean increased dry matter recovery (DMR), dry matter intake (DMI) and relative feed value (RFV) compared to sole crop maize. The NDF values of intercropped maize were better than that of pure maize resulting increases in DMI. Intercropping maize with any legumes caused an increase in crude protein (CP) content.

Keywords: Silage, feed quality, intercropping, maize

(27866) THE ISOLATION AND SILAGE FERMENTATION CAPABILITIES OF LACTIC ACID BACTERIA FROM DIVERSE ECOLOGICAL PASTURES

Mustafa Kizilsimsek¹, Tugba Gunaydin²

¹ *Kahramanmaras Sutcu Imam University, Turkey*

² *Kahramanmaras Sutcu Imam University, Agriculture Faculty, Turkey*

mkizil@ksu.edu.tr

Usage of high-quality forage that enhances the production efficiency in livestock industry is a quite important issue. During a famine period or when it is unavailable to reach fresh forage due to seasonal factors, the ensiled forage becomes a vital role for feeding ruminants. Lactic Acid Bacteria (LAB) is the most important microorganisms in silage for desired fermentation. In this work, LAB isolation in epiphytic flora from diverse field forage crops and ecologies in Turkey were made in order to determine their fermentative capacity and to develop a high-quality silage inoculant. For this purpose, the forage crops were collected from several rangelands from different altitudes of 50 to 1500 m from both fresh forage and ensiled material. Total acid production capacities of isolates were determined and 70 isolates were selected in terms of acid zone creation in growth media containing CaCO₃. Then, LA production levels in MRS broth media of isolates were determined and final 10 isolates were selected for inoculation trials. Also, morphological, physiologic, biochemical properties of selected 10 isolates were analyzed and identified by BIOLOG kit on species level. Isolates that have outstanding properties about lactic acid productivity are left to use further inoculation research work.

Keywords: Latic Acid Bacteria, silage, isolation

**(27867) LETHAL EFFECT OF TURKISH DIATOMACEOUS EARTH
(K14) AGAINST ADULTS OF AMERICAN COCKROACHES
(*Periplaneta americana* L.)**

Necati Al¹, Hasan Tunaz², Ali Arda Isikber¹, Mehmet Kubilay Er¹

¹ Kahramanmaraş Sutcu Imam University, Turkey

² Kahramanmaraş Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey

htunaz@ksu.edu.tr

In this study, mortality effects of K14 which is local diatomaceous earths, were investigated against adults of American cockroach (*Periplaneta americana* (L.)) on concrete, ceramic floor tile and laminate flooring. On these three different surfaces, *P. americana* adults were exposed to K14 diatomaceous earth at the doses of 2.5, 5, 10, 20, 40, 80 and 100 g/m² along 11 days. In all surface applications of K14 diatomaceous earth, exposure time and dose caused significant effect on mortality rates of *P. americana* adults. It was determined that K14 coded Turkish diatomaceous earth has the lowest mortality effect on all application surfaces at the dose of 2.5 g/m² after 11 days. Starting from the 40 g/m² dose of the K14 local diatomaceous earth, all doses have reached 100% mortality at the end of the eleventh day on all application surfaces. In general, the mortality activity of K14 diatomites against *P. americana* adults was found to be similar on all three surfaces at the end of the seventh to eleventh days. At the end of this study, local diatomaceous earth coded K14 was found to be good alternatives for controlling *P. americana* which is a medical pest insect.

Keywords: Turkish diatomaceous earth, *P. americana*, surface application

(27869) DETERMINATION OF TOXICITY OF GASEOUS OZONE AGAINST NYMPH STAGES OF GERMAN COCKROACH (*Blatella germanica* L.)

Ugur Guz ¹, Hasan Tunaz ², Mehmet Kubilay Er ¹, Ali Arda Isikber ¹, Inanc Safak Doganay ¹

¹ Kahramanmaras Sutcu Imam University, Turkey

² Kahramanmaras Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey

htunaz@ksu.edu.tr

In this study under, the effects of two different concentrations of ozone gas (16.7 and 33.3 mg / L) against *Blatella germanica* nymphs at different exposure times (10, 20, 30, 40 and 50 minutes) were investigated laboratory conditions. It was determined that the ozone gas had important effect on mortality of *B. germanica* nymphs. In general, ozone gas caused higher paralysis-mortality rates of *B. germanica* nymphs than mortality rates of *B. germanica* nymphs at both concentrations and all exposure times. A concentration of 33.3 mg / L of ozone gas with 40 and 50-minute exposure times killed all cockroach nymphs after 24 hours. On the other hand, only 16.7 mg / L concentration of ozone gas with 50-minute exposure time killed 100% of the *B. germanica* nymphs after 24 hours. In terms of the exposure time of the ozone gas to nymphs of *B. germanica*, the concentration of 33.3 mg / L. with 10-minute exposure times resulted 83% mortality, with 20-minute exposure times resulted 90 % mortality and with 30-50-minute exposure times resulted 100 % mortality after 24 hours. 16.7 mg / L of ozone gas, the nymphs resulted in 73% mortality with 10-minute exposure times, 83% mortality with 20-30-minute exposure times, and 100% mortality with 40-50-minute exposure times after 24 hours. All these results show that the ozone gas (33.3 mg / L) with 40-50-minute exposure times can successfully control *B. germanica* nymphs.

Keywords: Ozone gas, *Blatella germanica*, mortality, biological efficacy

(27870) BIOLOGICAL EFFICIENCY OF TREATMENT OF OZONE GAS AGAINST *Plodia interpunctella* (HUBNER) (LEPIDOPTERA: PYRALIDAE) (INDIAN MEAL MOTH) IN HAZELNUT

Ali Arda Isikber¹, Hasan Tunaz², Mehmet Kubilay Er¹

¹ Kahramanmaraş Sutcu Imam University, Turkey

² Kahramanmaraş Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey

isikber@ksu.edu.tr

In this study, ozone gas was treated to all biological stages of *Plodia interpunctella* (Hübner) (Indian meal moth) at various exposure periods (30, 60, 120, 240 and 360 minutes) and at different concentrations (8.4, 16.7, 33.3, and 66.6 mg/L), at intervals of half an hour in empty space. Moreover, in biological tests conducted in presence of hazelnuts, ozone gas at different concentrations (16.7, 33.3 and 66.6 mg/L) were exposed to all biological stages (egg, larva, pupa and adult) placed at top and bottom of the commodity for various exposure periods (2, 4 and 6 hours). Toxicity data for empty space ozone treatments indicated that mortality rates of the adults and pupae were found to be high at low ozone concentrations (8.4 and 16.7 mg/L) and short application periods (30 at 60 minute), whereas mortality rates of the eggs and larvae were very low. High mortality rates were obtained from the larvae and eggs with the increase in the application period, but 100% mortality of the larva and egg was achieved at the highest exposure times (240 and 360 minutes) and ozone gas concentration (66.6 mg/L). In biological tests conducted in presence of hazelnut, 100% mortalities of all biological stages of *P. interpunctella* placed at top of the commodity were obtained at tested ozone concentrations and exposure periods. Generally, the mortalities of all life stages of *P. interpunctella* placed at bottom of the commodity for ozone treatments were lower than those placed at top of the commodity. It was easy to kill the pupae and adults of *P. interpunctella* placed at bottom of the commodity while the ozone treatments resulted in low mortalities of the eggs and larvae placed at bottom of the commodity. Just as 100% mortalities of the larvae and adults were not obtained even at the highest ozone concentration for the longest exposure period. In conclusion, in this study, it was observed that ozone gas only at high concentrations can control all biological stages of *P. interpunctella* in hazelnut and therefore could have an alternative potential for methyl bromide in quarantine applications in short application period.

Keywords: *Plodia interpunctella*, ozone gas, hazelnut, fumigation

(27872) INSECTICIDAL ACTIVITY OF LOCAL DIATOMACEOUS EARTH IN COMBINATIONS WITH ENTOMOPATHOGENIC FUNGUS, *Beauveria bassiana* (Bals.) VUILL. AGAINST *Rhyzopertha dominica* (F.)

Ali Arda Isikber¹, Hasan Tunaz², Mehmet Kubilay Er¹, Ozgur Saglam³

¹ Kahramanmaraş Sutcu Imam University, Turkey

² Kahramanmaraş Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey

³ Tekirdag Namik Kemal University, Agriculture Faculty, Plant Protection Department

isikber@ksu.edu.tr

In this study, effectiveness of local diatomaceous earth (DE) in combinations with entomopathogenic fungus, a local isolate of *Beauveria bassiana* (Bals.) Vuill. (EP) against stored grain insect, *Rhyzopertha dominica* (F.) was determined. Biological tests were carried out to determine insecticidal activity of 250 and 500 ppm concentrations of DE alone, 150 and 300 ppm of EP alone and their binary combinations against *R. dominica* adults on wheat. The mortality of *R. dominica* 7 and 14 days after the treatments and their F1 progeny densities 65 days after the complete of each biological test were determined. All treatments of DE alone (250 and 500 ppm DE) resulted in low mortalities of *R. dominica* adults. After 7 days of the treatments, all combinations of DE and EP resulted in higher mortalities of *R. dominica* than DE and EP alone. However, treatments did not produce complete mortality of *R. dominica* adults after 7 days of the treatments. Whereas, all combinations of DE and EP, except treatment at the highest concentration of EP (300 ppm), resulted in significant increase of mortality of *R. dominica* adults after 14 days of the treatments. The complete mortality of *R. dominica* adults were obtained at only combination of 300 ppm EP and 500 ppm DE after 14 days of treatment. All combinations of DE and EP significantly reduced F1 progeny production compared with that at control. However, all combinations of DE and EP, except combination of 300 ppm EP and 250 or 500 ppm DE, did not completely prevent progeny production of *R. dominica*. In conclusion, this study indicated that binary combination of local diatomaceous earth and *B. bassiana* local isolate would have potential to be used for control of stored grain insects.

Keywords: Local diatomaceous earth, entomopathogenic fungus *Beauveria bassiana*, *Rhyzopertha dominica*

**(27877) MICROWAVE RADIATION TREATMENT FOR
CONTROLLING COWPEA WEEVIL (*Callosobruchus maculatus*
(Fabricius)) ON STORED CHICKPEA**

Aysegul Tavukcu ¹, Ali Arda Isikber ², Mehmet Kubilay Er ², Ozgur Saglam ³, Hasan Tunaz ⁴

¹ Republic of Turkey Minister of Agriculture and Forestry, Izmir Provincial Directorate of Agriculture, Turkey

² Kahramanmaras Sutcu Imam University, Turkey

³ Tekirdag Namik Kemal University, Agriculture Faculty, Plant Protection Department, Turkey

⁴ Kahramanmaras Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey

isikber@ksu.edu.tr

In this study, the experiments were conducted to determine efficiency of microwave radiation treatments in a kitchen-type and industrial conveyor belt type microwave oven against all biological stages of cowpea weevil (*Callosobruchus maculatus* (Fabricius)) on stored chickpea and their effects on chickpea quality. In biological tests conducted in kitchen type microwave oven, 100 % or close to 100 % mortality of all biological stages of *C. maculatus* on chickpea was achieved by 720 W 40 s and 900 W 40 s microwave treatments while surface temperatures of chickpea for these treatments were determined to be 64.8 and 69.9 °C respectively. In biological tests conducted in industrial conveyor belt type microwave oven, all microwave exposure periods (62 s, 72 s, 90 s, 100 s) at 800 W power produced the mortalities ranging from 98.7 % to 100 % of its biological stages with 72.7, 81.5, 90.6 and 97.4 °C of surface temperature on chickpea respectively, while all microwave exposure periods at 600 W power produced the mortalities ranging from 92.5 % to 100 % of biological stages with 59.8, 72.7, 78.9 and 84.9 °C of surface temperature respectively. Generally, in both kitchen-type and industrial conveyor belt type microwave oven germination rate of chickpea significantly decreased with increasing both microwave power and exposure time. However, total protein content of chickpea was not affected by microwave treatments. In conclusion, this study indicated that microwave disinfestation of *C. maculatus* on chickpea could have a great potential to be an alternative for chemical disinfestation methods.

Keywords: Microwave radiation, *Callosobruchus maculatus*, chickpea, stored product insects

(27888) MORTALITY OF *Spodoptera littoralis* LARVAE CAUSED BY EICOSANOID BIOSYNTHESIS INHIBITORS AND TWO NATIVE ISOLATES OF *Metarhizium anisopliae*

Hasan Tunaz¹, Mehmet Kubilay Er², Ali Arda Isikber²

¹ Kahramanmaraş Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey

² Kahramanmaraş Sutcu Imam University, Turkey

htunaz@ksu.edu.tr

Mortality responses were changed with two different *Metarhizium anisopliae* isolates. Although the effect of *M. anisopliae* (2735) isolate on mortality was lower, the effect of *M. anisopliae* (3293) isolate was expressed in a time-dependent manner on the mortality of larvae. When *M. anisopliae* (3293) isolates and eicosanoid biosynthesis inhibitors (phenidone dexamethasone, naproxen, indomethacin, esuletin, ibuprofen) were injected to the larvae, increased and faster larval mortality of the larvae was seen. Similarly, increasing dosages of phenidone (eicosanoid biosynthesis inhibitor) were associated with increased mortality activity of the larval insects co-injected with the *M. anisopliae* (3293) isolate. Nodulation is the predominant cellular reaction to the injection of bacteria and fungi in insects. Treating larvae of *S. littoralis* with *M. anisopliae* (3293) isolates induced nodulation reactions and injecting larvae of *S. littoralis* with eicosanoid biosynthesis inhibitors, immediately before intrahemocoelic injections of *M. anisopliae* (3293) isolate sharply reduced the nodulation response to fungal challenges. These findings support that the virulent effects of entomopathogen, *M. anisopliae* (3293) can be enhanced when the *S. littoralis* immune system is suppressed.

Keywords: Eicosanoid; *Metarhizium anisopliae*; *Spodoptera littoralis*

**(27889) EVALUATION OF INDIVIDUALS OBTAINED FROM
B28×KUNDURU-1149 RECIPROCAL CROSS POPULATION BY
FUNCTIONAL MARKERS**

Gulan Aydemir ¹, Ilker Yuce ¹, Tugba Baskonus ², Huseyin Gungor ³, Ziya Dumlupinar ⁴

¹ *Kahramanmaras Sutcu Imam University, Agricultural Biotechnology Department, Turkey*

² *Kahramanmaras Sutcu Imam University, Field Crops Department, Turkey*

³ *Duzce University, Field Crops Department, Turkey*

⁴ *Kahramanmaras Sutcu Imam University, Turkey*

zdumlupinar@ksu.edu.tr

In the study, B28 and Kunduru-1149 durum wheat varieties were crossed as reciprocal in 2012-2013 cropping season and 13 B28/Kunduru-1149, Kunduru-1149/B28 genotypes were obtained and were used as materials at F5 stage. The cross combinations were screened with 10 DNA markers to determine alleles of gluten strength (Bx7OE), Yellow rust (Sun104, Xgwm18, Xwgp115 and Xgwm47), stem rust (Sun209 and Sun479), high protein ratio (UHW89), powdery mildew (Xgwm66) and leaf rust (Xgwm130). In the study, the average polymorphism information content (PIC) was calculated as 0.98 and the lowest PIC value was obtained from Xwgp115 marker with 0.96, while the rest of the markers had 0.99 PIC value. Stem rust resistance allele *Sr49* was detected in B28/Kunduru-1149_F5_4 (Sun479) and B28/Kunduru-1149_F5_1 (Sun209) combinations. One of the yellow rust resistance alleles *Yr15* (Xgwm18) was detected in B28/Kunduru-1149_F5_2 and B28/Kunduru-1149_F5_3 combinations, while, *Yr51* (Sun104) was identified in B28/Kunduru-1149_F5_3, B28/Kunduru-1149_F5_6, B28/Kunduru-1149_F5_7, Kunduru-1149/B28_F5_2 and Kunduru-1149/B28_F5_6 combinations. A dendogram was created to determine kinship of the cross combinations with the parents. The highest genetic similarity was observed between B28 / Kunduru-1149_F5_6 and Kunduru-1149 / B28_F5_2 combinations with 0.714, while the most diverse ones were Kunduru-1149 and B28/Kunduru_F5_7 with 0.10.

Keywords: Durum wheat, Functional marker, yellow rust, stem rust

(27893) EFFECT OF FEEDING BEHAVIOR OF *Rhyzopertha dominica* ON ITS SENSITIVITY TO *Beauveria bassiana* INFECTIONS

Mehmet Kubilay Er¹, Cebraail Baris², Hasan Tunaz³, Ali Arda Isikber¹

¹ Kahramanmaras Sutcu Imam University, Turkey

² Kahramanmaras Sutcu Imam University, Agriculture Faculty, Turkey

³ Kahramanmaras Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey

mker@ksu.edu.tr

Entomopathogenic fungi has been tested against stored-product pests in search for alternative control agents. In many previous studies *Beauveria bassiana* was found more virulent to *Rhyzopertha dominica* when it is applied to cereals. The sensitivity of this species was mostly attributed to its morphological and immunity related differences from more resistant species. As *R. dominica* feeds within grains, this behavior was tested for its contribution to the sensitivity of *R. dominica*. Twenty adults for each replication were released into either intact or broken wheat and maize kernels (50 g) mixed with *B. bassiana* conidia (300 ppm in weight) and mortalities were recorded after 7 and 14 days. The experiment was conducted at 25±2 °C and 65±5 % relative humidity in darkness with five replications. There was not a statistically important difference between the mortalities when adults were in intact wheat and intact maize kernels. However, mortalities significantly decreased when adults were in broken kernels compared to those in intact kernels. As insects cannot completely penetrate inside broken kernels insects were infected less than those in intact kernels. These results illustrate that the sensitivity of *R. dominica* to *B. bassiana* treatments is at least partially due to insect's feeding behavior. This has a significant contribution to sensitivity of *R. dominica* to entomopathogenic fungi.

Keywords: biological control, microbial control, stored-product pest, cereals

**(27894) EFFECT OF HOST POPULATION ON THE EFFICACY OF
Beauveria bassiana AGAINST *Sitophilus oryzae***

Mehmet Kubilay Er¹, Cebraail Baris², Ali Arda Isikber¹, Hasan Tunaz³

¹ Kahramanmaraş Sutcu Imam University, Turkey

² Kahramanmaraş Sutcu Imam University, Agriculture Faculty, Turkey

³ Kahramanmaraş Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey

mker@ksu.edu.tr

In management of stored-product pests, alternatives to chemical insecticides have been searched and microbial control by entomopathogenic fungi have been considered as a promising alternative. Previously it was shown that the virulence of *Beauveria bassiana* to *Sitophilus oryzae* varies depending on the fungal isolate used. However, fungal infections and further the resulting outcome is determined by the interaction between the pathogen and the host. Therefore, virulence could also be affected by the host, *S. oryzae* in this study. To test this, two different *S. oryzae* populations were tested by exposing to two *B. bassiana* isolates. Twenty adults for each replication were released into wheat (50 g) mixed with *B. bassiana* conidia at two concentrations, 300 ppm and 500 ppm (w/w). Insect mortalities were recorded after 7 and 14 days. The experiment was conducted at 25±2°C and 65±5 % relative humidity in darkness with five replications. *S. oryzae* adults from Konya population were significantly more susceptible to both isolates of *B. bassiana* compared to adults from Kahramanmaraş population. This shows that success of the fungus application as biocontrol agent may vary depending on host populations. Therefore, different host populations should be tested before further development of a fungal agent to realize actual potential of the fungus.

Keywords: biological control, microbial control, stored-product pest, cereals

(27895) VARIATION IN THE EFFECT OF *Beauveria bassiana* ISOLATES AGAINST THREE COLEOPTERAN STORED-PRODUCT PESTS: CONCENTRATION-MORTALITY RELATION

Mehmet Kubilay Er¹, Ali Arda Isikber¹, Hasan Tunaz²

¹ Kahramanmaras Sutcu Imam University, Turkey

² Kahramanmaras Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey

mker@ksu.edu.tr

Entomopathogenic fungi have been investigated as microbial control agents against stored-product pests to develop alternative control measures to chemical insecticides. Amongst over a hundred entomopathogenic fungi nine *Beauveria bassiana* isolates were worth investigating further and thus tested against three stored-product pests, *Sitophilus oryzae*, *Rhyzopertha dominica* and *Oryzaephilus surinamensis*, using five concentrations of the conidia (50, 100, 500, 1000, 5000 ppm in weight). Twenty adults for each replication were released into wheat (50 g) mixed with *B. bassiana* conidia. The experiment was conducted at 25±2°C and 65±5 % relative humidity in darkness with four replications. Data was evaluated using probit analysis. The results showed that insect mortalities vary depending on host species. Lowest LC50 and LC90 values were calculated for *R. dominica* and the highest ones for *S. oryzae* adults, indicating general susceptibilities of pest species to *B. bassiana* infections. Concentrations needed to kill 90% of the populations of the pests varied enormously amongst *B. bassiana* isolates and three of them were selected as promising for further investigations.

Keywords: biological control, microbial control, stored-product pest, cereals

(27899) DETERMINATION OF THE RESPONSE OF RECOMBINANT INBRED LINES (F6) TO VERTICILLIUM WILT DISEASE (*Verticillium dahliae* Kleb) IN COTTON

Adem Bardak¹, Halil Tekerek², Oktay Erdogan³, Ziya Dumlupinar⁴

¹ Kahramanmaras Sutcu Imam University, Turkey

² Kahramanmaras Sutcu Imam University, Agriculture Faculty, Agricultural Biotechnology Department, 46100 Kahramanmaras, Turkey

³ Department of Organic Farming Business Management, School of Applied Sciences, Pamukkale University, 20600 Civril-Denizli, Turkey

⁴ Kahramanmaras Sutcu Imam University

ademardak@ksu.edu.tr

Cotton (*Gossypium* spp.) is an industrial plant cultivated in large areas both tropical and subtropical regions around the world, where the climate is considered as warm. In cotton cultivation, there are many disease and pests that affect yield and quality along with the production. Among these pests and diseases, the most destructive one is verticillium wilt, which is caused by *Verticillium dahliae* Kleb., a soil-born fungus the most effective way against this disease without chemical and effective control is the development of resistant/tolerant varieties. In this study, it was aimed to determine the response of 112 inbred lines at F6 stage with parents (Is 8x Orgosto 644) against Verticillium wilt. For this purpose, defoliating (PYDV6) and non-defoliating (Vd11) pathotypes of this fungus was arranged in a randomized plot design with five replications using conidial suspension technique in growth chamber. Carmen (*G. hirsutum* L.) and Giza 45 (*G. barbadense* L.) were used as tolerant controls, while Çukurova 1518 and Acala SJ2 (*G. hirsutum* L.) were used as susceptible controls. As a result of the study, the differences among recombinant inbred lines in terms of response to defoliant and non-defoliant pathotypes of verticillium wilt disease were found to be statistically significant ($p \leq 0.01$). It was determined that 11 recombinant inbred lines found tolerant against non-defoliant pathotype similar as tolerant control varieties, while two lines determined as tolerant against the defoliant pathotype, as well as tolerant control varieties. The lines determined as tolerant to Verticillium wilt disease might be registered after yield and fiber quality traits evaluated.

Keywords: Cotton, *Verticillium dahliae* Kleb. RILs, Pathotype, Disease Severity

(27902) THE ETHANOL AND SO₂ APPLICATIONS IN THE POSTHARVEST STORAGE OF “KOHNU” TABLE GRAPE

Yilmaz Ugur¹, Nihat Ozkan², Rukiye Yaman¹, Ozgul Iyigun Sahin², Okan Ozkaya³

¹ *Apricot Research Institute, Malatya, Turkey*

² *Apricot Research Institute, Malatya, Turkey*

³ *Cukurova University, Malatya, Turkey*

yilmaz.ugur@tarimorman.gov.tr

Decay, caused by *Botrytis cinerea* Pers., is the major problem of table grapes during cold storage. Preharvest and postharvest applications are compulsory to avoid significant losses. Therefore, in this study, the efficacy of applying ethanol and SO₂ gas generators to prevent storage decay was tested on cultivar of table grape, 'Köhnü'. Ethanol release pads and SO₂ gas generators were placed above the grapes in the modified atmosphere package. The grapes were stored for 120 days at 0±1 °C and determined after an additional 3 days at 20°C to shelf life. Samples were taken periodically and investigated physical [soluble solid content (SSC), pH, weight loss, berry colour, stem dry (%), separated rate, skeleton of cluster dry and decay rate (%)], chemical [titratable acidity, maturity index, phenolic compounds] changes, sensory analysis and microorganism population. Results showed that ethanol release pads treatments significantly decreased weight losses. Changes of the decay, skeleton of cluster dry and stem dry of the grapes with ethanol release pads were delayed.

Keywords: Cold storage, SO₂, Modified atmosphere packaging

(27934) RELATIONSHIP BETWEEN CHLORATE PHENOTYPE AND VIRULENCE IN *Macrophomina phaseolina* ISOLATES FROM CUCUMBER PLANTS

Fatih Mehmet Tok¹

¹ *Mustafa Kemal University, Turkey*

tokfatih@gmail.com

During 2018 summer season, surveys were carried out in cucumber growing areas of Hatay province of Turkey. Roots and crowns of cucumber plants showing disease symptoms such as yellowing, wilting, root rot, damping-off and gumming were collected and kept in an icebox until they get transported to the laboratory. Vascular tissues of diseased plants were extracted with a sterile lanced and then cut into 3-4mm small pieces. Plant tissues were transferred to Petri dishes containing potato dextrose agar (PDA) medium amended with tetracycline (10 mg L⁻¹). Five days after incubation, a total of 25 *Macrophomina phaseolina* isolates were obtained from diseased plants. To determine the phenotypes, isolates were grown on PDA medium amended with 120 mM potassium chlorate and incubated at 27°C for 7 days. According to their appearance on PDA medium, 8 isolates were phenotyped as dense, 12 isolates feathery and 5 isolates were restricted. Cucumber seedlings were used in the pathogenicity test. All the isolates were grown in cornmeal-sand mixture for 7 days and cucumber seedlings were transplanted to plastic pots containing potting mixture of soil, perlite, peat (1:1:1) amended with 50g of *M. phaseolina* inoculum grown in cornmeal-sand mixture. Twenty-one days after incubation, disease severity was measured with a 0-4 scale according to the symptoms on roots. All isolates were pathogenic to cucumber seedlings and produced root rot symptoms in this study. Disease severity index was varied from 2 to 4 and virulence was significantly different ($P<0.05$) among isolates. Dense isolates were most virulent with the 3.75 mean disease scale followed by Feathery and Restricted phenotyped isolates with 3.17 and 2.27 respectively. According to the results of this study, a high correlation ($R=0.92$) was determined between chlorate phenotype and virulence in *M. phaseolina* isolates from cucumber plants in Turkey.

Keywords: Cucumber, *Macrophomina*, Chlorate Sensitivity, Phenotype, Root Rot

**(27935) MALATYA'S OPENING WINDOW TO THE WORLD:
APRICOT**

Abdullah Erdogan¹, Yilmaz Ugur², Bennur Agbaba¹, Hatice Sahineroylek³

¹ *Apricot Research Institute, Malatya, Turkey*

² *Apricot Research Institute, Malatya, Turkey*

³ *Apricot Research Institute, Malatya, Turkey*

abdullah.erdogan@tarimorman.gov.tr

Turkey has the possibility to grow a large number of plant species / varieties. It has an important position in the world both in vegetable cultivation and fruit cultivation. As well as many fruits, it is also a country that have said in apricot production. Even though its homeland is not our country, Apricot is a kind of fruit which has widely acclimatized in many microclimate fields in Anatolia. This fruit is produced at most in Turkey. Uzbekistan, Iran, Algeria and Pakistan are other important producer countries except Turkey in world apricot production. About 55% of apricot production in Turkey take place in Malatya. The vast majority of production is directed towards the production of dried apricot. In this city, the apricot is utilised for many purposes. The apricot fruit is used in the production of jam, marmalade, jelly, pulp, chocolate, cake, nectar and perfume. In addition, the kickshaw, fat, benzaldehyde, activated carbon, amygdalin and hydrocyanic acid are obtained from the its seed. Malatya with the number of trees, amount of production and export figures, are not only Turkey but also the world's most important apricot central. Thanks to its potential, it deserves exceedingly the title of "World Apricot Capital". 106,000 tons dried apricot were exported to the world in 2016. 75% of this amount belongs to Turkey. Malatya alone cover 85% of this figure. In this study, it is aimed to evaluate the production status of the Malatya province, its potential and the expectations of the future of apricot.

Keywords: Malatya, production potential, dried apricot, World Apricot Capital

(27936) ENTOMOLOGICAL RISKS AND MANAGEMENT STRATEGIES IN APRICOT ORCHARDS (*Drosophila suzukii*, *Ceratitis capitata*, *Lyristes plebejus*)

Bennur Agbaba¹, Hasan Tunaz², Yilmaz Ugur³

¹ *Apricot Research Institute, Malatya, Turkey*

² *Kahramanmaras Sutcu Imam University, Agriculture Faculty, Plant Protection Department, Turkey*

³ *Apricot Research Institute, Malatya, Turkey*

bennuragbaba@gmail.com

Turkey is located among the world's major fruit producing countries in terms of quantity and the number of species and varieties of fruit production. One of the important agricultural export product grown in Turkey is apricot. Quality and yield losses in apricot production occur due to pests and diseases in the apricot production which is extremely important for our country and Malatya economies. Apricot diseases and pest control is of great importance to obtain more and quality products. It is very important to diagnose the pest correctly and to be able to intervene in time. With this study, current information about the status of *Drosophila suzukii*, *Ceratitis capitata* and *Lyristes plebejus* in apricot will be given and information will be presented about the serious threats that may occur in the future. According to this information, it is aimed to give information about this kind of management opportunities by taking the information in the literature into consideration.

Keywords: Apricot, *Drosophila suzukii*, *Ceratitis capitata*, *Lyristes plebejus*

(27942) HOW SEED BUGS (HETEROPTERA: LYGAEIDAE) SPREAD FROM CEREAL CROPS TO FRUITS CROPS

Bennur Agbaba¹, Talip Yigit¹, Rukiye Yaman¹, Abdullah Erdogan¹, Hasan Tunaz¹

¹ *Apricot Research Institute, Malatya, Turkey*

bennuragbaba@gmail.com

The family Lygaeidae is represented by 500 genera and 1000 species in the world. The family includes insects commonly known as seed bugs which are elongate, small to medium sized bugs. The family is sometimes called the chinch bug family because feeds on the sap of plants. Lygaeid bugs are common and wide spread in different habitats. These are also known as ground bugs, because most of them are found under leaf litter on the ground. Few also feed on the plants. Some important members of the family include cotton stainer (*Oxycarenus hyalinipennis*) and the Australian Rutherglan bug (*Nysius vinitor*), both of which are destructive to fruit trees. Their infestation during grain set and grain fill will reduce yield, oil content and oil quality. In seed crops, they will reduce germination of seed. Besides field crops, *N. vinitor* is also a significant pest of a wide range of horticultural crops. Therefore, this study will examine information about effect and spreading of seed bugs in horticultural crops in the literature into consideration.

Keywords: seed bugs, fruits, Lygaeidae

(27975) USING CLIMATE-SMART AGRICULTURE TO IMPROVE IRRIGATED CROP YIELD AND SOIL QUALITY IN UKRAINE

Nataliia Didenko¹, Vira Konovalova², Rafiq Islam³, Mykhailo Romashchenko²

¹ *Institute of Water Problems and Land Reclamation, Ukraine*

² *Institute of Irrigated Agriculture National Academy of Agrarian Sciences of Ukraine, Ukraine*

³ *The Ohio State University, USA*

9449308nd@gmail.com

Ukraine is one of the most important agrarian countries in support of global food security. However, agricultural management practices currently used in Ukraine rely heavily on extensive and deep plowing, inefficient irrigation, mono-cropping, and excessive fertilizer and reactive chemical usage. Consequently, agriculture under climate change effects in Ukraine is greatly suffering from unbalanced soil-plant-water ecosystems due to high evaporative demand and secondary salinization, prolonged seasonal drought and heatwaves, soil compaction, loss of organic matter (humus), and accelerated erosion with depleted soil quality and reduced crop productivity. As the demand for freshwater has increased, the looming prospect of reduced water availability for irrigation demands a solution to sustain economically viable and environmentally compatible agricultural systems in Ukraine, especially the southern irrigated regions. The goal of our research was to develop a climate-smart agricultural plan based on extended and living mulch of cropping diversity with plant stress alleviators under continuous no-till (NT) to help to improve soil quality, water- and nutrient use efficiency, and economic crop productivity with enhanced agroecosystem services. Salicylic acid was used as a chemical inducer to improve crop growth and yield in response to drought, heatwaves, salinity, and biotic stresses. A factorial experiment in a randomized block design was established in 2017 at the ASKANIYSKE FARM in the Kakhovka region of Kherson, Ukraine. Experimental predictor factors were: (1) tillage [continuous NT vs. conventional plowing (CT)], (2) cover crops (control vs. cover crop mixture), and (3) chemical inducer (control vs. salicylic acid); and these were replicated thrice. Cropping diversity was a soybean-winter wheat-cover crop-corn-rye rotation. After two years of field research (soybean-wheat), results showed that the transitional effects of NT on both soybean and winter wheat, as compared with the CT, were obvious. As expected, both soybean and winter wheat yields were lower by 14.9% and 20.7% in the NT than in the CT. However, the water-use efficiency of crops increased by 14 to 15% in the NT compared to the CT. In contrast, salicylic acid, as a chemical inducer, significantly exerted positive and consistent effects on crops under both tillage systems. Averaged across tillage, soybean yield increased by 14% and winter wheat yield increased by 5.1% with salicylic acid treatments when compared to the control. The effect of salicylic acid on crop yield was slightly higher in the NT than in the CT. Crude protein, fat, and gluten contents of both crops did not vary significantly either by tillage, salicylic acid or by their interaction. The water-use efficiency of soybeans increased by more than 2% in the NT compared to the CT. As expected, soil biology, especially microbial biomass and earthworms, has shown early changes in response to changes in tillage systems (i.e. converting the NT from the CT). Microbial biomass (by 19%) and earthworms (by 8%), as early indicators of soil quality, have significantly recovered and increased in the NT compared to CT. Water infiltration under NT also saw an 18% increase over CT. Based on two years of field studies, it is conclusive that NT and salicylic acid can be expected to increase the water-use efficiency of crops by reducing irrigation and improving soil quality in response to anthropogenic and climate change effects.

Keywords: Chemical inducer, No-tillage, Cover crops, Salicylic acid, Soil quality, Microbial biomass, Earthworms, Water infiltration, Water-use efficiency, Soybeans, Winter wheat

(27982) PERFORMANCE OF SOME PROMISING RUST RESISTANT BREAD WHEAT GENOTYPES UNDER RAIN-FED CONDITIONS

Emad Al-Maarooif¹, Sayran Hasan¹, Peshawa Zorab¹, Suma Aziz¹

¹ College of Agricultural Engineering Science, Iraq

ealmaarooif@yahoo.com

The present study was conducted to evaluate performance and behavior of eight promising wheat genotypes as comparing with the local wheat cultivar (Aras) under rain-fed conditions at the experimental field of college of agricultural engineering sciences/ university of sulaimani in Bakrajo during the winter seasons of 2014-2016. The experiments were laid out according to complete randomized block design with three replications. Seed were cultivated at a seed rate of (140 kg ha⁻¹) in rows within the plots. host reaction of the tested genotypes with the pathogen population of *Puccinia striiformis* f. *sptritici* were also investigated under natural infection conditions at the same field. Results revealed high significant differences among the genotypes in all the studied traits. Charmo significantly surpassed all other genotypes in plant height (108.5cm) and number of grains per spike (58.4g), the higher value of grain weight (47.4g) was detected in Azmar 2, while the higher number of spike per meter square (586.5 spike) was produced by the genotype Shaho2. Charmo significantly surpassed all other genotypes in grain yield per hectare. Based on the results of disease severity and coefficient of infection of the genotypes to yellow rust disease, Maarooif and Charmo explored high resistance reaction to the disease, while Aras showed high susceptibility reaction to the disease.

Keywords: *Triticum aestivum*, Fungal diseases, Wheat rust, Resistant cultivars, Yield Potential

(28030) DETECTION AND IDENTIFICATION OF WEED BY IMAGE PROCESSING TECHNIQUES

Bahadır Sin¹, Izzet Kadioglu², Tolga Sari²

¹ *Gaziosmanpasa University, Faculty of Agriculture, Turkey*

² *Tokat Gaziosmanpasa University, Turkey*

sinbahadir@gmail.com

In order to feed the rapidly growing human population, it is necessary to make the best use of limited resources by using modern and technological facilities. Weeds cause a significant yield loss in cultivated plants. In this study, it has been investigated whether there is a reduction of such expenses by using less chemical (herbicides) with the information obtained for detection, diagnosis and control of weeds which are problem in culture areas by using image processing techniques which is one of the modern techniques. In image processing techniques, which consist of three basic steps, first of all, it is necessary to photograph the target organism (weed) in different vegetation periods and create an image library. The second stage is the improvement of the image and the analysis. In the third and last step, the interpretation of the image is required. The first and most important step in image processing techniques is to create a data library by using digital cameras with different features and introducing the programs to be used by using these RGB values and taking the digital equivalents of the photographs taken. In particular, deep learning and image processing models made using different programs (Phyton, Matlab, etc.) and instant methods of combating methods are used to determine the prevalence of weeds in a field, follow-up of distribution status and weed detection. Especially with the automation systems, image processing technology will become very important for weed control. If this method is developed and practiced, it is expected that the weeds in the cultural areas can be reduced.

Keywords: Image, weed, diagnosis

**(28039) ROLE OF HEAT-SHOCK PROTEINS IN CELLULAR
FUNCTION OF BUMBLEBEES**

Kemal Karabag ¹, Mustafa Ersal ¹, Berkant Ismail Yildiz ¹

¹ *Akdeniz University, Turkey*

ersal.m@yahoo.com

Bumblebees are one of the most important pollinators that are both ecologically and economically important and are declining worldwide. In particular, the increase of temperature in the atmosphere caused by global warming leads to effects in bumblebees and many other organisms negatively. The heat stress, which is one of the stresses that occur as a result of this, is a condition that creates negative effects by disrupting cellular functions for all organisms. Proteins known as heat shock proteins (Hsp) or chaperones are structures that protect the biological mechanisms of living organisms from the negative effects of heat stress. The Hsps are involved in a variety of routine biological processes, such as aggregation and separation of proteins, protecting protein substrates from structural damage to enhance the function of proteins. Heat shock proteins have various functions within cellular structures. These are classified as small Hsp (Hsp 10-40), Hsp60, Hsp70, Hsp90, Hsp100 and Hsp110 according to their function, homology and molecular weights. In this review, we focused on the properties and functions of the Hsp classes.

Keywords: Bumblebee, Ecology, Heat shock protein, Heat stress

(28046) INVESTIGATION OF SOME AGRICULTURAL TRAITS AND TOLERANCE TO VERTICILLIUM WILT ON COTTON

Fatih Mehmet Tok¹, Yasar Akiscan¹

¹ *Mustafa Kemal University, Turkey*

tokfatih@gmail.com

This study was carried out with 3 cotton varieties (BA-525, Çukurova 1518 and Edessa) under the Amik plain conditions in 2017 growing season in order to investigate of some agricultural traits and tolerance to *Verticillium* wilt on these cotton varieties. The experiment was established according to randomized complete block design with 4 replications. Seeds were sown in plots each of which has 10m long 4 lines. *Verticillium dahliae* spore suspension was injected to the first node of plants which located on the outer 2 lines of plots by stem injection method. Just before the harvest, disease symptoms were measured by 0-4 scale according to both leaf and vascular tissue symptoms. Data obtained from experiment were analysed by SAS statistical analysis software. As a result of the study, variance analysis showed that difference among varieties, were statistically significant in terms of plant height, number of node and boll per plant, seedcotton weight per boll, 100 seed weight, disease severity index according to leaf symptoms, seedcotton weight and ginning ratio traits ($P < 0.01$), and in terms of disease severity index according to stem tissue symptoms ($P < 0.05$). According to the results of our study, plant height ranged from 81.78 cm (BA-525) to 58.88 cm (Edessa), number of node per plant 17.15 (Çukurova 1518) to 14.15 (Edessa), number of boll per plant 10.93 (Edessa) to 8.30 (Çukurova 1518), seedcotton weight per boll 5.85 g (Çukurova 1518) to 5.18 g (Edessa), 100 seed weight 12.03 g (Çukurova 1518) to 10.15 g (Edessa), disease severity index according to leaf symptoms 2.33 (Çukurova 1518) to 1.85 (Edessa), disease severity index according to stem tissue symptoms 2.48 (Çukurova 1518) to 2.08 (Edessa), seedcotton yield 440.38 kg/da (Edessa) to 310.50 kg/da (Çukurova 1518) and ginning ratio ranged from 42.35 % (Edessa) to 38.18 % (Çukurova 1518). In the present study, Edessa was more tolerant to *Verticillium* wilt, and it gave more seedcotton yield and ginning ratio compared to the other varieties used.

Keywords: Cotton, *Verticillium* wilt, tolerance, yield components

**(28049) EFFECTS OF PURPLE NUTSEDGE (*Cyperus rotundus* L.)
WATER EXTRACT ON SOME CULTURAL PLANTS AND
JOHNSONGRASS SEED BIOLOGY**

Izzet Kadioglu¹, Bahadir Sin², Hamza Keskin¹

¹ Tokat Gaziosmanpasa University, Turkey

² Gaziosmanpasa University, Agriculture Faculty, Turkey

izzet.kadioglu@gop.edu.tr

Purple nutsedge (*Cyperus rotundus* L.) is a harmful perennial weed that can reproduce with seeds and rhizomes. In this study, purple nutsedge plants collected from Mersin tomato greenhouses in 2018 were used. The collected plants were firstly air dried, kept in water at 1%, 3% and 5% rates for 3, 7, 10 days and then filtered through Whatman Filter paper to obtain water extract. The effects of these extracts on the germination of 5 cultivated plants (tomato, bean, cress, grass and cucumber) and one weed (*Sorghum halepense* (L.) Pers.) were investigated. Experiments were carried out in 9 cm petri dishes containing two pieces of filter paper as randomized block design with 4 replicates. Experiments were carried out under laboratory conditions, germination percentages of seeds were determined at 15th day, shoot and root lengths were measured. The results were analysed by Duncan test. As a result of experiment, while none of doses of buckthorn water extract had effect on bean seed germination, germination and root-shoot growth decreased in cucumber and grass. This result was significant especially in high dose water extract under higher application time. No germination was observed in tomato and cress at doses of 3% and %5 respectively. Germination decreased in *S. halepense* seeds as the extract dose increased, shoot and root dying was observed after application of extract which was kept for 10 days. In this study, it was concluded that nutsedge plant extract, have germination and growth inhibiting for several plants.

Keywords: Purple nutsedge, water extract, germination, culture plant, Johnsongrass

(28051) ADAPTATION OF NEW APRICOT VARIETIES FOR TURKEY

Alimcan Kipcak ¹, Burhanettin Imrak ²

¹ *Çukurova University, Agriculture Faculty, Horticulture Department, Adana, Turkey*

² *Çukurova University, Turkey*

bimrak@cu.edu.tr

The study was carried out on 4 years old 13 new apricot varieties which is grafted on Myrobolan29C rootstock, 4x1.5m planting distance. The trees were pruned as central leader system and cultivated in Çukurova University Pozantı Agriculture Research and Application Center at an altitude 1100m. The aim of the study was to determine the adaptability of new apricot varieties to high altitude regions. Pomological analyzes (Fruit weight, stone weight, flesh firmness, TSS (Total soluble solids) and yield values (kg/tree) were carried out in order to determine the fruit quality criteria. In the study where standard fertilization and irrigation programs were applied. However, the results of phenological observations (bud break, first bloom, full bloom, and harvesting date) were recorded. In addition, the chill accumulation of the research area was determined according to standard and chill unit methods. According to the pomological analysis result the highest fruit weight and firmness was obtained from Gady Cat cultivar (49.10g - 6.47kg/cm²). In terms of harvesting date Orange Ruby and Mediabel (28.06.2019) were detected the first apricot cultivars, Gady Cat Pincot were harvested in 02.07.2019. There were not detected any problem about chilling requirement of all new apricot varieties. In terms of quality and yield values Gady Cat, Mediabel, Orange Ruby and Faralia varieties was found suitable for high altitude areas to apricot growing. We are thankful to financial support of the Scientific Research Projects Unit of Çukurova University (Project No: FYL -2019-11945).

Keywords: Apricot, Adaptation, Chill Accumulation, Fruit Quality, High Altitude.

**(28053) STUDIES ON SEED BIOLOGY AND DORMANCY OF
JOHNSONGRASS [(*Sorghum halepense* (L.) Pers.)]**

Izzet Kadioglu¹, Bahadir Sin², Celal Yildirim¹

¹ Tokat Gaziosmanpasa University, Turkey

² Gaziosmanpasa University, Agriculture Faculty, Turkey

izzet.kadioglu@gop.edu.tr

Johnsongrass (*Sorghum halepense* (L.) Pers.) is a perennial plant that can reproduce with rhizomes and stolons. This weed is categorized as most harmful weeds due to its ability to reproduce both by seed and rhizomes. Accepted as one of the important competitors of crop plants the importance of knowing the biology of the plant gradually increased. In this study the effect of different applications (soaking in pure water, GA3, H2SO4, mechanical etching and folding methods) to break down the dormancy of *S. halepense* seeds were investigated. Dormancy breaking studies were conducted for one month at 25 °C incubator conditions. The experiments were arranged as randomized block design with 5 replicates. The best result with 62% germination rate was obtained from 30 minutes H2SO4 application. In addition, H2SO4 treated seeds for about 6 months and 30 minutes were kept in room conditions in dark conditions to determine the effect of different temperatures (5, 10, 15, 20, 25, 30, 35, 40 and 45 °C). The optimum germination temperature with 87% germination rate was obtained at 30 °C. Germination depth with dormancy broken seeds showed that 3 cm depth is most effective with 50% germination rate. The knowledge of biology of *S. halepense* is important and this results will contribute to further studies.

Keywords: Johnsongrass, germination biology, dormancy, germination temperature, seed

(28063) EFFECTS OF DROUGHT STRESS ON YIELD AND QUALITY OF POTATO GENOTYPES

Mehmet Emin Caliskan¹, Ufuk Demirel², Muhammad Naeem³, Mete Kaan Bulbul⁴, Sevgi Caliskan³

¹ *Nigde Omer Halisdemir University, Agricultural Sciences and Technologies Faculty, Turkey*

² *Nigde Omer Halisdemir University, Turkey*

³ *Nigde Omer Halisdemir University, Turkey*

⁴ *Doga Research Center A.S., Turkey*

caliskanme@ohu.edu.tr

Potato is the fourth most important food crops after wheat, maize and rice in the world with annual global production of over 380 million tons. It is a very versatile crop used as food, feed and industrial raw material, and has been recommended as a food security crop as the world faces a growing population and related problems with food supply. Although water use efficiency of potato is relatively high, it is more sensitive to soil water depletion compared to other crops due to its shallow root system. Potato is generally grown in loamy-sandy soils and irrigated up to 20 times with using 700 to 900 mm water during growing season in Central Anatolia in Turkey. This high water usage leads to diminish in water reservoirs and, therefore, threatens the agricultural sustainability in the region. Identifying and/or developing potato cultivars having high water use efficiency or drought tolerance is very important for sustainability of potato production in these types of environments. This study was aimed to screen growth and yield performances of 200 potato genotypes under full and deficit (35%) irrigation conditions. Ninety of genotypes obtained from Turkish (Doga Seed) breeding program, and 90 of them from German (Norika) breeding program, 20 cultivars commonly grown in both countries were also included to the genotype set. Field experiments were conducted Konya province located in Central Anatolia, Turkey between 2017 and 2018. In each year, two field experiments were set up with same set of potato genotypes in Augmented design using five check cultivars (Agria, Alegria, Jelly, Hermes, Rumba). Genotypes were subjected to deficit irrigation (35% of full irrigation) starting four weeks after emergence until harvest in one experiment while full irrigation (100% of evapotranspiration) applied throughout growing season in other experiment. Some yield (number of tuber per plant, mean tuber weight, tuber yield per hectare and size grading of tuber yield) and tuber quality (specific gravity, dry matter content, frying quality) traits were determined. Drought stress significantly affected all evaluated traits. In this presentation, the results of field experiments will be presented and discussed. This study was financially supported by The Scientific and Technological Research Council of Turkey (TUBITAK) with the project number of 115O949.

Keywords: potato, water stress, irrigation, drought tolerance, genotype

(28064) GERMINATION BIOLOGY STUDIES IN SOME WEED RHIZOMES (*Cyperus rotundus* L., *Sorghum halepense* (L.) Pers.)

Bahadır Sin¹, Izzet Kadioglu², Celal Yildirim³, Hamza Keskin³

¹ *Gaziosmanpasa University, Agriculture Faculty, Turkey*

² *Tokat Gaziosmanpasa University, Turkey*

³ *Tokat Gaziosmanpasa University, Turkey*

sinbahadir@gmail.com

Although weeds are defined as plants with harmful effects and growing in places where human beings do not want, they cause extremely big problems as a result of their reproduction with different structures (seed, rhizome, stolon, etc.). Perennial weeds, buckthorn and cannabis are spread extensively with both seeds and rhizomes. Their struggle is also very difficult due to rhizomes. In this study, the rhizomes found in the canopy were cut 2-3 cm long with one shoot eye in each piece, and placed in 3 pieces in 9 cm diameter glass petri dishes with 2-ply blotting paper in one rhizome tuber in the purple nutsedge. After 5 ml of water was added to the prepared petroleum, it was placed in the incubator set at 25 0C and the plant growth and plowing capacity were monitored for 21 days. The experiment was set up in randomized plots with 5 replications according to the experimental design and was repeated 2 times. In order to check whether the rhizomes have dormancy or not, the rhizomes that were kept in humid conditions at +4 0C for 1 year were compared with germination ability. While the ability to drive fresh rhizomes was determined as 60% in both plants, germination was 100% in Johnsongrass rhizomes which had waited for 1 year. Germination capacities at different depths were also investigated in rhizome studies. For this purpose, 20 cm long cylindrical containers were placed in a ratio of 1 to 1 peat-soil mixture and to different depths (3, 5, 7, 9, 12, 15 cm) 2-3 cm in length with a bucket on the fusion and a buckthorn. tuberous rhizomes. According to the needs, the plants that come out of the soil surface by irrigating the plants were controlled and recorded. As a result of the depth studies carried out for 1 month, it was found that the ideal germination of both plants was at a depth of 5 cm soil, the germination power decreased as the depth increased and the germination ended from 15 cm depth. Knowledge of rhizome biology, which is an important part of the growth of perennial weeds, is extremely important in terms of combating this kind of weeds. This study is thought to be an important resource for future studies for two very important weeds.

Keywords: Johnson grass, buckthorn, weed, rhizome, biology

(28075) EVALUATION OF ERWINIA AMYLOVORA STRAINS BY CRISPR TECHNOLOGY

Mustafa Alparslan Umarusman¹, Kubilay Kurtulus Bastas²

¹ *Konya Food and Agriculture University, Turkey*

² *Selcuk University, Turkey*

mustafa.alp.umarusman@gmail.com

Erwinia amylovora is the causal agent of fire blight, a devastating disease of apple, pear, quince and other plants in the *Rosaceae* family. The strains of *E. amylovora* exhibits very low levels of genetic diversity. The diversity of *E. amylovora* habitats could potentially increases the ecological context of CRISPR spacer evolution with exposure to distinct microbiomes. Analysis of CRISPR spacer sequences and patterns revealed considerably more genetic diversity in the pathogen than had been known previously. The pathogenicity effector (DspE) of *E. amylovora* interacts with apple DIPM protein genes. CRISPR/Cas9 system is utilized to target DIPM genes in apple protoplast to develop resistance against fire blight disease. The experiments are showed successful direct delivery of CRISPR/Cas9 ribonucleoproteins into plant protoplasts which has several benefits like rapid targeting efficiency, improved on target and reduced off-target activity. Genome editing by CRISPR/Cas9 may yield planned disease resistant traits within a very short period which cannot be achievable by traditional breeding methods. CRISPR technology will help new insights into fire blight spread, strain genetic diversity, phage resistance, plasmid content/ evolution, host pathogen interactions and control strategies.

Keywords: fire blight, CRISPR, genome, strain identification, resistance, apple

(28080) SCREENING OF RESISTANCE GENES AND SOME REACTIVE OXYGEN SPECIFIC ENZYMES AGAINST *Xanthomonas axonopodis* pv. *phaseoli* AND *Pseudomonas savastanoi* pv. *phaseolicola* IN BEAN VARIETIES

Tibebu Belete ¹, Badel Uysal Sahin ², Kubilay Kurtulus Bastas ³

¹ Selcuk University, Turkey

² Igdır University, Turkey

³ Selcuk University, Agriculture Faculty, Plant Protection Department, Campus, Konya / Turkey

kbastas@selcuk.edu.tr

Common bacterial blight (CBB) and halo blight (HB) of bean are the most destructive bacterial diseases that cause reduction of yield and quality of bean production and the use of resistant cultivars is the most effective control. Identifying the presence of resistance gene in a given bean variety and determine the activity of enzymes after and before bacterial inoculation is very important to develop a resistant breeding line. Therefore, the objectives of this study was to investigate the presence of resistance genes against *Xanthomonas axonopodis* pv. *phaseoli* (Xap) and *Pseudomonas savastanoi* pv. *phaseolicola* (Psp) in eight bean varieties (Ozmen, Noyanbey, Akman, Alberto, XAN159, Vax1, Aras 98 and 36K) and to determine the activities of the antioxidant enzymes like Peroxidase (POX) and Catalase (CAT) against to Xap and Psp in two bean varieties (Aras 98 and 36K). The resistant genes (SAP6, BAC6, BC420 and R7313 for Xap and SR13, ST8, SH11 and SB10 for Psp) using SCAR markers, the above eight varieties were screened at green house conditions. A four week-old bean seedlings were inoculated with different Xap and Psp isolates for enzyme analyses. To determine the above enzyme activities, one gram of bean leaves were collected from each pathogen-inoculated and control bean plants at 0, 12th, 24th, 48th, 72nd hours. The lowest disease incidence and severity for CBB and HB diseases were observed under greenhouse conditions from the variety XAN159, Vax1, Ozmen, Noyanbey and 36K ($p \leq 0.01$). SAP6 and BAC6 SR13 resistance genes were determined on all cultivars except cv. Alberto and cv. Aras 98, respectively and SR13 resistance gene was detected on all cultivars except cv. Noyanbey and cv. Aras 98. POX enzyme activity increased by 198.40% in 36-K cultivar at 36th hr. and CAT enzyme activity found as the highest (0.4087 Ugr-1/ FW) in 36-K cultivar at 72hr after Psp inoculation ($p \leq 0.01$). Increase of antioxidant enzymes and resistance genes activities might be an important component in the defense strategy of resistance and susceptible bean genotypes against the bacterial infection.

Keywords: Bean, Enzyme, SCAR, *Xanthomonas axonopodis* pv. *phaseoli*, *Pseudomonas savastanoi* pv. *phaseolicola*

(28086) SPATIAL DISTRIBUTION AND SEASONAL POPULATION DYNAMICS IN PLANT PARASITIC NEMATODES IN ORCHARDS IN NORTHWESTERN MARMARA REGION OF TURKEY

Lerzan Ozturk¹, Tohid Behmand², Atilla Ocal³, Ibrahim Halil Elekcioğlu⁴

¹ *Viticulture Research Institute, Tekirdag, Turkey*

² *Cukurova University, Turkey*

³ *Ministry of Agriculture and Forestry, Atatürk Horticultural Central Research Institute, Yalova, Turkey*

⁴ *Cukurova University, Agriculture Faculty, Plant Protection Department, Turkey*

lerzanzturk@gmail.com

Plant-parasitic nematodes are harmful soil born pests causing root damage and growth inhibition in several fruit trees. In Northwestern Marmara Region we carried out a nematological survey in olive, walnut, cherry, apple, pear, apricot, peach, fig, plum, almond and quince orchards. Total of 35 plant parasitic nematodes from 16 families were identified and most distributed nematode genera in the orchards were *Ditylenchus* spp., *Mesocriconema* spp., *Helicotylenchus* spp., *Aphelenchoides* spp., *Pratylenchus* spp. Among all species *Mesocriconema xenoplax*, *Pratylenchus thornei*, *Pratylenchus neglectus*, *Trichodorus similis*, *Xiphinema index*, *Xiphinema italiae* and *Ditylenchus dipsaci* were known as most damaging nematode species of trees. A study on spatial distribution of plant parasitic nematodes was carried out in order to determine spatial distribution and population dynamics of plant parasitic nematodes. On this purpose horizontal distance were evaluated by collecting soil samples regularly from 30, 60, 90 cm distance away from trunk base. Vertical distribution was estimated by collecting samples from 0-15, 15-30, 30-45, 45-60 soil depths. Most of the *Ditylenchus* spp. nematode species and fungivore nematodes were found colonized at 0-15 soil depth while other tylenchids species were found frequent at 15-30 cm. The prominent species *M. xenoplax*, *Pratylenchus thornei*, *P. neglectus* and *Ditylenchus* species were common in 15-30 soil depth with higher number of individuals. Longidorids were distributed in deeper soils. *X.index* was found at 30-45 cm depth and 30 cm distance from fig tree trunk. There were significant influence of soil temperature and moisture conditions on nematode density. The number of nematodes of all families were peak in spring and autumn after rainfalls. The appropriate sampling time and distance for nematode analysis were determined as 15-30 soil depth in April and May.

Keywords: Plant parasitic nematodes, Vertical and horizontal distribution, orchards, Turkey

**(28091) DETERMINATION OF QUALITY CHARACTERISTICS OF
DIFFERENT SWEET POTATO GENOTYPES**

Yasin Bedrettin Karan, Ozlem Gultekin Sanli, Sevket Ozdemir

Tokat Gaziosmanpasa University, Turkey

yasinb.karan@gop.edu.tr

This study was conducted in 2018 under Tokat-Kazova condition. The experiment was laid out in Randomized Complete Block Design, with three replications. The objective of this research was to test performance, dry matter content, protein content and antioxidant capacity and antioxidant content of different sweet potato genotypes. Dry matter contents of the four sweet potato genotypes differed from each other as well as from each other. In this study, the dry matter content of the sweet potato genotypes ranged from 28.11 to 33.36 %. The highest dry matter content was obtained from Hatay Yerlisi genotype. The overall average of the tubers in terms of the protein content % 3.68. When ranking in terms of antioxidant content was determined that Kalem (% 32.62), Hatay Yerlisi (% 32.35), Hatay Kırmızı1s1 (% 28.66) and Havu (% 26.80).

Keywords: Sweet potato, quality, antioxidant content, dry matter, protein content

(28092) YIELD AND YIELD COMPONENTS OF DIFFERENT SWEET POTATO (*Ipomoea batatas*) GENOTYPES

Yasin Bedrettin Karan, Sevket Ozdemir

Tokat Gaziosmanpasa University, Turkey

yasinb.karan@gop.edu.tr

The experiment was conducted in 2017 under net greenhouse conditions in the Turkey-Tokat-Kazova. Altitude of Tokat-Kazova was 630 meters, soil type is loamy, lower salt content, and slightly alkaline. Variabilities in total yield, marketable yield and components of yield (tuber numbers and mean tuber weights) were studied in four sweet potato cultivars. Yield variability was high, particularly in marketable tubers, and was related to either or both components of yield. The contribution of yield components to variability in total yield was evaluated and sources of yield variation were attributed to planting material, tuber development and season. The highest total tuber yield from Havuç genotype (7604.93 kg/da). In this study, the total tuber yield of the genotypes ranged from 1283.95 – 7604.93 kg/da.

Keywords: Sweet potato, yield, yield components

**(28094) DETERMINING THE PERFORMANCE OF SOME NEW
POTATO CULTIVARS AND CANDIDATES IN CENTRAL BLACK SEA
REGION**

Gungor Yilmaz, Yasin Bedrettin Karan, Fuat Baris

Tokat Gaziosmanpasa University, Turkey

gungor.yilmaz@gop.edu.tr

The present study was conducted to determine yield and yield components of 15 potato genotypes in Tokat-Artova. The experiment was a randomized complete block design with four replications. In the study, some agronomic traits such as emergence time, emergence rate, shape of plant growth, observations of flower and fruit setting, number of main stems, plant height, days to flowering, days to maturity, number of tubers per hill, average tuber weight, tuber yield, marketable tuber yield and technological values were studied. According to the results, emergence times were between 27-38 days, emergence rates 87.9%-100%, the number of main stems, 4.4-8.5, plant height 33.9-92.3 cm, days to flowering 57.8-73.3, days to maturity 96-117, the number of tubers per hill 2.9-9.3, average tuber weight 47.90-96.82 g and tuber yield 699.96-3625.04 kg/da. It was concluded that genotype Alegria (st) with the highest tuber yield (3625.04 kg/da) seemed to be suitable for the region.

Keywords: Potato, yield, second crop

**(28095) DETERMINATION OF YIELD AND QUALITY
CHARACTERISTICS OF SECOND CROP POTATO UNDER CENTRAL
BLACK SEA REGION**

Yasin Bedrettin Karan, Gungor Yilmaz, Sevket Ozdemir

Tokat Gaziosmanpasa University, Turkey

yasinb.karan@gop.edu.tr

This study was conducted in order to determine of yield and quality characteristics of second crop potato production at Tokat in 2018. Nine potatoes varieties, Agata, Agria, Alegria, Basciftlik Beyazi, Everest, Jelly, Lady Claire, Lady Olympia, Madeleine were planted on June 21st in 2018. The plots were harvested in the first week of November. According to the results, the second crop potato cultivation could be possible under Tokat conditions. The highest tuber yield was obtained from cultivar Basciftlik Beyazi (3920 kg/da), Madeleine (3020 kg/da) and Alegria (2970 kg/da). Dry matter contents of the 9 standard varieties differed from each other as well as from each other. In this study, the dry matter content of the cultivars ranged from 19.2 to 28.4%. The highest dry matter content was obtained from Basciftlik Beyazi

Keywords: Potato, yield, second crop

(28110) BACTERIOPHAGES AS COMPLEMENTARY AGENTS IN THE MANAGEMENT STRATEGIES OF FIRE BLIGHT DISEASE

Aysegul Geduk¹, Kubilay Kurtulus Bastas²

¹ Selcuk University, Turkey

² Selcuk University, Turkey

aysegul.geduk@selcuk.edu.tr

Fire blight disease, is caused by *Erwinia amylovora*, is a very destructive and economically significant disease of apples, pears and many other Rosaceous plants. Specific bacteriophages for *E. amylovora* play an important role in epidemiology of fire blight disease and they have a great potential to disease management. Phages of *E. amylovora* have usually been found on above ground parts and in soil associated with fire blight infected apple and pear trees. The identified bacteriophages have highly specific for the pathogen and also complete genomes of these phages have been determined. Control of the blossom blight stage of fire blight is crucial in the combat program of the disease. The bacterium colonizes on the stigmatic surfaces of blossoms before blossom infection. It was determined that *E. amylovora* specific phages present on the blossoms, they might be suppressed the growth of the pathogen on the stigmatic surfaces. However, natural phage populations are below desirable levels during the bloom period. Therefore, the blossoms applications of *E. amylovora* phages would be required to be with similar methods and time, as with bacterial and fungal biological preparations. Obtaining data showed that prior colonization of the host blossoms by an avirulent strain of *E. amylovora* was important for the establishment and maintenance of phage populations. Some phages reduced the infection of pear and apple blossoms between 50% and 80% ratios, comparing to streptomycin. Without such being a prior colonization on host the population of phage importantly declined, due to UV light, desiccation, temperature and the other climatically effects. It is considered that *E. amylovora* phages may show the potential to confer effective the disease control as part of an sustainable, organic and integrated management strategy.

Keywords: bacteriophage, control, pome fruits, eco-friendly agriculture

(28124) INSULIN-LIKE GROWTH FACTOR-1 (IGF-1) IN POULTRY

Kemal Karabag¹, Berkant Ismail Yildiz¹, Mustafa Ersal¹

¹ Akdeniz University, Turkey

ersal.m@yahoo.com

Insulin-like growth factor-1 (IGF-1) is a polypeptide hormone that structurally related to insulin, which, has multifunctional metabolic activities. IGF-1 contains 70 amino acids with approximately 7600 kDa weights. In birds, IGF-1 which has high molecular similarity to insulin hormone shows significant effects on growth and development. IGF-1 gene plays a key role in the growth of multiple tissues including muscle cells. Many variations in this gene affect gene expression at the transcriptional and translational levels. and these variations can affect the growth and developmental characteristics of animals. The development of molecular biology, especially DNA based markers, during the past three decades has created new approaches for several economically important traits in chickens. Selection according to genotype has the power to increase the productivity of farm animals, as well as to enhance environmental adaptation and maintain genetic diversity. Although recent advances in molecular genetic tools have facilitated the understanding of the functional mechanism of the IGF-1 gene, more information isn't known about its effects in the regulation of this gene and the nucleotide variation in the gene region promoter. Recently, many studies have been conducted to identify mutations in the IGF-I gene, especially in poultry, and to understand its relationships with growth and reproduction characteristics. Conclusion, the IGF-1 gene is a candidate gene that can be used in breeding programs.

Keywords: IGF-1, reproduction traits, growth, poultry

(28140) INCIDENCE AND SEVERITY OF MANGO MALFORMATION DISEASE IN SUDAN

Adel Awadelgeed Abdalla Ahmed¹, Yousif Fadlalla Mohamed Mohamed², Omer Osman Ahmed Elbashir Elbashir², Gasim Abdalla Daffalla Daffalla²

¹ *University of Gezira, Sudan*

² *University of Gezira, Sudan*

adelawad98@yahoo.com

Mango (*Mangifera indica* L.) is one of the world's most important fruit crops (Steenkamp et al., 2000; Zheng and Ploetz, 2002). Mango is an important horticultural crop in Sudan. Mango malformation disease is the most serious disease of mango. So, the research work is aimed to assess disease incidence and severity, survey was conducted in different mango cultivation areas which included: River Nile, Khartoum, Gezira and Sennar States, the results indicated that; the disease is widely spread in Sudan with different incidence and severity and caused by *Fusarium mangiferae* and may be controlled by both botanical and synthetic fungicides.

Keywords: Mang, malformation

(28237) DETERMINATION OF SOME SENSORY AND CHEMICAL PROPERTIES ON THE CANNED OF PEAS GENOTYPS GROWN IN THE DIFFERENT ENVIRONMENTAL CONDITIONS

Hatice Bozoglu ¹, Reyhan Karayel ²

¹ *Ondokuz Mayıs University, Agriculture Faculty, Turkey*

² *Black Sea Agriculture Research Institute, Turkey*

reyhan.karayel@tarimorman.gov.tr

Pea is a plant that has the highest variety of uses and is cultivated and researched in the generally developed world countries. Fresh pods of pea during the period of milk filling period as vegetables, its fresh seeds as canned and frozen products; its seeds or plants are also used as animal feed. It is also used as innovative bakery products such as protein concentrates and isolate, functional foods in processed meat products in developed world countries. In Turkey, more widely used as canned and frozen products. This study was carried out to determine the canned characteristics of pea genotypes (6 cultivar + 30 lines) grown in 4 different locations and 2 sowing time (summer and winter). Fresh seeds is harvested and canned. Sensory-visual evaluations (general view, blur of canned water, fragmentation of grains) using 1-5 (best-worst) scale and chemical analyzes (dry matter in canned water, loss of dry matter in seed, protein, starch, amylose, ash, Fe, Zn, Cu, Ca, Mg, K, P minerals in seed) were made in the canned kept for a certain period of time. The rate of dry matter transferred to canned water was 4.94% as the trial average. This value varies between 3.99-7.10% in genotypes. In canning, quality as well as visuality are important in terms of consumption. As a result of our sensory evaluation, the registered varieties have received moderate values (3) in terms of general appearance and turbidity of canned water. While Sprinter, Vilmoren and Lancet control varieties had 2 scale values in fragmentation of grain, it was observed that the B32 and B42 lines did not dissipate at all. As a result of the correlation analysis, they were determined that there was positive and significant relationship between the general appearance of sensory-visual values and water turbidity; there was a significant relationship between water turbidity and grain distribution.

Keywords: Pea, Canned, Correlation, Chemical Properties

(28284) EFFECT OF CANOPY TEMPERATURE AT DIFFERENT GROWTH STAGE ON YIELD COMPONENT IN BREAD WHEAT (*Triticum aestivum* L.) GENOTYPES UNDER RAINFED CONDITION

Irfan Ozturk¹

¹ *Trakya Agricultural Research Institute, Edirne, Turkey*

ozturkirfan62@yahoo.com

Bread wheat is the widely growing cereal crops in Trakia region and various environment condition causes reducing grain yield. The aim of this research was to determine the effects of canopy temperature at different growth stages in bread wheat genotypes on yield and yield component under rainfed conditions. Research was carried out at Trakya Region, Turkey, in 2017-2018 growing years at 4 locations with 25 genotypes in randomized completely blocks design with 4 replications. Canopy temperature, chlorophyll content, days of heading, grain yield, plant height, peduncle length, spike length, number of spike per square meter, number of spike per spike, number of kernel per spike, and spike weight and also, relationship among these characters were investigated. For determining canopy temperature of the genotypes data was taken at four different plant growth stages (GS41, GS55, GS60 and GS70). The analysis of variance revealed highly significant differences among the genotypes for grain yield, plant height, days of heading, chlorophyll content, number of spike per square meter, peduncle length, spike length, number of spike per spike, number of kernel per spike and spike weight. Mean grain yield of the genotypes was 616.1 kg da⁻¹, and the highest yields were obtained in G21 line with 680.7 kg da⁻¹ and followed by cultivar Köprü (677.6 kg da⁻¹). Correlation coefficients based on the investigated parameters were determined by Pearson's correlation analysis. Grain yield was negatively slightly correlated with canopy temperature at booting stage (Z41) and negatively significantly correlated at Z51 growth stage ($r=-0.534^{**}$). A significant positive correlation was determined between grain yield and chlorophyll content at Z55 growth stage ($r=0.600^{**}$). It was found significant positive correlation between grain yield and number of spike per square meter ($r=0.416^{*}$) and, peduncle length ($r=0.469^{*}$). A negative correlation was observed between chlorophyll content with canopy temperature at Z41 ($r=0.595^{**}$), and Z55 ($r=0.586^{**}$) growth stages. A moderate negative correlation was found between spikelet number per spike with canopy temperature at Z61, and at Z70. The correlations among physiological parameters revealed that canopy temperature and chlorophyll content were positively associated with grain yield; hence these components can be used as reliable selection criteria to improve grain yield in wheat. Thus estimation of correlation analysis among yield and yield components and, physiological parameters may provide effective selection criteria to improve bread wheat grain yield.

Keywords: Bread wheat, genotypes, yield components, physiological parameters

**(28289) PLANT PARASITIC NEMATODES ASSOCIATED WITH
IMPORTANT GARLIC (*Allium sativum* L.) GROWING AREAS IN
TURKEY**

Atilla Ocal¹, Elif Yavuzaslanoglu², Ibrahim Halil Elekcioglu³

¹ Republic of Turkey Ministry of Agriculture and Forestry, Atatürk Horticultural Central Research Institute, Yalova, Turkey

² Karamanoglu Mehmetbey University, Technical Sciences Vocational School, Plant and Animal Production Department, Karaman, Turkey

³ Cukurova University, Agriculture Faculty, Plant Protection Department, Saricam, Adana, Turkey

atilla_ocal@hotmail.com

In this study, plant parasitic nematode species in important Garlic (*Allium sativum* L.) growing areas in Turkey were examined as faunistically and taxonomically. When adult nematodes are more abundant, totally one hundred and fortyone soil and plant root samples from garlic growing areas were taken during April and July between 2017-2019. Soil and plant samples were extracted, prepared and identified. Plant parasitic nematode species identified were placed in superfamilies of Tylenchoidea, Dolichodoroidea, Anguinoidea, Aphelenchoidea and Hoplolaimoidea of Tylenchida and Aphelenchida orders. The most encountered species in this study are *Aphelenchus avenae* Bastian, 1865; *Ditylenchus dipsaci* (Kuhn, 1857) Filipjev, 1936, *Helicotylenchus digonicus* (Perry in Perry), Darling and Thorne, 1959; *Merlinius brevidens* (Allen, 1955) Siddiqi, 1970 and *Pratylenchoides alkani* Yüksel, 1977 in garlic growing areas, respectively. No literature record of about the presence of plant parasitic nematodes has been determined in important garlic growing areas in Turkey.

Keywords: Plant parasitic nematodes, Garlic, Turkey

(28445) DEFOLIANT APPLICATIONS AND EFFECTS FOR COTTON HARVESTER

Abdullah Sessiz¹, Resat Esgici¹, F. Goksel Pekitkan², A. Konuralp Elicin²

¹ *Dicle University, Turkey*

² *Dicle University, Agriculture Faculty, Agricultural Machinery and Technologies Engineering Department, Turkey*

asesiz@dicle.edu.tr

More than half of the cotton (*Gossypium hirsutum L.*) produced in Turkey is provided by the Southeastern Anatolia Region. Cotton production area and the production amount in the region are constitutes of 58% of Turkey's total cotton production areas at current situation. Harvest period is the most important stage that affects the cotton fiber quality, yield and the gain in cotton production. The product must be collected as soon as possible and with minimal losses for profitability and quality. Hence, to reduce production costs and to improve the fiber quality, completeness of the application must be executed correctly in machine harvesting of cotton. One of the processes affecting cotton harvest is defoliant applications. Farmers who used cotton harvest machine and machine owners in Turkey are making the defoliant application as required and mandatory application. Therefore, the use of chemicals such as deciders, boll openers and leaf dessicants are requires for harvesting of cotton by machine. Defoliant and boll opener application time for machine harvest, application rate and method is very important. So, the defoliant application time and execution of application should be considered for a successful mechanical harvest. With the help of chemicals, leaves are fall earlier and bolls are opened more quickly. The defoliant application time and the defoliant amount are the main factors for machine harvest and to increase the efficiency of the machines used in the cotton harvest depending on the current weather conditions. With these applications, it helps to achieve higher yield and fiber quality by enabling the harvest to be done earlier. However, the deficiencies caused by defoliant application increase the losses of harvest and decrease the fiber quality. The success of the machine harvest depends on defoliant application time, application norm and chemical dose. Therefore, it is essential for a successful machine harvest that the defoliant is made in a timely and appropriate application norm.

Keywords: Cotton, harvest, defoliant, quality, losses, cotton harvester

(28448) THE EFFECT OF TOP CUTTING HEIGHT OF COTTON STALK AND CHEMICAL APPLICATION ON COTTON YIELD

Resat Esgici ¹, F. Goksel Pekitkan ², A. Konuralp EliCin ², Abdullah Sessiz ¹

¹ *Dicle University, Turkey*

² *Dicle University, Agriculture Faculty, Agricultural Machinery and Technologies Engineering Department, Turkey*

asesiz@dicle.edu.tr

The objective of this study was to determine the effect of top cutting height of cotton (*Gossypium hirsutum L.*) stalk and chemical application on cotton yield. In order to increase the yield and prevent of increase of plant height, the cotton producers in Southeastern part of Turkey are cut the top of cotton plant before bolls open by workers. This process is difficult and tiring. Therefore, it requires mechanical cutting. In accordance with this purpose, BA-440 cotton variety was planted as experimental material on 21 April 2018 by a pneumatic planter at a commercial farm in 2018 at the Diyarbakır province, where cotton production is intensively done. The field experiment was designed according to randomized complete block design with three replications. Experimental field consisted of 18 plots with each measuring 15 m x 6 m with an inter row spacing of 0.7 m distance. Topping cut of cotton stalk is done by worker during the vegetation period. Pix application was done by field sprayer. According to experiment results the cotton yield were not affected by treatments. There were not found significant ($p>0.05$) differences between the application treatments. However, the highest yield were observed at pix treatment methods as 4.363 kgha-1, the lowest value were found at 20 cm top cutting height of cotton stalk as 3.821 kgha-1.

Keywords: Cotton, stalk topping, yield, pix application, Turkey

(28506) HERBICIDE RESISTANCE AND RESEARCH-DEVELOPMENT (R & D) STUDIES IN TURKEY WEEDS

Nilgun Arikan¹, Bahadir Sin², Izzet Kadioglu³

¹ *General Directorate of Agricultural Research and Policies, Ankara, Turkey*

² *Gaziosmanpasa University, Agriculture Faculty, Turkey*

³ *Tokat Gaziosmanpasa University, Turkey*

nilgun_arikan@yahoo.com

Our agricultural production areas are gradually decreasing despite the rapidly increasing world population. Therefore, it is necessary to produce crops at the maximum level in our limited agricultural areas. As a result of various problems in the agricultural production carried out in this way, serious yield losses occur. Despite the struggle for control of weed problem which is one of the most important factors in the production areas, it has been reported by the studies that there is an average loss of 28.6% in wheat and this rate goes up to 100% in case of no control. Weeds create enormous problems causing damage both by sharing the nutrient, light and water of the crop in which they exist, and indirectly. Although various control methods such as physical, biological mechanical and cultural control are used against weeding, chemical control is the most widely used method. If it is to be looked at the plant protection products market concerning our country, herbicides take second place after fungicides with a share of approximately 24.7% according to 2018 data. Although chemical control practices provide an easy and fast solution, the problem of resistance arises due to the continuous use of the same group of herbicides and the lack of a regular herbicide alternation program. There are 502 different herbicide x species cases detected in the world, and it was detected in 93 different plant groups on 167 different herbicides in 258 plant species from 70 different countries. As for Turkey, 18 different cases have been reported in 15 different plant x herbicide relationship. In this context, the most resistant herbicides are found in ALS group herbicides. Lately in this scope, the researchers from particularly the Ministry of Agriculture and Forestry, universities and the private sector have given priority to work on herbicide resistance. This study has been prepared to provide information about R & D activities and awareness of the resistance in Turkey.

Keywords: Herbicides, resistance, ALS, Turkey

(28518) DERIVING MATHEMATICAL RELATIONSHIPS BETWEEN ELECTRICAL CONDUCTIVITY AND CONCENTRATIONS OF SOME MINERALS IN GROUNDWATER: A CASE STUDY IN THE MEDITERRANEAN REGION OF TURKEY

Mahmut Cetin ¹, Muhammed Said Golpinar ¹, Muge Erkan Can ¹

¹ *Cukurova University, Turkey*

merkan@cu.edu.tr

The quality and quantity of water varies from place to place and time to time. Therefore, supply of fresh water is a limiting factor for irrigated agriculture in arid and semi-arid regions of the world, including Mediterranean region although irrigation and fertilizers are two of the major inputs of modern agriculture in the region. Pollution from anthropogenic sources or activities degrades the quality of freshwater, lessening its usefulness. In this regard, irrigated agriculture has negative impacts on surface and groundwater resources. Staple objectives of this study are two-fold: a) to derive mathematical forms of relationship between electrical conductivity and concentrations of some minerals in groundwater, b) to bring those relationships into the use in areas where shallow water table with poor quality is dominant and only EC measurements are available. In line with those objectives, the study was conducted in an irrigated catchment, covering an area of 9 495 ha, located in the Lower Seyhan Plain irrigation project area, in the Mediterranean region of southern Turkey. A total of 362 groundwater samples were collected from 105 drainage observation wells with the depth of 4-m in winter, spring and autumn in 2016 and 2017. Electrical conductivity (EC, *dS m-1*) and concentrations (meq L-1) of major ions, i.e. calcium and magnesium (Ca+Mg), sodium (Na), potassium (K), chloride (Cl), carbonate (CO₃), bicarbonate (HCO₃) and sulfate (SO₄), were determined in the lab by following standard methods. Then, total dissolved solids (TDS in *mg L-1*) concentration in each was calculated by summing up the major ion concentrations considered. Correlation and regression analysis was performed to derive mathematical forms of relationship between EC and TDS, and other ion concentrations. Analysis results showed that a strong linear mathematical relationship existed between TDS and EC, and Na with the determination coefficient (R²) greater than 93 percent ($r \geq 0.95$). Surprisingly the relationship between EC and Cl was found to be in the form of quadratic (R²=0.97). On the other hand, although the association between EC and Ca+Mg was linear and weak (R²=0.71), ANOVA results lead us to conclude that the relationship was statistically significant ($\alpha=0.05$). Contrary to the expectations, no statistically significant relationship existed between EC and the remaining ion concentrations. Mathematical forms of the relationships between EC and mineral ion concentrations may be used to derive additional information regarding groundwater quality in agricultural areas where drainage observation wells are available and EC measurements are taken for granted.

Keywords: Irrigated agriculture, drainage observation well, water table, groundwater quality, Lower Seyhan Plain (ASO)

**(28519) PLANT PARASITIC NEMATODES ASSOCIATED WITH CORN
(*Zea mays* L.) GROWING AREAS IN ADIYAMAN PROVINCE,
TURKEY**

Atilla Ocal¹, Selda Caliskan², Tohid Behmand³, Lerzan Ozturk⁴, Ibrahim Halil Elekcioğlu⁵

¹ Republic of Turkey Ministry of Agriculture and Forestry, Atatürk Horticultural Central Research Institute, Yalova, Turkey

² Republic of Turkey Ministry of Agriculture and Forestry Bati Akdeniz Agricultural Research Institute, Antalya, Turkey

³ Cukurova University, Agriculture Faculty, Plant Protection Department, Saricam/Adana, Turkey

⁴ Republic of Turkey Ministry of Agriculture and Forestry Tekirdag Viticulture Research Institute, Tekirdag, Turkey

⁵ Cukurova University, Agriculture Faculty, Plant Protection Department, Saricam/Adana, Turkey

atilla_ocal@hotmail.com

In this study, plant parasitic nematode species in rhizosphere of Corn (*Zea mays* L.) growing areas in Adiyaman province (Turkey) were examined as faunistically and taxonomically. When adult nematodes are more abundant, thirty eight soil and plant root samples from Corn growing areas were taken during June and September in 2012-2014 and nematode samples were extracted, prepared and identified. Plant parasitic nematode specimens found in this study placed in superfamilies of Tylenchoidea, Dolichodoroidea, Anguinoidea, Aphelenchoidea and Hoplolaimoidea of Tylenchida and Aphelenchida orders. The most encountered species were *Pratylenchoides alkani* Yüksel, 1977; *Filenchus thornei* (Andrassy, 1954) Andrassy, 1963; *Pratylenchus zae* Graham, 1951; *Aphelenchus avenae* Bastian, 1865 and *Helicotylenchus digonicus* (Perry in Perry), Darling and Thorne, 1959 in corn growing areas, respectively. No literature record of about the presence of plant parasitic nematodes has been determined in corn growing areas in Adiyaman province.

Keywords: Plant parasitic nematodes, Nematofauna, Corn, Adiyaman, Turkey

(28523) THE EFFECTS OF HARVESTING STAGES ON FORAGE YIELD AND QUALITY OF SILAGE CORN

Mehmet Alagoz¹, Mevlut Turk²

¹ *Graduate Education Institute, Turkey*

² *Field Crop Dept, Agricultural Faculty, Isparta Technical University, Turkey*

mehmetalagoz@isparta.edu.tr

This research was conducted to determine the effects of five different harvest stage (tassel formation stage, milk stage, milk-dough stage, dough stage and physiological maturity stage) yield and some quality characteristics of silage maize. The study was carried out at Isparta University of Applied Sciences, Faculty of Agricultural, Education, Research and Application Farm in 2018. In this research, kalouseus hybrid corn variety was used as study material. The experiment was established in a randomized complete block design with three replications. Herbage yield, dry matter (DM) content, DM yield, leaf, stalk and cob ratio, crude protein (CP) ratio and CP yields were determined. According to results of this research, herbage yield increased from tassel formation stage to dough stage, but decreased during physiological maturity stage. The highest herbage yield (10421.0 and 10104.8 kg/da-1) were obtained from dough stage and milk-dough stage while the lowest (5954.1 kg/da-1) was obtained from tassel formation stage. Physiological maturity stage had the highest DM content (33.1 %). The highest DM yield (3106.3 kg/da-1) was obtained from physiological maturity stage and the lowest (1099.7 kg/da-1) was obtained from tassel formation stage. The best leaf, stem and cob ratio values were determined from the dough stage. The maximum CP ratios (9.69 %) and CP yield (289.1 kg/da-1) were determined from dough stage. According to the results of this research, the most suitable harvest time was determined as the dough stage.

Keywords: harvest stage, yield, corn, CP yield

(28524) THE DETERMINATION OF NUTRITIVE VALUE OF ALFALFA AND CORN SILAGES AT DIFFERENT RATES

Mehmet Alagoz¹, Mevlut Turk², Kadir Emre Bugdayci³

¹ *Graduate Education Institute, Turkey*

² *Field Crop Field Crop Dept, Agricultural Faculty, Isparta Technical University, Turkey*

³ *Mehmet Akif Ersoy University, Turkey*

mehmetalagoz@isparta.edu.tr

This research was carried out in Isparta University of Applied Sciences, Faculty of Agricultural, Education, Research and Application Farm and in field crops laboratories in 2018-2019. In this study, it was aimed to determine the silage quality characteristics alfalfa (A), maize (M) and three different alfalfa+maize mixtures (75% A+25% M, 50% A+50% M and 25% A+75% M). In this research, 'bilensoy' alfalfa cultivar and 'DKC721' hybrid corn cultivar were used as study materials. The alfalfa of was harvest at the 10% blooming stage, while the silage maize was harvested at milk-dough stage. Post harvest, the plants materials chopped to about 1.5-2.0 cm length and filled into 2 kg jars. The experiment was established in a randomized complete parcels design with three replications and totally 15 jars silages were made. After waiting 60 days jars were opened for dry matter content (DM), crude protein content (CP), acid detergent fiber content (ADF), neutral detergent fiber content (NDF), silage pH, physical characteristics (PC) and flieg score of silages were determined in this study. As a results of this research, as the amount of alfalfa in the silage increases DM content, CP ratios and pH volues increased, acid detergent fiber content and neutral detergent fiber content values also decreased. Alfalfa in terms of nutritional values gave the best values. But the smell, color, structure, total score and Flieg Score as physical evaluation parameters in alfalfa silage were significantly improved with increasing level of corn.

Keywords: alfalfa, corn, silage, silage pH, flieg score

**(28526) ADAPTATION OF THE SELECTED CHERRY LAUREL
GENOTYPES IN ORDU (TURKEY)**

Ali Islam¹, Selim Karagol¹, Hale Orta Secmen¹

¹ Ordu University, Turkey

islamali@hotmail.com

In this study, the adaptation of 32 different cherry laurel (*Laurocerasus officinalis*) genotypes selected from the Black Sea region was determined. The genotypes by selection from Samsun, Ordu, Giresun, Trabzon, Rize and Artvin were planted in the orchard in 2012 and their development was followed. Pomological characteristics such as cluster length, cluster weight, fruit dimensional properties, fruit weight, stone dimensional properties, stone weight, fruit stem length and thickness, TSS, pH and acidity measurements were determined and sensory properties such as astringency, taste, fruit flesh hardness, fruit shape, cluster fullness were observed in University of Ordu, Horticultural department, pomology laboratories and orchard. As a result; R-20 and T-219 genotypes has the heaviest fruits with 7.32 g and 6.07 g. The R-27 genotype had the lowest value with a cluster weight which average is 14.81 g. The highest cluster weight was measured in S-21 genotype with 118.57g. In the study, the highest total soluble solid (TSS) rate was found to be 15,6 with T303 genotype.

Keywords: Cherry laurel, pomology, adaptation, TSS, *Laurocerasus officinalis*

(28527) THE EFFECTS OF DIFFERENT NITROGEN DOSES ON SOME AGRICULTURAL CHARACTERISTICS OF PHASELIA (*Phacelia tanacetifolia* Bentham)

Mevlut Turk ¹, Mehmet Alagoz ²

¹ *Field Crop Dept, Agricultural Faculty, Isparta Technical University, Turkey*

² *Graduate Education Institute, Turkey*

mehmetalagoz@isparta.edu.tr

This research was conducted to investigate the effects of five different nitrogen doses (0, 40, 80, 120 and 160 kg ha⁻¹) on some agricultural characteristics of phaselia (*Phacelia tanacetifolia* Bentham) at the experimental area of Agricultural Faculty of Isparta University of Applied Science under Isparta ecological conditions in 2017. This research was conducted in randomized block design with three replications. Plant height, beginning of flowering period, 50% flowering stage, number of raceme per plant, number of flower per raceme, 1000 seed weight and seed yield were investigated in this research. According to the results of the research, nitrogen doses had a significant effect on all properties. Nitrogen applications increased plant height, beginning of flowering period, 50% flowering, number of raceme per plant, number of flower per raceme, 1000 seed weight and seed yield.

Keywords: phaselia, nitrogen, dose, flower period

**(28561) EFFECTS OF DIFFERENT APPLICATIONS AND
TEMPERATURE LEVELS TO CUTTINGS ROOTING IN KIWIFRUIT
(*Actinidia deliciosa* A. Chev.)**

Ali Islam, Cemal Karabulut

¹ *Ordu University, Turkey*

islamali@hotmail.com

This study was conducted in 2016. Hardwood cuttings of Hayward varieties were used. The cuttings taken from the plants were from 16 years-old Hayward kiwifruit plant in Altınordu province of Ordu. They were taken from 28 February to 1 March 2016. 0, 2000, 4000, 6000 ppm IBA, 50, 100, 200 ppm SA and 4000+50 ppm (IBA+SA), 4000+100 ppm (IBA+SA), 4000+200 ppm (IBA+SA) doses were applied to the cuttings before planting. The cuttings were planted in the rooting media at 21 °C and 26 °C degrees and at March 15. IBA+ SA and SA applied cuttings were planted at March 16 after waiting 24 hours in SA doses. Rooting cuttings were removed from rooting media after 90 days. Live cutting ratio, callus ratio, number of roots, root length and root quality were investigated. As a result, rooting ratio, number of roots and root quality were found better in 2000 ppm IBA doses. SA and combination applications were not good enough like IBA applications.

Keywords: Kiwifruit, Hardwood cutting, Rooting, IBA, Salicylic Acid

(27180) DETERMINATION OF PHENOLOGICAL AND GENETIC DIFFERENCES IN GENOTYPES OBTAINED FROM FREE POLLINATED SEEDS IN SÜTYEMEZ-1 WALNUT CULTIVAR

Esra Yildirim ¹, Mehmet Sutyemez ¹, Sakir Burak Bukucu ², Akide Ozcan ³

¹ *Kahramanmaraş Sutcu Imam University, Horticulture Department, Agriculture Faculty, Kahramanmaraş, Turkey*

² *Kahramanmaraş Sutcu Imam University, Agriculture Faculty, Horticulture Department, Turkey*

³ *Kahramanmaraş Sutcu Imam University, Afsin Vocational School, Kahramanmaraş, Turkey*

burakbukucu@gmail.com

In this study, phenological and genetic differences of 95 genotypes obtained from free-pollinated seeds of Sütyemez-1 walnut cultivar were determined. In order to determine the phenological differences between the main plant and genotypes, traits such as budburst, first foliation, leaf yellowing and defoliation dates periods were investigated. 12 ISSR and 5 SRAP primers were used to determine genetic variation. Among the phenological traits examined in the study, it was determined that was distributed budburst, first leafing, leaf yellowing and defoliation 62 days, 60 days, 32 days and 44 days, respectively. When the walnut genotypes were compared with the main plant (Sütyemez-1), phenological variation was detected at 96.84% in first leafing with bud burst, 78.9% in leaf yellowing, and 88.4% in defoliation. As a result of genetic analysis, a total of 45 bands were obtained and 42 of these bands were found to be polymorphic. According to these bands, the polymorphism rate was 93.3% and the average number of alleles was 4.6. Most bands were obtained from ISSR-11 primer (7 amplifications). According to genotypes, Polymorphism Information Content (PIC) value ranged between 0.51 and 0.99, while the mean PIC value was calculated as 0.91. As a result of clustering analysis, the genotypes were clearly divided into 2 main clusters. It was determined that the population used in the study had a significant variation in both phenological and genetically and that the use of morphological and molecular data together in the management of gene resources revealed a more clear characterization. In addition, it has been confirmed that ISSR and SRAP marker techniques are effective in determining genetic differences in related walnut genotypes.

Keywords: Walnut, *Juglans regia* L., phenological, molecular, ISSR, SRAP

(27835) RESPONSE OF *T. aestivum* L. CULTIVARS TO NUTRITION WITH ORGANIC FERTILIZERS IN LONG-TERM LOW-INPUT CROPING SYSTEM OF HAPLIC CHERNOZEMS II. EFFECT OF THE ORGANIC FERTILIZATION ON THE BREAD MAKING FLOUR PROPERTIES DETERMINED BY ALBUMEN-PROTEIN COMPLEX

Sonya Doneva¹, Margarita Nankova², Iliya Iliev³, Stefan Krustev⁴

¹ Dobrudza Agricultural Institute, Bulgaria

² Dobrudzha Agricultural Institute, Bulgaria

³ Dobrudzha Agricultural Institute, Bulgaria

⁴ Agricultural University, Bulgaria

margo_nankova2019@abv.bg

The results of the study on the quality of flour of 20 wheat cultivars (*Triticum aestivum* L.) grown in a long-term low-input cropping system of Haplic Chernozems are reported. The cultivars were developed at Dobrudzha Agricultural Institute, General Toshevo. They were sown on two soil nutrition regimes: 1. Control - natural soil fertility and 2. Organic fertilization with ExcellOrga, produced in France. In addition to these variants we used a humine preparation Plantagra for pre-sowing seed treatment of sowing material (150 ml/100 kg seeds). Main soil organic fertilization with ExcellOrga especially with combination with seed material treatment (SMT) positively influenced on the sedimentation values (SDS, ml) and bread volume (ml). The average SDS value in this variant is 42.55 ml with increasing over control variant with 3.65%. The highest and relatively stable by variants were the SDS values of cultivar Pchelina (51.25 ml), followed by cultivars Kiara (50.25 ml) and Galateya (46.75 ml). The bread volume in this condition exceeded the control with 3.75%. The maximum value in the trail was reached from cv. Bojana - 795 ml. Organic fertilization lead to increasing a wet gluten content according to the control with 2.60%. The cultivats Kiara and Bojana has a leader position according to the value of this index - 23.35% and 23.25% respectively. A tendency was established for decreasing of values of wet gluten content in variants with SMT. However, an exception to the tendency the genotypes specificity is strongly expressed - cultivars Pchelina, Kosara and Kiara reacted positively to the SMT. Stable of dough is subject to highly expressed dynamics of values according to the genotype. Cultivars Enola and Katarjina were distinguished with maximum average values - 3.88 and 3.80. Soil organic fertilization increased values of this index according to the control variant with 4.60%. Valorimetric values were negatively influenced by soil organic fertilization and especially with combination with SMT. We established also highly expressed correlations between yields (grain and protein) with chemical composition of grain, physical grain properties, reological properties of flour and bread making qualities.

Keywords: Corresponding Autor: Margarita Nankova, E-mail: *nankova_margo@abv.bg*

(27836) ROLE OF POST-HARVEST RESIDUE TREATMENT ON THE WHEAT PRODUCTIVITY, FLOUR PROPERTIES AND BREAD-MAKING QUALITIES

Ilia Iliev ¹, Sonya Doneva ², Margarita Nankova ³

¹ *Dobrudzha Agricultural Institute, Bulgaria*

² *Dobrudzha Agricultural Institute, Bulgaria*

³ *Dobrudzha Agricultural Institute, Bulgaria*

margo_nankova2019@abv.bg

The effect of the soil tillage systems and sowing machines and of the type of the previous crop post-harvest residue treatment (common bean, maize, sunflower) on the wheat yields and chemical grain composition, flour properties and bread-making qualities were investigated in six-field crop rotation. The wheat post-harvest residues (PHR) were utilized in three different ways (removed from the field; chopped and subsequently incorporated into the soil; and burned). The trial was carried out at Dobrudzha Agricultural Institute on Haplic Chernozems. The productivity of the wheat (cv. Enola) in the crop rotation was significantly affected by the ways of utilizing the plant residues from the previous crop. The maximum yield was obtained by using of combining sowing system after common bean - 7277.6 kg/ha. Under the conditions of the experiment removing the PHR contribute to the increase of protein grain concentration. Bean predecessor positively influenced on the sedimentation values (SDS, ml), wet gluten content and many others quality indices. Some tendency we established for using of traditional sowing system in compare with combine sowing system. Removing the plant residue from the field lead to increase the values of sedimentation, wet gluten content, stability of the dough and especially of reological properties. Contrary, incorporation of plant residue into the soil lead to markedly decreasing of values of these indices. In the same time in this variant we received a bread with highest average volume - 616.67 ml. The values of this index was the lowest in the variants with plant residue were burned.

Keywords: Ways of utilization of post harvest residue, wheat, yields, flour properties, bread-making qualities

(27837) RESPONSE OF *T. aestivum* L. CULTIVARS TO NUTRITION WITH ORGANIC FERTILIZERS IN LONG-TERM LOW-INPUT CROPPING SYSTEM OF HAPLIC CHERNOZEMS I. ORGANIC FERTILIZATION AND ITS EFFECT ON CHEMICAL COMPOSITION AND PHYSICAL PROPERTIES OF GRAIN AND WHEAT PRODUCTIVITY

Margarita Nankova¹, Sonya Doneva², Iliya Iliev³, Stefan Krustev⁴

¹ Dobrudzha Agricultural Institute, Bulgaria

² Dobrudzha Agricultural Institute, Bulgaria

³ Dobrudzha Agricultural Institute, Bulgaria

⁴ Agricultural University, Bulgaria

margo_nankova2019@abv.bg

The investigation was carried out in a stationary field trial at Dobrudzha Agricultural Institute (DAI) on Haplic Chernozems in 2017. It included a 20 *Triticum aestivum* L. varieties which were developed at DAI and they differed by productivity and many other characteristics. These varieties were grown against backgrounds of natural soil fertility (control variant) and organic fertilization. We use organic fertilizer ExcelOrga (Triple-Action Fish-Guano Organic Fertilizer) is produced by Angibaud & Specialites, France. We use it for main soil fertilization in norm 350 kg/ha. The sowing material was treated (SMT) with a humine preparation Plantagra, produced by ROMB Ltd – Sofia. This product is based on organic symbiosis between useful micro flora and its extra cellular systems immobilized on potassium humates originating from biologically decomposed lignite of Leonardite type. In essence, Plantagra is a humine preparation with immobilized enzyme systems and living cells of representatives from genera *Bacillus*; *Pseudomonas* and *Trichoderma* which are beneficial to the plants. Main soil organic fertilization with Excell Orga increase macro elements concentration in wheat grain. This effect was more expressed on phosphorus content with values were more with 15.89% than in control variant. Such favorable soil nutrition regime lead to grain yield increasing with 24.88% according to the control variant. In the same time organic fertilization caused grow up of crude protein yield with 27.56% according to the control. Sowing with seed material treatment (SMT) with Plantagra on this two soil nutrition regimes (Control and ExcellOrga) contribute to the increase of NPK concentration of grain. This positive effect of SMT is more well expressed in natural fertility variant. Average dynamics of grain physical values weaker influenced from using fertilizer practices. However, it was established a strongly dynamics of its values according to the cultivars. Generally, it be concluded also that cultivars Enola, Kristi and Stoyana distinguished with very high average grain and protein yields among all tested varieties. Its average yields were 3984.4 kg/ha, 3881.2 kg/ha and 3825.6 kg/ha, respectively. Nearly 50% from the investigated winter common wheat cultivars demonstrated high productivity in combination with very good physical properties of the grain and they are suitable for growing with the above “low-input” practices for plant nutrition.

Keywords: wheat cultivars, organic fertilizers, low-input nutrition, yield, grain NPK concentration

**(27838) DISTRIBUTION OF THE CHROMOSOMAL
TRANSLOCATION 1BL/1RS AND THE ALLELIC COMBINATIONS
7+9/J AND 7+8/J IN A SET OF DIHAPLOID LINES OF COMMON
WHEAT**

Sonya Doneva ¹, Ilia Iliev ², Margarita Nankova ³, Ivan Todorov ²

¹ *Dobrudzha Agricultural Institute, Bulgaria*

² *Dobrudzha Agricultural Institute, Bulgaria*

³ *Dobrudzha Agricultural Institute, Bulgaria*

ilia_iliev2019@abv.bg

The influence of wheat-rye translocation *1BL/1RS* and allelic combinations of *7+9/j* and *7+8/j* on the genetic degradation of wheat dihaploid lines was studied. The results of the study showed close to normal genetic degradation, which is assessed on the basis of the presence or absence of *1BL/1RS* translocation in the DH lines obtained from eight hybrid combinations. Due to the association between the allele encoding the Glu-B1 high-molecular fraction *7+9* and the low-molecular allele 'j' from the locus Glu-B3, dihaploid lines were obtained with certain combinations of high-(HMW) and low-(LMW) molecular weight glutenin configurations. This phenomenon could significantly limit the possibilities of combinational selection in some cases.

Keywords: common wheat, *1BL/1RL* translocation, dihaploid lines (DH), HMW- and LMW glutenin configurations

(27839) INVESTIGATION OF THE COMPLEX INFLUENCE OF HIGH- AND LOW-MOLECULAR GLUTENINS AND CRUDE PROTEIN ON THE QUALITY OF BREAD WHEAT (*T. aestivum* L.)

Sonya Doneva ¹, Margarita Nankova ², Ilia Iliev ³

¹ *Dobrudzha Agricultural Institute, Bulgaria*

² *Dobrudzha Agricultural Institute, Bulgaria*

³ *Dobrudzha Agricultural Institute, Bulgaria*

ilia_iliev2019@abv.bg

The relation between high- (HMW) and low-molecular (LMW) glutenins with the quality indicators – sedimentation value, valorimetric value and loaf volume of a collection of Bulgarian wheat varieties was studied. A total of about 63% of the sedimentation value, 44% of the valorimetric value and 39% of the loaf volume was controlled by the two groups of glutenins and the crude protein. The high- and low-molecular weight glutenins had an almost equal share in controlling the sedimentation value and the valorimetric value. The LMW glutenins had a significantly higher share in controlling loaf volume than that of HMW glutenins. The participation of individual glutenin loci in quality control was not one-sided. It was mainly determined by genetic diversity and by the linking with the quality of the individual glutenin subunits. The relative contribution of crude protein to the control of quality indicators during the various harvest years was highly variable, but its optimum quantity was a necessary condition for showing the positive effect of glutenin subunits on the quality of the wheat varieties.

Keywords: winter wheat, HMW- and LMW-glutenins, crude protein, sedimentation value, valorimetric value, loaf volume

(27840) GENETIC DIVERSITY OF CEREAL STORAGE PROTEINS IN HEXAPLOID TRITICALE VARIETIES FROM DIFFERENT ORIGIN

Sonya Doneva ¹, Hristo Stoyanov ², Nikolay Neykov ³, Ilia Iliev ², Margarita Nankova ⁴

¹ Dobrudza Agricultural Institute, Bulgaria

² Dobrudzha Agricultural Institute, Bulgaria

³ Institute of Plant Genetic Resources, Bulgaria

⁴ Dobrudzha Agricultural Institute, Bulgaria

ilia_iliev2019@abv.bg

A collection of 15 triticale varieties (*Triticosecale*) grown in Bulgaria, 17 varieties grown in Poland, 1 variety grown in France and 3 variety grown in Germany were analysed using sodium dodecylsulfate polyacrylamide gel electrophoresis (SDS-PAGE) to describe allelic diversity in the storage proteins encoded at the *Glu-1* (*Glu-A1*, *Glu-B1* and *Glu-R1*), *Glu-3* (*Glu-A3* and *Glu-B3*), *Glu-B2* and *Gli-R2* loci. 32 alleles were identified: 16 at the loci encoding for high molecular weight (HMW) subunits (9 for glutenins and 3 for secalins), 12 for low molecular weight glutenin subunits and 4 for 75K γ -secalins. These alleles form 40 allelic configurations including 37 specific for one cultivar each. 2 new allelic forms for HMW-secalins were found in *Glu-R1* loci and 1 new allelic form of 75K γ -secalins (named 'new') was found in *Gli-R2* loci. 83% of triticale cultivars were homogenous, only 17% showed two or more diagrams respectively in HMW glutenin subunits, LMW glutenin subunits and 75K γ -secalins. Thus, the total number of genotypes in the study increased to 54. Triticale varieties exhibit great genetic diversity in *Glu-B1*, *Glu-R1* and *Glu-B3* loci. 29 varieties possess allele b and 7 varieties commonly grown in Bulgaria possess allele a in *Glu-A1* loci. These alleles are associated with good breadmaking qualities. Genetic diversity of triticale storage proteins could be of a high interest in the breadmaking quality improvement.

Keywords: Triticosecale – storage proteins – SDS-PAGE –genetic diversity – varieties

**(27939) VERMICOMPOST APPLICATION AFFECTED SOIL
PHYSICOCHEMICAL PROPERTIES UNDER DIFFERENT
IRRIGATION REGIMES**

Hamed Keshavarz¹, Seyed Ali Mohammad Modarres-Sanavy², Ali Mokhtassi-Bidgoli²,
Hashem Asghari-Najib²

¹ *Tarbiat Modares University, Jallal-Al-Ahmad Highway, Nasr Bridge*

² *Tarbiat Modares University, Iran*

H.Keshavarz@modares.ac.ir

This study was conducted to determine the effects of vermicompost applications (0, 2.5 and 5% w/w) on physicochemical characteristics of soil with sandy clay texture under three soil water regimes (Well-water, mild and severe water deficit stress) in greenhouse grown peppermint (*Mentha Piperita* var. Black Mitcham). Vermicompost (VC) applications significantly increased organic matter content. The highest organic matter content (2.19%) was observed for those pots that received well water with the VC application rate of 5%, and the lowest organic matter content was obtained from application of the mild stress without VC. When compared with the control, soils treated with VC under different irrigation regimes, showed apparent increases of electrical conductivity, available macroelements. Soil physical properties, such as bulk density, available water capacity, total porosity and saturated hydraulic conductivity were positively affected with the VC application under different irrigation regimes. Soil organic matter had significant correlations with available phosphorus, bulk density, available water capacity, total porosity. Findings obtained in this study have clearly showed that the vermicompost treatment is an influential way to enhance soil physicochemical properties under different irrigation regimes.

Keywords: Vermicompost, organic amendment, water deficit stress, organic matter

(27967) ANTIFUNGAL ACTIVITY OF *Mentha rotundifolia* ESSENTIAL OIL AGAINST FUSARIUM OXYSPORUM

Leblalta Amina¹, Harzallah Daoud², Cherrad Semcheddine³, Ibrahim Demirtas⁴

¹ Agronomy Department University Ferhat Abbas Setif1

² Laboratory of Applied Microbiology, Faculty of Nature and Life Sciences, University of Ferhat Abbas, Setif 1, Algeria

³ Conidia, Algeria

⁴ Cankiri Karatekin University, Chemistry Department, Cankiri, Turkey

amina8319@yahoo.fr

The antifungal activity of *Mentha rotundifolia* essential oil, harvested in Setif (Algeria) was evaluated *in vitro* against a phytopathogenic fungus *Fusarium oxysporum*, causing damage on tomato. The molecular identification of the strain was based on a comparison (BLAST) of the sequences obtained against a database and was often supplemented by microscopic observations. After "SANGER" sequencing of the PCR products, the sequences were received in FASTA format. Analysis of *M. rotundifolia* essential oil by Gas Chromatography/Mass Spectrometry method (GC-MS) identified 14 compounds. The 3-Cyclopenten-1-one, 2-hydroxy-3- (3-methyl-2-butenyl) - was the major constituent of this oil with a rate of about 89.09%. For this activity, we adopted the technique of direct contact on agar. *F. oxysporum* continued to grow on oil-free media at 1% and 0.1% (fungistatic effect); also on media with an oil concentration of 0.01%. While the explants taken from petri dish with essential oil concentration of 2; 4 and 10% did not grow (fungicidal effect). The very interesting antifungal effect of *M. rotundifolia* essential oil indicates the potential of this plant species as a source of natural fungicidal material. The present study revealed that this mint exhibited antifungal effect against *F. oxysporum* which provided a scientific basis for the use of this species as a good source of antifungal compounds. This preliminary work could provide a basis for the determination of sufficient and effective concentrations for *in planta* studies for the biological control of natural active substances of *M. rotundifolia* against fungal diseases.

Keywords: Antifungal activity, *Mentha rotundifolia*, essential oil, *Fusarium oxysporum*, molecular identification, GC/MS

**(27984) AGRONOMICAL AND PHYSIOLOGICAL BEHAVIOR OF
DURUM WHEAT (*Triticum durum* Desf.) UNDER SEMI-ARID
CONDITIONS**

Semcheddine Nadjim¹

¹ *Department of Agronomic Sciences, Sny Faculty, Ufa Setif 1, Algeria*

semcheddinenadjim@gmail.com

In the semi-arid high plains of Algeria, water stress is one of the most significant factors restricting cereal production. This study aims at analyzing water stress effect on durum wheat behavior with a particular focus on relationships between some agronomical and physiological traits. Ten genotypes were tested under rain-fed and full-irrigated conditions in semi-arid climate of Eastern Algeria. The experiment was led down in a randomized complete block design (RCBD) with three replications at the experimental field of Natural and life Sciences Faculty of Sétif 1, Algeria. Yield and its components, leaf relative water content, leaf specific weight, grain-filling rate and duration and leaf chlorophyll content were measured. Significant genotypic and environmental variations were observed for major measured traits. Water stress significantly decreased potential yield by 39%. Significant and strong correlation was observed between agronomical and physiological characteristics. In both stress and non stress conditions, grain yield was positively and significantly associated with: harvest index ($r = 0.896$), Chlorophyll content ($r = 0.895$), relative water content ($r = 0.956$) and grain filling duration ($r = 0.853$). Wheat productivity was highly associated with high photosynthetic activities, good water status and long grain filing duration. This finding suggests using these traits as tool for screening durum wheat tolerance to water stress.

Keywords: Chlorophyll content, Tolerance, Wheat, Water stress, Yield

(28040) HIGH-YIELDING TRITICALE LINES WITH HIGH RESISTANCE TO POWDERY MILDEW AND STEM RUST

Yordanka Stanoeva¹, Hristo Stoyanov²

¹ *Dobroudja Agricultural Institute, Bulgaria*

² *Dobrudzha Agricultural Institute, General Toshevo, Bulgaria*

y_zdravkova@abv.bg

In recent few years, the triticale has seen in increasing attack from some fungal diseases. Along with the yellow and brown rust, the major economically important diseases in the triticale are the powdery mildew and the stem rust. Developing of resistant varieties is the economically most efficient method to reduce the losses caused by the disease. In 2015-2016, 43 lines of triticale were selected to show resistance to the causative agents of the powdery mildew (*Blumeri graminis* f.sp. *tritici* = *Erysiphe graminis* f.sp. *tritici*) and the stem rust of *Puccinia graminis* f.sp. *tritici*. The study was conducted at an artificial infection field at Dobrudzha Agricultural Institute – General Tfshevo. Lines are divided into three groups depending on their resistance to the studies pathogens and their productivity. An analysis of productive capabilities on all triticale lines was made. The triticale lines 102 / 99-212, 211 / 05-107, 63 / 08-89, 218 / 08-97 and 93/08-87 show complete resistance to the agents of powdery mildew and stem rust and have a productivity above 20% of the standard used. Lines 63 / 08-86, 63 / 01-293, 63 / 08-83, 100 / 08-93, 218 / 08-81, 100 / 08-87, 11 / 07-95, 195 / 05-120, 113 / 07-86, 111 / 07-102, 93 / 08-89, 63 / 08-88, 63 / 08-79, 157t / 9-4, 196 / 06-135, 195 / 05-148, combine high productivity with complete resistance to powdery mildew and good resistance to stem rust.

Keywords: Triticale – Powdery mildew – Stem rust – Productivity

(28056) NEMATODES RESISTANCE IN PLANTS

Tohid Behmand¹, Atilla Ocal², Lerzan Ozturk³, Ibrahim Halil Elekcioğlu⁴

¹ *Cukurova University, Turkey*

² *Ministry of Agriculture and Forestry, Ataturk Horticultural Central Research Institute, Yalova, Turkey*

³ *Republic of Turkey Ministry of Agriculture and Forestry Tekirdag Viticulture Research Institute, Tekirdag*

⁴ *Cukurova University, Agriculture Faculty, Department of Plant Protection, Saricam/Adana*

tohid.behmand63@gmail.com

Parasitic nematodes infect thousands of plant species, but some plants harbor specific resistance genes that defend against these pests. Several nematode resistance genes have been cloned in plants, and most resemble other plant resistance genes. Nematode resistance is generally characterized by host plant cell death near or at the feeding site of the endoparasitic worm. The timing and localization of the resistance response varies with the particular resistance gene and nematode interaction. Although there is genetic evidence that single genes in the nematode can determine whether a plant mounts a resistance response, cognate nematode effectors corresponding to a plant resistance gene have not been identified. However, recent progress in genetics and genomics of both plants and nematodes, and developments in RNA silencing strategies are improving our understanding of the molecular players in this complex interaction. In this article, we review the nature and mechanisms of plant–nematode interactions with respect to resistance in plants.

Keywords: plant parasitic nematodes and resistance

(28062) EVALUATION ON BIOCHEMICAL CHANGES INDUCED BY RED, BLUE AND WHITE MONOCHROMATIC LED LIGHT TREATMENT, APPLIED TO THE TOMATO (*Lycopersicon esculentum*) PLANTS IN DIFFERENT STAGES OF DEVELOPMENT

Silvana Danaila- Guidea¹, Floarea Burnichi ², Gabriela Neata¹, Paul-Alexandru Popescu¹, Mihaela Draghici¹, Elisabeta Elena Popa¹, Ricuta-Vasilica Dobrinoiu¹, Valerica-Luminita Visan¹, Amalia Carmen Mitelut¹, Mihaela Geicu-Cristea¹, Radiana Maria Tamba-Berehoiu¹, Mona Elena Popa¹

¹ *University of Agronomic Sciences and Veterinary Medicine of Bucharest (Usamv), Romania*

² *Vegetable Research and Development Station Buzau, Romania*

silvana.danaila@yahoo.com

In this paper the results obtained in various experimental setups for tomato plant treatments with led lights are presented. The purpose of the treatment method tested in the present experiments was to increase the qualitative and quantitative performances at the level of plants from 3 Romanian varieties of tomatoes Sonia de Buzău, Coralina and Hera at all stages of development, using high power monochrome light fields emitted by red and blue LEDs and white light. In the experimented diagram we have analyzed in parallel for each of the three devices used for the additional treatment with monochrome LED lights and three lengths of exposure time: 15, 30 and 45 minutes. The biochemical changes induced by the treatments with red, blue and white monochrome LEDs (light spectra with light emissions), added to the natural light from the greenhouse culture area, on tomato plants from 3 Romanian tomato varieties Sonia de Buzău, Coralina and Hera, have been determined. For this purpose, for the analyzed tomatoes in the stages of juvenile development (seedlings) and mature (flowering and fruiting), have performed the following biochemical analyzes on leaves and fruits: N-NO₃ (ppm), P-PO₄ (ppm), K + (ppm), acidity %, soluble carbohydrates % and vitamin C (mg / 100g fresh product) content. The results obtained in the plants treated additionally with LED light were then compared with the control samples maintained only under the effect of natural light and which were not further treated with the light emitted by LEDs.

Keywords: tomato plants, monochrome LEDs lighting, biochemical changes

(28071) WHEAT GENOTYPE REACTIONS ON THE YELLOW RUST (YR) (*Puccinia striiformis*, Wes.) INFECTION DEGREE IN LATVIAVija Strazdina¹, Valentina Fetere¹¹ Institute of Agricultural Resources and Economics, Latvia

vija.strazdina@arei.lv

In recent year's, yellow (stripe) rust (YR) caused by the fungus *Puccinia striiformis* Wes. showed a worldwide distribution occurring in wheat cultivation areas causing sizable yield losses. Partly it has been associated with genetically diversity of the fungus. Since 2011 in Europe has appeared several new distinct YR races – Warrior, Kranich, Warrior (-) and others that have caused wide epidemics on different varieties of wheat. Information on wheat variety susceptibility to local *Pst* races can help to reduce the risk of yield losses in high disease pressure situations. Grain yield losses can be prevent using a combination of varietal resistance and fungicides. Information on spring and winter wheat varieties diversification can help to reduce the risk of spread YR in the high disease pressure situations. In Latvia, meteorological conditions were suitable for YR development and wide spread of infection recorded in all wheat-growing regions of Latvia during 2015–2017, and it was one of the most dangerous wheat leaf disease. The aim of the study was to investigate reaction of different winter and spring wheat genotypes to the local YR population during vegetation period and effect of fungicide treatment on yield and quality traits. Field trials with eight most popular and perspective varieties in Latvia winter wheat (*cv* Fredis, Edvins, Skagen, Olivin, Talsis, Zeppelin, Ceylon, and SW Magnifik) and seven spring wheat (*cv* Arabella, Robijs, Uffo, Hamlet, Taifun, Zebra, Willow) were establish in the North-Western part of Latvia (Stende Research Centre) during 2016-2018. The trial designed as two randomized complete blocks (treated and untreated) with three replications. Two applications of fungicides used to control the YR: prothioconazol 53 g L-1, spiroxamin 224 g L-1, tebuconazole 148 g L-1 - 0.6 L ha-1 at BBCH 29-32. Bixafen 65 g L-1, prothioconazol 130 g L-1, fluopyram 65 g L-1- 1.5 L ha-1 at BBCH 37-39. Severity of the infection level was visually recorded (%), by using the following intervals scale: 0/1 / 5 / 10 / 20 /30/ 40 / 50/60 /70/80/90/ 100. Grain yield assessed from all plot and corrected for dry matter 14%. Representative samples from each replicate were analysed by using ISTA (International Seed Testing Association) standard methods for TKW. The grain yield, grain quality such as thousand-kernel weight (TGW), protein and, volume weight recorded and determinate. In 2017, meteorological conditions were suitable for development of the YR. The assessment data clearly demonstrated that winter and spring wheat genotypes differently affected by occurrence of YR symptoms and infection severity. Results indicated there was a difference between genotypes resistance/susceptibility to YR. Severity of infection level was 1- 80% depending on genotype resistance. Application of fungicides increased grain yield by 2.9 % to 33.0% of winter wheat and grain yield 1.8% to 31.8% of spring wheat depending on variety. In 2017 grain yield and thousand-kernel weight (TGW) of all tested varieties was significantly lower ($P>0.001$) in untreated block. Protein content and Test Weight less affected by YR. In 2018, weather conditions did not promote YR and infection level of wheat varieties was low. In average 2016-2018 application of fungicides increased grain yield by 2.9 % to 13.0% and TKW by 1.4% - 18.2 % depending on variety. Latvian Ministry of Agriculture funding within the project "Distribution of yellow rust disease causal agent *Puccinia striiformis*, Wes. races in Latvia and measures to minimize damage in wheat fields".

Keywords: yellow rust, yield, TKW, protein, TW, wheat

**(28087) MOLECULAR CHARACTERISATION AND PHYLOGENY OF
Longidorus elongatus FROM NORTHWESTERN MARMARA REGION,
TURKEY**

Lerzan Ozturk¹, Tohid Behmand², Atilla Ocal³, Ibrahim Halil Elekcioğlu⁴

¹ Republic of Turkey Ministry of Agriculture and Forestry Tekirdag Viticulture Research Institute,
Tekirdag

² Cukurova University Faculty of Agriculture, Department of Plant Protection, Turkey

³ Ministry of Agriculture and Forestry, Ataturk Horticultural Central Research Institute, Yalova,
Turkey

⁴ Cukurova University Faculty of Agriculture, Department of Plant Protection, Turkey

lerzanzoturk@gmail.com

Longidorus elongatus is an ectoparasitic plant parasitic nematode from Longidoridae family. This species is found in soil samples collected from vineyards in Tekirdağ. The identification of *L. elongatus* was done based on the morphological and morphometrical characteristics and molecular method with G18SU - R18Ty11 and D2-D3 primer pairs. Phylogenetic analysis was conducted to evaluate relationships of *L. elongatus* populations with other local *Longidorus* species. For phylogenetic analysis sequence data from the D2–D3 region of the 28S rRNA molecule of *L. elongatus* were subjected to GenBank sequence comparison using BLAST. Neighbour joining, Maximum likelihood with Kimura 2-parameter model, pairwise distance with Custral W analysis were performed on Mega X software comparing 50 different *Longidorus* species. After phylogenetic analysis the similarity was found higher with Blast records of populations from Mediterranean countries.

Keywords: *L.elongatus*, molecular, phylogeny, Northwestern Marmara, Turkey

(28088) MOLECULAR CHARACTERISATION AND PHYLOGENETIC RELATIONSHIPS OF *Xiphinema pachtaicum* FROM NORTHWESTERN MARMARA REGION, TURKEY

Lerzan Ozturk¹, Tohid Behmand², Atilla Ocal³, Ibrahim Halil Elekcioğlu⁴

¹ Republic of Turkey Ministry of Agriculture and Forestry Tekirdag Viticulture Research Institute, Tekirdag, Turkey

² Cukurova University Faculty of Agriculture, Department of Plant Protection, Turkey

³ Ministry of Agriculture and Forestry, Ataturk Horticultural Central Research Institute, Yalova, Turkey

⁴ Cukurova University Faculty of Agriculture, Department of Plant Protection, Turkey

lerzanzturk@gmail.com

Xiphinema pachtaicum is an ectoparasitic plant parasitic nematode from Longidoridae family. This species is found in wide range of host plants in Tekirdağ including olive, cherry, walnut orchards, vineyards and sunflower fields. The identification of *X. pachtaicum* was done based on the morphological and morphometrical characteristics. Phylogenetic analysis was conducted to evaluate relationships of *X. pachtaicum* populations with other local *Xiphinema* species. For phylogenetic analysis the D2-D3 segment of 28S rDNA was amplified with D2A and D3B primer pair and sequenced for approval of identification. On this purpose Sequence data from the D2–D3 region of the 28S rRNA molecule of *X. pachtaicum* were subjected to GenBank sequence comparison using BLAST. Neighbour joining and Maximum likelihood with Kimura 2-parameter model was performed on Mega X software comparing 26 different *X. pachtaicum* sequences and 29 other *Xiphinema* species. Pairwise distance was calculated after aligning the sequences in ClustalW. After PCR the amplification product of D2A and D3B primers of both species were approximately 640 bp. After phylogenetic analysis the similarity was found higher with Blast records of populations from Morocco and Iran.

Keywords: *Xiphinema pachtaicum*, molecular, phylogeny, Northwestern Marmara, Turkey

(28117) ORGANIC DAIRY CATTLE RAISING AND ANIMAL HOUSINGS

Sedat Karaman¹, Serkan Yazarel²

¹ Tokat Gaziosmanpasa University, Turkey

² Tokat Gaziosmanpasa University, Turkey

sedat.karaman@gop.edu.tr

Parallel to the rapidly growing world population, demands for plant and animal products have also increased. As a result of these pressures, conventional agricultural techniques using various synthetic and chemical materials were used to obtain more products from the unit area and animal. The negative effects of conventional agriculture on human and animal health are emerging day by day. In intensive livestock facilities, animals are kept in a closed area continuously and they cannot show their natural behaviors enough and animal diseases such as mastitis, lameness, acidosis and ketosis occur due to this reason. In intensive farming, animals are constantly encouraged to eat more for more products. In order to meet this need of agricultural enterprises, inputs such as fertilizer and medicine are used intensively in conventional plant production. These inputs cause soil deterioration, surface and groundwater pollution through leaching with irrigation water, erosion and destruction of various genetic resources. In intensive production systems, antibiotics and hormones are also used in order to accelerate growth and get more efficiency. Consumption of these products causes more diseases such as decreasing body resistance, asthma, allergy and anemia. Today, due to these problems, the importance of organic animal raising is increasing day by day. In this study, conditions of organic farming and planning principles of animal housings are explained.

Keywords: Organic Livestock, Animal Housings, Dairy Cattle

**(28133) MONITORING ON THE PATHOGEN POPULATION OF
P.triticina IN BULGARIA DURING 2013-2014**

Vanya Ivanova¹

¹ *Dobrudzha Agricultural Institute, Turkey*

vkiryakova@yahoo.com

Population surveys of crop disease agents are an inalienable step in the development of scientifically coordinated strategy in the selection of resistance. This investigation explores the pathogen variability of *P.triticina* population structure in Bulgaria during 2013-2014. The analysis of the population structure was carried out in accordance with the methodology adopted at the Laboratory of Phytopathology at the Dobrudzha Agricultural Institute - General Toshevo, Bulgaria. One hundred thirty-nine isolates were analyzed from 47 probes. Were identified 59 phenotypically different pathotypes (27 during 2013 and 37 during 2014). Five of pathotypes (02762,12722, 12762,12763 and 52762) were identified during both years of study. We have identified 25 new phenotypes, not yet established in the period 2000-2012. The distribution of the pathotypes over agro ecological zones was uneven. Three pathotypes were predominant: 12762, 52762 and 53763. The genes of resistance demonstrated variable efficiency. Strong genes Lr 9 and Lr 19 have proved to be absolutely effective in 2013, but in 2014 have been detected pathotypes to overcome their resistance. In the first year of the study as absolutely effective were reacted genes Lr 2c, Lr 22A, Lr 22B, Lr 25, Lr 41 and Lr 45. In the second-year absolute effectiveness showed genes Lr 22A, Lr 22B and Lr 25. Good efficiency was of the genes Lr 2a, Lr 2b, Lr 3ka, Lr 24, Lr 42, Lr 44, Lr 45, Lr 46, and Lr 47. Poor efficiency has been reported in genes Lr 1, Lr 3, Lr 10, Lr 15, Lr 16, Lr17, Lr18, Lr 20, Lr 21, Lr 23, Lr 26, Lr 36, Lr 37, Lr 39, Lr 48, Lr 51 and Lr 52. Absolutely ineffective were genes Lr 30, LR 38 and Lr 60.

Keywords: *P.triticina*, pathotypes, virulence, effectiveness, Lr genes

(28134) SOFT WINTER WHEAT BREEDING FOR YIELD AND VALUE IMPROVING OF THE BEST VARIETIES AND LINES BASED ON THEIR ECONOMIC FEATURES

Lubov Holyk, Svitlana Holyk, Olha Levchenko

National Science Center Institute of Agriculture NAAS, Ukraine

holykselekcjoner@gmail.com

The weather conditions have varied significantly during the last five years (2014-2018 years), which helped us more desirable to evaluate varieties and lines of competitive variety testing based on their yield and economic traits. Our studies revealed that the best yield of winter wheat varieties had Pyriatinka (average yield 8.46 t / ha); Meshka (8.29 t / ha); Policianka, Spivanka Poliska (8.15 t / ha); Mirolubna (8.11 t / ha) and others. During this year was observed the maximum level of yield in the following varieties as: Kraevid 9.30 t / ha, Caesarea Poliska 9.09 t / ha, Pamiaty Hirca 8.87 t / ha, Polesinka 8.81 t / ha. Accordingly, the coefficient of variation to the minimum yield was with an average level of variation $V = 19.13\%$, $V = 16.99\%$, $V = 18.99\%$, $V = 11.41\%$. The yield was slightly lower in the following varieties: drought-resistant Vodograj and early-ripening Romanivna and Osiajna. It was selected the lines with the greatest degree of yield such as *Erythrospermum* 242-13 (8.45 t / ha), Lutescence 101-13 (8.15 t / ha), *Erythrospermum* 185-13 (7.75 t / ha). Accordingly, the coefficient of variation to the minimum yield was distinguished with a slight variation $V = 1.54\%$, $V = 2.21\%$, $V = 7.35\%$. The maximum yield was observed in the line named Lutescent 195-13 (9.06 t / ha), with a significant variation of $V = 29.29\%$. It was high yield both in 2018 year and during 2014-2017 years for such lines as *Erythrospermum* 185-13, *Erythrospermum* 279-13, *Erythrospermum* 278-13, Lutescence 231-13, *Erythrospermum* 242-13 which was the leader based on its yield (average 8.45 t / ha) during 2014-2017 years gave place to the standard sample with the difference of 30 kg/ha in 2018 year. There were the best line of competitive variety testing in terms of the quality indicators such as Lutescent 281-15, *Erythrospermum* 384-16, *Erythrospermum* 392-16, *Erythrospermum* 279-13, *Erythrospermum* 453-15, Lutescent 265-13, *Erythrospermum* 307-13, *Erythrospermum* 225-13. It was found that the proportion of varieties and lines in terms of yield, winter hardiness, disease resistance, protein content, gluten, sedimentation, starch was different during the years of the study. Though, in 2018, out of 52 numbers of winter varieties and lines of wheat competitive variety testing exceeded yield of 23 numbers of the crops - 44% . Respectively, the proportion was for the winter hardiness 18 pcs. - 35%, disease incidence 29 pcs. - 56%, protein content 30 pcs. - 58%, gluten content and sedimentation 60 pcs. - 60%, starch content 12 pcs. - 23%. The average share of varieties and lines was 48%. If we consider this share in 2014-2018 years, it was higher in 2017 year by 64% and in 2016 year by -57% and lower in 2015 by 26%. The proportion was almost equal in 2018 year - 48% and 2014 year - 45%. The selected varieties such as Mereshzhka, Polesinka, Spivanka Poliska, Mirolubna, Vodohraj, Namisto, Krajevid, Caesarea Poliskia, Pamjaty Hirka, Osyayna, Romanovna we will apply to the production. The varieties such as Piryatinka, Mokosha, Krasunia Polisska, Koloryt, Efectna, Zaotar are carrying on their qualification expertise investigation. We use varieties and lines as a valuable starting material for hybridization of mild winter wheat to create new breeding forms with higher yields and better economic traits.

Keywords: soft winter wheat, variety, line, yield, variation, quality indicators, economically valuable feature

(28454) DETERMINATION OF THE EFFECT OF SOME HERBICIDES WITH DIFFERENT WATER LEVELS ON WEEDS IN GREENHOUSE CONDITIONS

Tugba Kazankiran¹, Izzet Kadioglu²

¹ Tokat Gaziosmanpasa University, Turkey

² Tokat Gaziosmanpasa University, Turkey

ttugbakazankiran@hotmail.com

This study was carried out between 2017-2018 in order to evaluate the effect of different herbicides with different pH levels on monocotyledone and dicotyledone weeds. The study was conducted in 18x20 cm diameter pots and the experiments design was randomized block design with four replicates and repeated once. Three seeds per *Triticum aestivum* L. (wheat), *Sinapis arvensis* L. (mild mustard), *Avena sterilis* L. (wild oat) were sown to each pot at 3 cm soil depth. After plant emergence one seedling per pot was removed and the rest were used in ongoing studies. During flaternity 3 different herbicides (2,4-D amin, chlorsulfuron, tribenuron methyl) with different spraying water pH levels were applied (3, 5, 7, 9 pH). Plants were harvested after for 50 days. The results were evaluated statistically by using Duncan multiple comparison test. As a result of the study, *S. arvenis* length was measured as 6,37 cm in control treatment while this value was 2,39 cm in 2,4-D spraying water pH-7 application. In addition, tribenuron methyl pH-9, tribenuron methyl pH-7, 2,4-D amin pH-9 and 2,4-D amin pH-5 with spraying water took place in the group. The highest dry weight of *A. sterilis* was achieved as 0,24 gr/pot in 2,4-D pH-9 experiment. Meanwhile 2,4-D pH-7 with 0.09 gr/pot dry weight grouped with chlorsulfuron pH-7, 2,4-D amin pH-5 and tribenuron methyl pH-7. The dry wieght was found higher in other spraying water pH trials. The longest wheat plant heigh was obtained from 2,4-D with spraying water pH-7 application (17,90 cm) and the shortest wheat length was obtained from weed control application (12,85 cm). Based on the results of study, the ideal pH level for spraying water was Neutral pH.

Keywords: Wheat, Spraying water, Herbicide, pH, Weed

(28531) GENERATION OF RNASEQ DATA FOR *Corylus avellana* L.

Nehir Ozdemir Ozgenturk¹, Zehra Omeroglu Ulu¹, Aysun Akar², Salih Ulu¹

¹ *Molecular Biology and Genetic Department, Yildiz Teknik University, Turkey*

² *Republic of Turkey Ministry of Agriculture and Forestry Hazelnut Research Institute, Giresun, Turkey*

nehirozdemir@yahoo.com

Turkish Tombul hazelnut (*Corylus avellana* L.) is the most widespread hazelnut species in our country and has high impact on industry and global agricultural sector. It has high rich nutrients such as oleic acid, phytosterols and vitamin E. In this study, young leaves, flowers (male and female), bud, husk shoot of Turkish Tombul hazelnut (*Corylus avellana* L.) obtained the collection of Giresun Hazelnut Research Institute. Total RNA from these material was extracted with RNeasy Plant Mini Kit (Qiagen), separately. After total RNA extraction, RNA pool was composed after cleaning with RNA MinElute Kit (Qiagen). The concentration of RNA was measured with Bio-spec-nano UV-VIS Spectrophotometer. Pair-end (2x100 bp) sequencing was performed using an Illumina HiSeq™ 4000 sequencing system (Illumina) at Beijing Genomics Institute (BGI). RNA-Seq resulted in an average of ~42 million clean reads. We used the Trimmomatic software for quality trimming. And then the quality of clean reads was checked using FastQC program. The analysis of *de novo* assembly from this RNA-seq data were done via Trinity platform. We got comprehensive information about gene expression profile of Turkish Tombul hazelnut (*Corylus avellana* L.) species with this study.

Keywords: RNAseq, Transcriptome, Hazelnut, Corylus

(28533) RESOLVING OF CERTAIN CONSERVED MIRNA IN *Olea europaea*

Nehir Ozdemir Ozgenturk¹, Hatice Nur Aydin¹, Sultan Cansu Ilgin²

¹ *Yildiz Technical University, Molecular Biology and Genetic Department, Turkey*

³ *Altinbas University, Vocational School of Health Services Department, Anesthesia Programs, Turkey*

nehirozdemir@yahoo.com

Micro RNAs were first discovered in 1993. These are 21-23 nucleotides in length and are defined as short RNA sequences. This short interfering RNA sequences has the role of gene expression control. Olive plant is an important food source for countries in terms of economy and health. In this study, conserved micro RNAs were investigated to show their expression level in olive plant. First of all, RNAs were isolated from young olives leaves (*Olea europaea*). RT PCR (Reverse Transcriptase Polymerase Chain Reaction) was performed by using primers to transformed into cDNA which is more stable nucleotid than RNA. The real time PCR method was used to detect these miRNAs (miR-159, miR-160, miR-171, miR-396, miR-2919 and miR-8123) that are specific to the olive plant. A total of six miRNAs were tested. Real Time PCR results were show those 5 miRNA expressed well (miR-159, miR-160, miR-396, miR-2919 and miR-8123). micro RNA types associated with growth and development were observed in young olive leaves. The effect of these miRNAs on gene expression control of olives will be investigated.

Keywords: miRNA, *Olea europaea*, q- PCR

**(28310) FOREST VITALITY - ICP SAMPLE PLOTS LEVEL I AND II -
WITH SPECIAL EMPHASIS ON ABIOTIC AGENTS (ICE BRAKES) IN
REPUBLIC OF SERBIA FOR PERIODE 2014-2019**

Renata Gagić-Serdar, Tomislav Stefanović, Goran Češljarić, Miroslava Marković, Ivana Živanović

¹ *Institute of Forestry, Belgrade, Serbia*

katas96@hotmail.com

Degradation of forests is reflected by impaired vitality of the trees and the result is unfavorable effects of the complex factors abiotic and biotic origin on trees as living organisms and complex natural processes within the forest biocoenosis. Agents classified into one of these two groups can act simultaneously or successively alternates. The groups whose participation is among those with high risks to the health state of the forest are abiotic factors specially disasterous ice breaks in Eastren Serbia, both, on the Sample Plots level I and Level II. Determining the process in forest ecosystems requires detailed research into ecological factors that lead to the occurrence of this phenomenon that are sometimes sufficient only with climate change, then determining the state of the canopy that succumbs influence of important agents that must be kept under control having the full insight into all aspects of the health state of forest communities. An insight into the state forests for making conclusions about the necessary improvement measures, it is possible to determine through monitoring of health state of forests. Subject of ICP for the monitoring of forests are anthropogenic (mainly air pollution), biotic and here abiotic factors harmful to the state and development of forest ecosystems in Europe. Under coordination of NFC- National Focal Center of Serbia for monitoring at the Institute of Forestry in Belgrade, the noise monitoring system was integrated into the state forestry environment, to participate in several institutions with their associates.

Keywords: forests, abiotic impacts, monitoring, ice breaks, Serbia

(27994) THE EFFECT OF DIETARY SUPPLEMENTATION OF DIFFERENT MULTI-ENZYMES ON PRODUCTION PERFORMANCE AND EGG QUALITY CHARACTERISTICS IN LAYING HENS

Ozgur Polat, Muzaffer Denli

¹ *Dicle University, Agriculture Faculty, Animal Science Department, Turkey*

muzaffer.denli@gmail.com

The purpose of this study was to determine the effects of dietary addition of multi-enzymes in different source of grains based diets on performance and egg quality characteristics of laying hens. A total of 225, 24 weeks of old laying hens (Atak-S) were divided into 3 treatments with 5 replicates and 15 hens per replicate for 10 weeks. The control group was fed basal diet (without any supplementation) and treatment groups were fed basal diet supplemented 0.1% Enzyme-A (xylanase, β -glucanase, cellulase, α -amilase and protease) and 0.05 % Enzyme-B (xylanase, β -glucanase). Performance and egg quality parameters were checked weekly throughout the experiment. Dietary multi-enzymes supplementation significantly changed the shape index, yolk index and yolk color (L and a) at different weeks of trial ($P < 0.05$). However, daily feed intake, egg production, average egg weight and feed conversion rate were not significantly affected by addition of both multi-enzymes during the experimental period ($P > 0.05$). In addition, dietary addition two types of multi-enzymes did not effect the egg specific gravity, eggshell thickness, eggshell rate, albumen index, Haugh units ($P > 0.05$). As a result, it was determined that the addition of multi-enzyme additions to the laying hens of the hens between 24-33 weeks of age did not affect the performance parameters, but caused limited changes on some egg quality characteristics.

Keywords: Multi-enzymes, laying hens, performance, egg quality

**(28001) ORGANIC DAIRY GOAT PRODUCTION MODEL FOR
SOUTHEASTERN REGION IN TURKEY**

Halit Deniz Sireli ¹, A. Konuralp Elicin ², Muzaffer Denli²

¹ *Dicle University, Agriculture Faculty, Animal Science Department, Turkey*

² *Dicle University, Agriculture Faculty, Agricultural Machinery and Technologies Engineering
Department, Turkey*

muzaffer.denli@gmail.com

Organic goat farming is very poorly developed although Turkey has sufficient natural vegetation for organic goat breeding. The aim of this study was to investigate the viability of organic goat breeding as a model in the Southeastern Anatolia. Within the scope of this research, a total of 70 dairy goat capacity organic goats farm was built. The minimum indoor area (net) on the farm was 1.5 m² for an adult goat and 0.35 m² for a child. The out-door run was a minimum of 2.5 m² for adult goats and 0.5 m² for kids. About 13.3 adult goats per ha were allowed graze on organic pastures. Totally 70, 12-month-old Kilis goats were kept in modern stables had seasonal access to pasture. Depend on the lactation period goats were fed with 60 % of roughage and 40 % concentrated feed. Live weight changes, pregnancy rate, and first mating and other adaptation values were checked. The results obtained showed that Kilis goat breed may be raising is this region for organic goat production.

Keywords: Organic Farming, Dairy goats, Milk performance, Southeastern region, Turkey

**(28078) THE EFFECT OF TRIS-BASED TAXIFOLIN AND
TREHALOSE EXTENDER ON POST-THAWED RAM SEMEN
PARAMETERS**

Mustafa Numan Bucak¹, Nazan Keskin², Ali Erdem Ozturk³, Nuri Baspinar⁴, Pinar Ili⁵

¹ *Selcuk University, Veterinary Medicine Faculty, Reproduction and Artificial Insemination
Department, Konya, Turkey*

² *Pamukkale University, Medicine Faculty, Histology and Embryology Department, Denizli, Turkey*

³ *Selcuk University, Veterinary Medicine Faculty, Reproduction and Artificial Insemination
Department, Konya, Turkey*

⁴ *Selcuk University, Veterinary Medicine Faculty, Biochemistry Department, Konya, Turkey*

⁵ *Denizli Vocational School of Health Services, Medical Services and Techniques Department, Denizli,
Turkey*

mnumanbucak@gmail.com

In this study, the effect of taxifolin and trehalose added tris based extender were investigated on freezeability of ram semen. Semen were collected from rams with helping of artificial vagina. Semen were pooled and were divided eight equal parts. Groups were performed as follows: glycerol 5% (G5), glycerol 5% + 10 µM taxifolin (G5T10), glycerol 5%+ 100 µM taxifolin (G5T100), glycerol 5% + 500 µM taxifolin (G5T500), glycerol 3% + 60 mM trehalose (G3TRE), glycerol 3% + 60 mM trehalose + 10 µM taxifolin (G3TRET10), glycerol 3% + 60 mM trehalose + 100 µM taxifolin (G3TRET100), glycerol 3% + 60 mM trehalose + 500 µM taxifolin (G3TRET500). Semen were equilibrated for 2 hours. After equilibration diluted semen froze in 0.25 ml French straws in liquid nitrogen. Straws were thawed for 25 second in a water bath. The levels of lipid peroxidation (LPO), glutatyon (GSH) and total antioxidant capacity (AOC) were assessed. When LPO levels were examined, it was determined that the level of G5 group was significantly higher than those of G5T500 and G3TRET100 groups (p <0.05). There were no significant difference between GSH and AOC for all groups.

Keywords: Ram semen, cryopreservation, trehalose, taxifolin, antioxidant.

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(28115) IN VITRO RUMEN FERMENTATION CHARACTERISTICS AND METHANE PRODUCTION OF SOME MICROALGAE SPECIES AND PROTEIN FEEDS COMMONLY USED IN RUMINANT DIETS

Ekin Sucu¹

¹ Bursa Uludag University, Turkey

ekinsucu@gmail.com

The objective of this study to examine the nutrient properties, in vitro rumen fermentation characteristics and methane (CH₄) production of three different microalgae (*Chlorella vulgaris*, *Chlorella variabilis* and *Schizochytrium* sp.) and to compare these algae with protein feeds (sunflower meal, soybean meal and alfalfa hay) commonly used in ruminant diets. Microalgae species and protein sources incubated *in vitro* at 3, 6, 12, 24 and 48 h time intervals and the gas production was monitored. The proximate composition of microalgae and protein sources were examined. At 48 h incubation rumen fermentation variables and CH₄ production were also assessed. There were differences among the means of nutrient content of microalgae and protein sources (P<0.05). Organic matter was found to be higher (P<0.05) in sunflower meal and soybean meal than all other treatments. The protein content ranged from 119 to 389 g/kg DM in algae species and ranged from 197 to 482 g/kg DM in protein sources. Protein content of *Chlorella vulgaris*, *Chlorella variabilis* and soybean meal were markedly higher (P<0.05) than that of sunflower meal, alfalfa hay and *Schizochytrium* sp. The algae and protein feeds also differed in lipid content, total lipids being highest in *Schizochytrium* sp. and being lowest in alfalfa hay (P<0.05). Soybean meal and alfalfa hay had the highest gas production whereas sunflower meal and *Chlorella variabilis* had the lowest rumen total gas production (P<0.05). Ruminal pH ranged 6.26 to 6.81 and the highest ruminal pH was observed in sunflower meal. The lowest (P<0.05) CH₄ production was observed in *Chlorella variabilis* and *Schizochytrium* sp. This reduction in CH₄ production was accompanied by decreased volatile fatty acids (VFA) and acetate and increased propionate (P<0.05). The NH₃-N was the highest in all type of algae than protein feeds (P<0.05). The results of this study are promising that a microalgae supplemented feed could both add protein for better rumen microbial protein synthesis as well as decrease CH₄ production. Further research is needed in the form of combinations of different algae species and varied basal diets. As well as additional experiments engaging animal responses.

Keywords: *Chlorella* sp., in vitro, methane production, protein feeds, rumen fermentation, *Schizochytrium* sp.

(28491) THE EFFECTS OF IN-OVO INJECTION OF D3 VITAMIN ON HATCHABILITY AND SUPPLY ORGAN WEIGHTS IN JAPANESE QUAIL EGGS

Abdoulaziz Hamissou Maman¹, Ali Aygun¹, Mohamed K. K. Al-Sadoon², Iskender Yildirim¹

¹ *Selcuk University, Turkey*

² *King Saud University, Saudi Arabia*

iyildir@selcuk.edu.tr

The purpose of this study was to determine the effects of In-Ovo injection of vitamin D3 at the day 11 and 14 of embryonic development on hatchability, embryonic mortality (EM), chick weight, bone length and weight and supply organ weights of Japanese quails. A total of 480 fertile eggs were used in the study. The eggs were randomly divided into 3 groups as 160 eggs in each group with four replicates of 40 eggs each. Eggs were injected at the 11th and 14th day of incubation to deposit test material into amniotic fluid through the blunt end of the egg. The first group without injection (control), while, the second group at 11th day of incubation and third groups 14th day of incubation were injected with 0.2 ml Vit.D3 (333 IU), for per egg. The results showed that in ovo injection of vitamin D3 on day 11 and 14 of incubation resulted in significant decreases in the hatchability and increases in EM ($P < 0.05$). However, there was no significant difference neither in the supply organ rate nor in the chick and bone weight and bone length among treatment groups. In conclusion from the present study shows that injection with Vit.D3 in quail eggs with 333 IU at 11th and 14th of incubation decreases the hatchability increases EM without affecting the bone length, bone and supply organ weight in quail eggs. This study project has been supported by Selcuk University (S.U.) BAP Office (Coordinating Office of Scientific Research Projects, Project No: 19701326). The authors would like to thank “the S.U.-BAP staffs”

Keywords: Vit D3, In ovo injection, Incubation, Quail

(28516) EVALUATION OF ANIMAL-BASED INDICATORS TO BE USED IN A CATTLE FARM WELFARE ASSESSMENT

Muge Erkan Can¹, Mustafa Boga²

¹ *Cukurova University, Turkey*

² *Omer Halisdemir University, Turkey*

merkan@cu.edu.tr

High productivity and performance expected from the animal can be obtained if the livestock enterprises are established with a detailed and meticulous project and all the components of the subject are given due care. If the animal husbandry activity is not followed carefully, if some issues are ignored or insufficient attention is given, animals cannot be repaired over time and serious problems may arise. It is possible to say that the livestock sector, which is expected to yield high yields and gains, is a whole when the necessary attention is paid to all issues and it is a systematic farm. One of the most frequently ignored or underestimated livestock parameters is animal welfare. Animal welfare is a subject that defines a potentially measurable quality of a living animals and farm conditions. Cattle welfare is an increasing cause for concern due to limitations of the present legislation, which differs between countries and does not encompass all aspects of welfare for researchers and the relevant authorities and the animal producers who give the necessary attention to the issue. The objectives of this study are to examine behavioral changes in cows due to animal welfare indicators and to investigate the effect of unsuitable farm conditions in the light of scientific literature researches and presenting observations and determinations we have obtained during our farm visits. increasing animal welfare will be important in terms of getting away from stress environment and achieving better performance. This research and its results may guide to improve animal welfare ideas and projects by emphasizing the importance of animal welfare.

Keywords: Animal Welfare, Milk composition, High performance, Farm condition

(28543) IMPROVED NUTRITIONAL QUALITIES OF SUNFLOWER MEAL BY FERMENTATION

Ramazan Tosun¹, Sulhattin Yasar¹, Zeynep Sonmez²

¹ Iğdir University, Turkey

² Iğdir University, Turkey

zeynep.sonmez@gmail.com

The study aimed to improve the nutritional quality of sunflower meal (SFM) by *Aspergillus ficuum* fermentation. Three fermentation experiments were conducted using with or without *Aspergillus ficuum*. SFM was incubated for 72 hours at fixed conditions of pH, temperature, moisture, aeration and stirring rates. Samples taken at the hours of 0, 24, 48 and 72 were chemically analysed. The results indicated that fermentation of SFM with *Aspergillus ficuum* significantly ($P<0.05$) increased crude ash content by 15% and crude protein content by 11%. The fermentation with *Aspergillus ficuum* significantly ($P<0.05$) decreased crude lipid by 32%, the crude fibre SFM by 29%, ADF by 21% and NDF by 13%. There was a remarkable ($P<0.05$) increase in total reducing sugar by about 341% by *A. ficuum* fermentation. The fermentation of fungal microorganisms significantly ($P<0.05$) reduced the acetic acid and butyric acid content of SFM by 78% and 100% respectively. On the other hand, the fungal fermentations significantly ($P<0.05$) increased lactic acids from 0.95% at 0 hours to 16.05% at 24 hours. Fermenting SFM with fungal inoculants significantly ($P<0.05$) decreased tannin and phytic acid contents. As a result, the fermentation of SFM by fungal microorganism yielded an enrichment of nutritional qualities and added biologically functional compounds, mainly lactic acids. The fermented SFM with improved nutritional qualities is holding a great potential in farm animal nutrition.

Keywords: *Aspergillus ficuum*, functional feed, solid state fermentation, sunflower meal

(27590) EFFECT OF INCORPORATING AN AGRO-INDUSTRIAL BYPRODUCT OF CITRUS PULP INTO THE BROILER DIET

Arbouche Yasmine¹, Mennani Achour¹, Arbouche Rafik², Arbouche Fodil², Arbouche Halima Saadia²

¹ *University Farhat Abbas Setif 1*

² *University Ghardaia*

yas.arbouche@yahoo.fr

Our experiment on the effects of incorporating citrus pulp, by-product of the agri-food industries, in the feed ration and on broiler growth performance. A total of 250 1-day-old ISA F15 chicks were divided into 5 groups of 50 based on the rate of substitution of maize for citrus pulp at 0; 10.20; 30 and 40%, over a period of 48 days. No deaths were observed in any group. Live weight, average weight gain, and dietary intake were significantly reduced and proportionally to the amount of citrus fruit pulp incorporated during the start-up (D1 to D20), growth (D21 to D33) and finishing (J34 to J48), for substitution rates of 10%; 20%; 30% and 40%. Citrus pulp can only be incorporated at rates of less than 10%. Beyond that can cause a slowing of growth of this animal.

Keywords: diet, citrus pulp, corn, broiler

(27856) IMPACT OF THE INCORPORATION OF VEGETABLE OILS INTO THE FEED ON THE PERFORMANCE OF BROILERS: CASE OF SOYBEAN OIL

Mennani Achour¹, Arbouche Yasmine¹, Arbouche Rafik², Boucetta Sami³

¹ *University Farhat Abbas Setif 1, Algeria*

² *University Ghardaia, Algeria*

³ *Department of Agronomy, Agronomic and Veterinary Institute, University of Batna, Algeria*

achour_mennani@yahoo.fr

The purpose of this study is to better understand the impact of the incorporation of vegetable oil of soy into the feed on the zootechnical performance of broilers. The present study was carried out on a number of 165 day-old chicks Arbor Acres strain, they identified and weighed to be randomly distributed in 5 batches, and raised separately under the same ambient conditions. The average weight of day-old chicks was 37.01 ± 3.08 g. During the three rearing phases (start-up, growth and finishing), the feed was blended with 5% soybean oil in the following way: batch 1 without incorporation, lot 2,3 and 4 with an incorporation of 5% during startup, growth and finish respectively. Lot 5 was incorporated during the three fattening phases. Data analysis showed that incorporation of soybean oil had a highly significant ($p < 0.01$) influence on weights at 21, 42, 47 and 56 days of age. Thus, this incorporation had a highly significant influence ($p < 0.01$) on average daily earnings between (0-21 days); (22-42 days); (43-47days) and (48-46days), with an improvement in the consumption index. Chicks have overall average weights of 718 ± 7.75 g at 21 days; 2234 ± 21.29 g at 42 days; 2746.02 ± 30.78 g at 47 days and 3280.1 ± 44.94 g at 56 days.

Keywords: Vegetable oil of soy, average daily gain, consumption index, broiler

(28302) FEEDING OF LATVIAN DARK-HEAD LAMBS WITH CONCENTRATE AD LIBITUM UNDER INTENSIVE FATTENING CONDITIONS

Līga Šenfelde, Daina Kairiša, Dace Barzdina

¹ *Latvia University of Life Sciences and Technologies, Faculty of Agriculture, Institute of Animal Science, Latvia*

shenfeldel@gmail.com

The study was carried out on ram testing station of the association “Latvian Sheep Breeders Association” located in Latvia (57.849789, 25.327707). Research was aimed to study the effects of concentrate feeding *ab libitum* to fattening performance in Latvian Dark-Head lambs and forage digestibility. Four purebred Latvian Dark-Head lambs (rams) were used. Three of them were borned as twins, one – as triplet. Average age of lambs at the beginning of research were 82 days, average live weight – 25.9 kg. During the fattening lambs were fed by concentrate, grass hay and water *ab libitum*. Concentrate were offered in loose trough. Lamb fattening were carried out 63 days, divided in three periods each by 21 day. During the last four days of each period lambs were removed to grid floor and data of forage intake, fecal and urine amount were collected. During the last four days of each period the average daily concentrate intake per lamb were: 1.018 kg (in first period), 1.539 kg (in second period) and 1.747 kg (in third period). Grass hay daily intake were 100 – 130 g per lamb. Nutrients consumed with forage resulted in average live weight gain 531.3 g d-1 (in first period), 468.8 g d-1 (in second and third period) per lamb. At the end of fattening lambs average age were 145 days and average live weight 50.4 kg per lamb. Average fecal amount was 0.586 kg d-1 (in first period), 0.805 kg d-1 (in second period) and 0.913 kg d-1 (in third period) per lamb. During the research there were observed concentrate intake by lambs in small portions and after each portion there were water intake. In the result by increase of concentrate intake were observed the increase of faecal and urine amount. Average amount of urine were in range from 0.251 kg d-1 (in first period) to 0.748 kg d-1 (in third period) per lamb.

Keywords: sheep, forage digestibility, intake

**(26042) PHYTOCHEMICAL SCREENING AND ANTI
INFLAMMATORY, ANTIOXIDANT AND ANTIBACTERIAL
ACTIVITY OF METHANOLIC EXTRACT OF *Corchorus olitorius***

Mokrani Djamila, Thaweb Harzallah, Yaacoub Fadjeria

¹ *Biskra University, Algeria*

mokranidjamila@gmail.com

The species *Corchorus olitorius* linn (Family–*Tiliaceae*) is a commonly known as Mouloukhiya, buch okra and jew's mallow It is an economically important fibre. The plant is widely distributed in the tropics of both the hemisphere. The present study was carried out to identify and valorise the bioactive of the methanolic extract of the mulukhiya by evaluate the phytochemical screening and evaluation of the antioxidant, antiinflammatory, antibacterial activity in vitro.

Keywords: methanolic extract, Mulukhiya, *Corchorus olitorius*, screening, antioxidant, antiinflammatory

(27875) PRODUCTION AND CHARACTERIZATION OF BIODIESEL FROM *Scenedesmus quadricauda* (Turpin) ISOLATED FROM KANYE WATER RESERVOIR IN KANO STATE, NIGERIA

Yahaya Mustapha

Bayero University, Kano, Nigeria.

ymustapha116@gmail.com

In this study, *S. quadricauda* was isolated from Kanye water reservoir in Kano state, Nigeria and cultivated in the laboratory for the extraction and characterization of biodiesel. The algal culture was scaled-up in a photo bioreactor designed to provide optimum light intensity and aeration which yielded 1000ml of the algal culture. Algal oil was extracted from the harvested algal biomass and it was subjected to esterification and purification protocols. Characterization of the oil using FT-IR revealed the presence of ester, alkane and aliphatic functional groups. The oil was further subjected to ASTM standard tests which revealed that the oil has essential energy properties whose values fall within set limits as follows: Saponification value(193mhKOH/gm); Acid value(0.6mgKOH/gm); Free fatty acid(0,3%); Molecular weight(168); Refractive index(1.5%); pH(7.2) and Iodine value(83mgKOH/gm). The findings of this investigation indicate that *S. quadricauda* biomass is a good feedstock for biodiesel production which has the potential to serve as a good alternative to fossil fuels when produced on a large scale. In this study, *S. quadricauda* was isolated from Kanye water reservoir in Kano state, Nigeria and cultivated in the laboratory for the extraction and characterization of biodiesel. The algal culture was scaled-up in a photo bioreactor designed to provide optimum light intensity and aeration which yielded 1000ml of the algal culture. Algal oil was extracted from the harvested algal biomass and it was subjected to esterification and purification protocols. Characterization of the oil using FT-IR revealed the presence of ester, alkane and aliphatic functional groups. The oil was further subjected to ASTM standard tests which revealed that the oil has essential energy properties whose values fall within set limits as follows: Saponification value(193mhKOH/gm); Acid value(0.6mgKOH/gm); Free fatty acid(0,3%); Molecular weight(168); Refractive index(1.5%); pH(7.2) and Iodine value(83mgKOH/gm). The findings of this investigation indicate that *S. quadricauda* biomass is a good feedstock for biodiesel production which has the potential to serve as a good alternative to fossil fuels when produced on a large scale.

Keywords: Biodiesel, *S. quadricauda*, Kanye water reservoir

(27931) SCREENING INDUSTRIAL ENZYME PRODUCTION OF BACTERIAL STRAINS ISOLATED FROM HOT SPRINGS, TURKEY

Dilsat Nigar Colak

Dereli Vocational High School, Dereli, Turkey

dilsatnigar@hotmail.com

Microbial enzymes are widely used in biotechnological processes. A demand for stable enzymes that are able to withstand the conditions of industrial applications is increasing. Thermophilic enzymes are highly suitable for biotechnological use due to their thermal stability. A variety of thermophilic enzymes including proteases, lipases, xylanases, amylases etc. have already been used in principle industrial sectors. Food industries, beverage, starch processing, detergent, paper, and textile industries are some examples of this area. In this work, thermophilic isolates were screened for 5 different enzyme production; protease, xylanase, lipase, amylase, and cellulose. Water samples were collected from Karakoc (Izmir) and Kaynarca (Izmir) hot springs of Turkey. Total twenty-eight strains surviving between 45-55°C were isolated and purified from water samples. 16S rRNA sequence analyses carried out for identification. Plate assays were performed for each enzyme with suitable substrates. Skim milk (10%) for protease, birchwood xylan (5 g/L) for xylanase, olive oil (2.5%) for lipase, starch (10 g/L) for amylase, and carboxymethyl cellulose (5 g/L) for cellulose activity were used. Inoculated plates were incubated at 50 °C for 2 days. After incubation, positive strains were determined based on clear zones formed around colonies. Based on 16S rRNA sequence analyses, *Bacillus licheniformis* (10), *Brevibacillus theroruber*, *Brevibacillus aydinogluensis* (2), *Anoxybacillus puschinoensis* (3), *Brevibacillus formosus*, *Anoxybacillus kaynarcensis* (7), *Anoxybacillus gonensis* (2), *Bacillus aerius*, and *Anoxybacillus* sp. strains were identified. The strains were exhibited different enzyme production capabilities. While 22 of the strains were able to degrade cellulose, 13 of them degraded xylan, 11 of them capable of degrading protease and lipase and finally 9 of the strains showed amylase activity. Only one of the strains (T132) was positive for all enzymes, however four of the strains had no activity for none of the enzymes.

Keywords: Bacteria, Industrial enzymes, Thermophilic

(28130) ANTIOXYDANT ACTIVITIES, BIOCHEMICAL AND HISTOLOGICAL INVESTIGATIONS OF *Paronchia argentia* PLANT EXTRACT ON RODENTS

Seraiche Dahamna Saliha¹, Harzallah Daoud², Khennouf Seddik³, Merghem Mounira⁴,
Harrag Abdelmalek⁴

¹ *Laboratory of Pacd Setif 1 University, Algeria*

² *Laboratory of Applied Microbiology, Faculty of Nature and Life Sciences, University of Ferhat Abbas, Setif 1, Algeria*

³ *Laboratory of Pacd University of Setif 1, Algeria*

⁴ *Laboratory of Pacd Faculty of Nature and Life Sciences University of Setif 1 Setif, Algeria*

dahamna_s@yahoo.fr

The plant *Paronchia Argentia* is a largely used in the Algerian folk medicine, especially for the treatment of kidney stones. This work is aimed for the study of the effect of acute toxicity of the methanolic extract of this plant on some biochemical settings, on some blood components and also on the tissues of some organs. Mice of *Albino-wister* species were divided in two groups, each one contains 4 mice: the first is the control group (C), and the second is the group of treated with the methanolic extract at a dose of 200 mg/kg (T). Hematological results, showed a decrease in some blood values such as IDL-CV, IDL-DS and PLT in all treated mice in comparison with the control group, also there was a decrease in both VMP and IDP. The histological investigation of some target organs showed a little alteration on the liver parenchym and kidneys. Methanolic extracts of the plant *Paronchia Argentia* has been tested for their antioxidant activities. Evaluation of antioxidant power by five methods showed in vitro antioxidant capacity in all extracts and fractions, but ethyl acetate and Butanolic fractions were good antioxidants. The more potential activities measured by DPPH free radical scavenging method were showed by ethyl acetate fraction (EC₅₀ = 6.3 ± 0.135 µg/ml). Concentration, Inhibition of β-carotene bleaching activity is potentially performed by ethyl acetate fraction of (56.32%). According to the results, the plant extract contained a quantity of flavonoids and total polyphenols.

Keywords: *Paronchia argentia*, acute toxicity, Hematological parameters, histopathology, antioxidant activities, polyphenols, flavonoids

**(28159) CONSERVATION PRACTICES ON RARE ENDEMIC
HALOPHYTIC *Iberis halophila* IN TURKEY**

Fatos Sekerciler ¹, Ozcan Simsek ², Ogun Demir ¹, Evren Cabi ¹

¹ *Tekirdag Namik Kemal University, Turkey*

² *Canakkale On Sekiz Mart University, Turkey*

ecabi@nku.edu.tr

The genus *Iberis* L. (Brassicaceae) comprises approximately 50 species. It is represented by 8 species in Turkey and 2 of them, *I. halophila* and *I. carica* are endemic for our country. The former one, *I. halophila* is the only halophytic species in the genus. This endemic taxon distributed at the edge of Tersakan Lake in the Cihanbeyli District of Konya Province and in the South and Southwestern part of Tuz Lake located in the Eskil District of Aksaray Province. Until now there is no detailed population information on this species. With this study, number and size of metapopulations, and habitat properties of the *I. halophila* have been investigated. Based on detailed field observations potential threats on its habitat as well as IUCN conservation threat category and status have been determined. Field studies were carried out between June and August in 2016 During the surveys, number of individuals of *I. halophila*, altitude, GPS coordinates and other plant species growing together in the locality were noted. *I. halophila* is adapted to salt marshes with increased groundwater. It grows together with *Elymus elongatus* subsp. *salsus* Melderis, *Juncus maritimus* Lam., *Puccinellia koeieana* subsp. *anatolica* Kit Tan, *Eragrostis collina* Trin., *Molinia caerulea* (L.) Moench, *Verbascum pyroliforme* (Boiss. & Heldr.) Kuntze, *Scorzonera parviflora* Jacq., *Falcaria falcarioides* (Bornm. & H. Wolff) H. Wolff, *Schoenus nigricans* L., *Cladium mariscus* (L.) Pohl and *Lotus strictus* Fisch. & C. A. Mey. It has been distributed at 10 different sites far from each other and may represent a moderately fragmented population. The only total number of individuals has been found about 200 but there is no clear evidence of a continuing decline. *I. halophila* has an extremely restricted geographic range with an estimated extent of occurrence (EOO) of no more than 100 km². The whole distribution range of the species intersect with known conservation units. Road and field expansion studies, overgrazing, drought and excessive use of groundwater for cultivation are the main threats for the taxon. Based on all findings the most appropriate rating is proposed as Endangered. This study was supported by the General Directorate of Nature Conservation and National Parks of the Ministry of Forestry and Water Affairs.

Keywords: *Iberis halophila*, endemic, Tuz Golu, Aksaray, Konya

(28211) DEVELOPING A SOFTWARE BASED ON LAKE LEAFPACS2 CALCULATIONS BY USING PYTHON PROGRAMMING LANGUAGE

Ogun Demir, Aybuke Kizilirmakli, Evren Cabi

Tekirdag Namik Kemal University, Turkey

ogundemir8@gmail.com

Macrophytes are any group of macro organisms (vascular plants, stoneworhs (Characeae), bryohytes, pteridophytes aquatic algae even some macrofungi) which have relationship with water. They grow usually in water or edge of water bodies. They are accepted as reliable indicators for healthy wetland ecosystems and also they are commonly used to determine the water quality of lakes. Lake LEAFPACS2 which is one of the common classification method, enables the evaluation of macrophytes in lakes according to the requirements of the Water Framework Directive (WFD). The method includes five metrics which describes different aspects of the macrophyte communities: “Lake Macrophyte Nutrient Index (LMNI) – a taxon-specific nutrient response score. Number of functional groups of macrophyte taxa (NFG) - a diversity metric, individual taxa are allocated to one of 18 “functional groups”* Number of macrophyte taxa (NTAXA) - a diversity metric, the number of scoring taxa recorded in the field survey. Mean percent cover of hydrophytes (COV) – derived from lake macrophyte survey data Relative percent cover of filamentous algae (ALG) – derived from lake macrophyte survey data”. This method mostly used by Evironment Agency, SEPA and Natural Resources Wales for detect the impact on lake macrophytes of nutrient enrichment. Normally the macrophyte metric EQRs, the entire EQR and the Confidence of Class can calculate by manually using a calculator or spreadsheets such as MS Excel but when the number of points and the number of species increase, it is difficult to calculate Lake LEAFPACS2 by manually or with spreadsheet Microsoft Excel and the rate of error increases. So as to minimize the calculation errors we developed a user friend software by using PHYTON. Calculation algorithms have been created with *os*, *math* and *random* libraries in *Python*, were followed by the mathematical operation in the Lake LEAFPACS2 method. The species information given in the Lake LEAFPACS2 method has been transferred to the Microsoft Excel file and is being imported with the *openpyxl* library to software. In order to create the graphical user interface (GUI), the *Tkinter* library was used in *Python*. When the calculation process is over, the results of station are written to the excel file with *openpyxl*. So, our generated software is very userfriend and talented to reduce the error rate of the calculations made in LEAFPACS2 method.

Keywords: LEAFPACS2, Python, Ecology, Quality, Lake

(28212) CALCULATION OF IBMR SCORE VALUES BY USING PYTHON PROGRAMMING LANGUAGE

Ogun Demir, Evren Cabi

Tekirdag Namik Kemal University, Turkey

ogundemir8@gmail.com

There are many indexes developed in rivers to assess water quality and to create typologies based on flora or phytosociological communities. One of them, the Macrophyte Biological Index for Rivers (IBMR or MBIR), is used to determine the water quality of our country's rivers. IBMR, which assesses trophic distortion as well as heavy organic pollution, becomes a difficult and time-consuming index to be calculated by classical methods as the number of studied rivers and the number of taxa evaluated increase. In this study, an application with graphical user interface has been created for calculating IBMR using Python programming language. The algorithm of the mathematical models in the IBMR index was generated in Python. It was also used as a file database with *xlsx* extension. The database includes the taxa from the French IBMR method and the trophic level (CSi) and stenosis factor (Ei) reference values of these taxa. In the calculation phase, sample CSi and Ei values of taxa and sample taxa were used. Taxa were entered into the program with sample abundance values and the IBMR value was calculated. Accuracy of the obtained results was compared with the manual calculations. With the software we have generated, we have achieved much faster and more accurate results than the conventional calculation methods (including Microsoft Excel). We have also provided a simple interface to users, avoiding the confusion in the calculation methods in Microsoft Excel. No matter how many rivers and taxa in the determination of ecological quality status of rivers, it provides great convenience to the researcher with easy of use and performance in calculations.

Keywords: IBMR, Python, Macrophyte, Quality, River

**(28227) ASSESSMENT OF ECOLOGICAL QUALITY BY USING
AQUATIC MACROPHYTES IN LAKE AVLAN**

Aybuke Kizilirmakli¹, Evren Cabi², Nesibe Turan³

¹ *Tekirdag Namik Kemal University, Turkey*

² *Tekirdag Namik Kemal University, Turkey*

³ *Republic of Turkey, Ministry of Agriculture and Forestry, Turkey*

kizilirmakliaybike@gmail.com

Lake Avlan is located Elmalı district of Antalya and it covered 850 hectar area before dried up in 1970. In 2001, the lake was restored for enhancing the water regime in the region. In this study, we aimed to estimate the ecological quality status of Lake Avlan, Antalya based on macrophyte diversity. For this purpose, diversity and coverage of macrophytes were determined at four different vegetation periods in 2014 and 2015. Eight submerged taxa (*Polygonum amphibium* L., *Myriophyllum spicatum* L., *Schoenoplectus lacustris* subsp. *lacustris* (L.) Palla, *Potamogeton crispus* L., *Ranunculus trichophyllus* Chaix ex Vill. and *Potamogeton nodosus* Poir.), three emergent taxa (*Bolboschoenus maritimus* subsp. *maritimus* (L.) Palla, *Butomus umbellatus* L. and *Nasturtium officinale* R.Br.) and two algae (*Cladophora* sp. and *Zygnema* sp.) were recorded throughout four vegetation periods in the lake. Ecological quality calculation is measured based on LEAFPACS2 Lake index. As a result of calculation, we measured ecological quality of Lake Avlan as moderate with 0,52 index score. This study was supported by the Republic of Turkey Ministry of Agriculture and Forestry, General Directorate of Water Management.

Keywords: Lake Avlan, Macrophytes, LEAFPACS2, Ecological Quality

(28228) MACROPHYTE BIODIVERSITY OF THE NORTH AEGEAN BASIN IN TURKEY

Ezgi Buke¹, Evren Cabi², Nesibe Turan³

¹ *Tekirdag Namik Kemal University, Turkey*

² *Tekirdag Namik Kemal University, Turkey*

³ *Republic of Turkey, Ministry of Agriculture and Forestry, Turkey*

ezgibuke@gmail.com

North Aegean Basin which is located in the Aegean and Marmara geographical regions is one of the 25 hydrological basins in Turkey. This basin covers just only 1.3% of the surface area of Turkey. According to the EU Water Framework Directive all member states need to monitor and assess their surface waters using specific biological quality elements, in addition to hydrochemical data. Macrophytes are one of the important parameters used as biological indicators of organic pollution and also one of the ecological quality assessments to monitor and assess the ecological status of water bodies. For this purpose, abundance and species macrophyte composition in total 19 water bodies in the basin were determined and assessed according to the requirements of the Water Frame Directive. Surveys carried out during the project “Establishment of a Water Quality Ecological Assessment System Specific to Our Country” which were conducted by the General Directorate of Water Management of the Ministry of Agriculture and Forestry. During the surveys between 2014 and 2015, 16 rivers and 3 dam reservoirs were visited and 73 different macrophyte taxa were recorded from these 19 water bodies. Different methodologies have been followed for sampling macrophytes from dams and rivers. For the dams 4 transects which represent the lake and spanning the shallow-water zone perpendicular to the shoreline have been chosen. Each transect was represented by a georeferenced location. Sampling at each transect was carried out by throwing a rake in five directions, and collecting the plant material for species identification. For the river macrophyte sampling we conducted along 100 m-long stretches, which include both swift and slow flowing habitats. Percentage cover (exact numeral) is estimated in the field for all the macrophyte taxa observed. All collected macrophytes pressed and preserved in alcohol solution (70%) for exact diagnosis. *Lycopus europaeus* L., *Lythrum salicaria* L., *Mentha longifolia* subsp. *typhoides* (Briq.) Harley, *Paspalum distichum* L., *Polygonum lapathifolium* L., *Pulicaria dysenterica* (L.) Bernh. are found the most frequent emergent species. *Ceratophyllum demersum*, *Chara vulgaris*, *Myriophyllum spicatum* and *Potamogeton* ssp. are common rooted submergent species in the study area. The most frequent algae taxa in the basin were noted as *Cladophora* sp. and *Spirogyra* sp. The highest richness was found in the Menderes Stream (Canakkale)(27 different taxa) and the lowest number of species was recorded in Geyikli Stream (Izmir)(only 1 taxa). All macrophyte life forms are present, but floating plants are represented only by *Lemna minor* and not common in the area, contrary *Potamogeton* ssp. genus is most common and represented by 5 taxa. Emergent and rooted submergent species are more frequent both in rivers and dams. This study was supported by the Republic of Turkey Ministry of Agriculture and Forestry, General Directorate of Water Management

Keywords: Macrophytes, North Aegean Basin, Turkey

**(28230) CONSERVATIONAL NOTES ON THE *Acantholimon avanosicum*
DOGAN & AKAYDIN (AVANOS: NEVSEHIR) IN TURKEY**

Huseyin Kursad Ildeniz¹, Ferhat Celep², Ozal Guner³, Mehmet Gul⁴, Evren Cabi⁵

¹ Kartaltepe Mah. Mercan Cad. No:35/6, Turkey

² Kirikkale University, Turkey

³ Gazi University, Turkey

⁴ Enpark Environment and Energy Consultant Company, Turkey

⁵ Tekirdag Namik Kemal University, Turkey

kursad.ildeniz@gmail.com

The genus *Acantholimon* L. (Plumbaginaceae) includes approximately 295 species worldwide. This genus is represented by 50 species of which 32 are endemic for Turkey. *Acantholimon avanosicum* Dogan & Akaydin, a rare endemic taxon, grows only argillaceous slopes, between Avanos and Hacibektas in Nevsehir Province. With this study, number of individuals, and size of metapopulations, and habitat features of *A. avanosicum* have been investigated. According to field observations, IUCN conservation threat categories and status besides potential threats to its habitat have also been identified. Field studies were carried out between July and August in 2018. During the surveys, georeferenced occurrence data, number of individuals of *A. avanosicum* in metapopulations and other plant species growing together in the localities were noted. Based on extensive field surveys 3 different occurrence sites which were not far from each other were recorded. These occurrence sites can be accepted as one fragmented population. Totally 750-800 mature individuals have been recorded, however, there is no clear evidence that the number of individuals decreasing or stable. Extent of occurrence (EOO) of *A. avanosicum* is not more than 1.200 km². The most appropriate rating is proposed Critically Endangered according to all findings. It grows together with *Astragalus microcephalus* Willd, *Thymus sipyleus* Boiss., *Gundelia tournefortii* L., *Echinophora tournefortii* Jaub. & Spach, *Gypsophila* sp., *Hedysarium* sp., *Euphorbia* sp., *Scabiosa* sp., *Verbascum* sp., *Nonea* sp., *Rhamnus* sp., *Helichrysum* sp., *Stipa* sp., *Cousinia* sp., *Dianthus* sp., *Aspedoline* sp., *Globularia orientalis* L., *Eryngium campestre* L., *Taeniatherum caput-medusae* (L.) Nevski, *Peganum harmala* L., *Onosma* sp., *Acantholimon acerosum* (Willd.) Boiss., *Alhagi* sp., *Marrubium* sp., *Salvia hypargeia* Fisch. & C.A. Mey., and *S. absconditiflora* (Montbret & Aucher ex Benth.) Greuter & Burdet. There are tile and brick factories around the distribution range of the species. These factories use soil as raw material for their brick process so soil taking is the main threat over the sustainability of *A. avanosicum* in the area. Other threats are road and field expansion studies, urbanization, storing construction waste. This study was supported by the General Directorate of Nature Conservation and National Parks of the Ministry of Agriculture and Forestry Affairs.

Keywords: *Acantholimon avanosicum*, endemic, Conservation biology, Nevsehir, Cappadocia

FIRST RECORD OF CALANOID COPEPOD, *Pontella atlantica* (Milne Edwards, 1840) FROM THE MEDITERRANEAN COASTS OF TURKEY

F. Banu Yalim¹, Cihan Toslak¹, Sinan Mavruk², Faruk Pak¹, Meltem Ok³

¹*Mediterranean Fisheries Research, Production and Training Institute, Antalya, Turkey*

²*Fisheries Faculty, Cukurova University Adana, Turkey*

³*Institute of Marine Sciences, Middle East Technical University, Mersin, Turkey*

fatmabanu.yalim@tarimorman.gov.tr, banuyalim@yahoo.com

The species of genus *Pontella* belonging to the family Pontellidae inhabit surface waters of Indo-West Pacific region. On 7 June 2018, a single specimen of a male calanoid copepod *Pontella atlantica* was observed for the first time from the Turkish coasts of the Eastern Mediterranean. The sample was collected in context of an ichthyoplankton survey by using double oblique Bongo-60 net tows (200 and 500µm mesh). *P. atlantica* was morphologically identified based on the description of Rose (1970). A brief description of the morphological features, the key diagnostic characters and measurements of *P. atlantica* male were given in context of this study. After identification and photographing, the specimen was preserved in 4 % buffered formalin. Environment conditions were measured at the station where the specimen was observed.

Key words: Occurrence, Zooplankton Antalya Bay, Eastern Mediterranean, Levant Basin

**(28305) A REASSESSMENT OF IUCN THREAT CATEGORY OF
Verbascum bugulifolium Lam. (Riva Mullein)**

Evren Cabi¹, Burcin Cingay², Fatos Sekerciler¹, Ogun Demir¹, Huseyin Kursad Ildeniz³

¹ *Tekirdag Namik Kemal University, Turkey*

² *Nezahat Gokyigit Botanical Garden, Turkey*

³ *Kartaltepe Mah. Mercan Cad. No:35/6, Turkey*

ecabi@nku.edu.tr

The genus *Verbascum* L. includes approximately 360 species worldwide. In Turkey, it is represented by 251 species and 130 hybrids. *V. bugulifolium* Lam (Riva mullein) has a very narrow distribution in Northwestern part of Turkey and is one of the vulnerable species in the genus. In addition to populations in Turkey, there is also a small population in Bulgaria. In 2009, *V. bugulifolium* has been evaluated as Endangered B1ab(ii,iii,iv)+2ab(ii,iv); C2a(i) for the Bulgarian flora. With this study, considering the whole distribution of this taxon we reevaluated the threat category on the basis of IUCN criteria. For this purpose we carried out several field excursions in Kırklareli province and we determined 49 populations in Kırklareli. Besides Kırklareli populations this taxon has been already recorded from Tekirdağ, Istanbul, Adapazarı and Yalova provinces by other researchers in Turkey. *V. bugulifolium* is adapted to oak forest, macchies, meadows waste and acidic rocky places. We calculated extent of occurrence (EOO) and area of occupancy (AOO) in its whole distribution area with using GeoCAT. EOO and AOO has been measured as 14,754.154 km² and 168 km² relatively. Road and field expansion studies, are the main threats for the taxon. Based on all findings the most appropriate rating is proposed as EN B1ab(i,ii) + B2ab(i,ii). This conclusion was reached by bringing together the populations determined in Kırklareli province and the presence records in other provinces.

Keywords: *Verbascum bugulifolium*, Mullein, IUCN, Threat

**(28496) RAPID IDENTIFICATION OF *Lactobacillus plantarum* BY
TAQMAN 5' NUCLEASE ASSAY**

Asiye Esra Eren, İhsan Yaşa, Nazanin Eftekhari

Ege University, Turkey

asiyesraeren@gmail.com

In food fermentation lactobacilli especially *Lactobacillus* different species play the main role and in traditional fermented vegetable food such as table olive the predominant species in most natural and treated fermentation process is *Lactobacillus plantarum* and *Lactobacillus pentosus*, *Lactobacillus plantarum* is classified in human microbiota with functional activities like antimicrobial and antitumorigenic activities. So, this type of microbial factors could be utilized for developed fermented vegetable. Because of phenotypic similarity and genetically relation of this tow species, separation and identification of them are difficult and time-consuming. There are too many cultural and molecular methods which applied in microbiology, but always rapid and simple methods are acceptable and useful for to identify this group of bacteria from their natural ecosystem. In this study, Quantitative Real-Time PCR method with special strain probs was utilized to identify lactic acid bacteria and molecular characterization strain level of this family as fast and secure method for 60 different traditional table olive brine samples collected from Izmir province in Turkey. The results show that the procedure could be taken in less time than the other molecular and cultural methods with definite outcome information. This method is useful for detection and identification of the other bacteria families such as pathogen groups in diagnostic microbiology or the other environmental bacteria and could be replaced as the other biochemical and molecular methods.

Keywords: Real time PCR, *Lactobacillus plantarum*, Table olive, fermentation

**(28514) OLIVE LEAF EXTRACT INDUCED *Galleria mellonella* (L.)
(LEPIDOPTREA: PYRALIDAE) TOTAL HEMOCYTE COUNT
CHANGES**

Serhat Kaya ¹, Emine Inci Balkan ¹, Neslihan Demir ²

¹ *Canakkale Onsekiz Mart University, Turkey*

² *Canakkale Onsekiz Mart University, Turkey*

balkaninci@gmail.com

According to the literature, olive (*Olea europaea*) leaf extract has a neuroprotective, antimicrobial, antiviral, hypotensive, hypoglycemic, antioxidant, anticancer, anti-inflammatory, antithrombotic, antihyperlipidemic and anti-ischemic effects. The invertebrate immunity is considered to be the origin of the vertebrate immune system. There are two types of invertebrate immune responses: humoral and cell-mediated. Hemocytes play a central role in both immune responses. In this study, the effects of *O. europaea*, which is known to have pharmacostatic effects, on the *Galleria mellonella* immune system were investigated. To examine that, the leaf extract of *O. europaea* was dissolved in 40% Dimethyl sulfoxide in 0.1, 0.25, 0.5 and 1%. Then, 5 microliters from the solution was injected to each *G. mellonella* in the last instar larvae. Five larvae were used in every replicate at each dose and three replicates were performed in total at each dose (n=15). After 24 hours, the effects of the injection process began to be fully observed. For total hemocyte count, 4 microliters of hemolymph collected through the wound that was made at the anterior segment of the larvae, was mixed with 36 microliter anticoagulant. Then, the hemocyte cells in 10 microliter hemolymph-anticoagulant mixture were counted with a Neubauer hemocytometer under the phase contrast microscope. The study results indicate that; all experimental injection groups have higher hemocyte average in compare with the control groups. Accordingly, low doses of *O. europaea* leaf extracts are considered to have immune-promoting effect.

Keywords: Olive Leaf Extract Induced *Galleria mellonella* (L.) (Lepidoptrea: Pyralidae) Total Hemocyte Count Changes

**(28550) AN ACTIVE PROTECTION OF *Aldrovanda vesiculosa* IN
EASTEREN POLAND**

Marzena Parzymies¹, Magdalena Pogorzelec¹, Barbara Banach-Albińska¹

¹ *University of Life Sciences in Lublin*

marzena.parzymies@up.lublin.pl

Aldrovanda vesiculosa L. is an aquatic carnivorous plant species, critically endangered in Europe. The plant was common in prehistoric times, but nowadays it is present in few stands throughout the World. In Poland, according to data from 1958, there were about 50 stands of *Aldrovanda vesiculosa*, while in 1986 there were only 14 left. In the 70s of the 20th century the International Union of Conservation Nature advised to moniote the species. *Aldrovanda vesiculosa* is listed in the Appendix I of the Convention on the conservation of European Wildlife and Natural Habitats 1993 and Habitats Directive 92/43/EWG. According to the General Directorate for Environmental Protection *aldrovanda* is listed among 61 the species that need restitution and it is on the first position as a plant which reintroduction has a chance for a success. We present the activities which are run under the project 'An active protection of *Aldrovanda vesiculosa* on the territory of Lubelszczyzna region', no. POIS.02.04.00-00-0034/18, cofinanced by the Operational Programme 'Infrastructure and Environment'. The aim of the project is protection of biodiversity of water habitats in Poleski National Park, through preservation, supplementation and reconstruction of populations of rare and threatened with extinction *Aldrovanda vesiculosa* species. The tasks conducted include protection of genetic resources through cultivation and propagation in tissue cultures, and then restoration through reintroduction of new populations or sthrenghtening the existing ones. A multidirectional monitoring, both of populations and habitats is also run, so it is possible to quickly react in case of any problems that might occure due to changing conditions in abiotic environment or on the level of populations functioning.

Keywords: *Aldrovanda vesiculosa*, Endangered species, Poland, aquatic plant, Biodiversity, Conservation

(26072) STUDY OF THE ANTIOXIDANT ACTIVITY AND SYNERGISTIC EFFECT OF THREE SPICES: *Curcuma longa*, *Piper nigrum*, *Zingiber officinale* roscoe, USED IN ALGERIA

Yaacoub Fadjeria¹, Yaacoub Fadjeria¹, Mokrani Djamila¹

¹ *Biskra University, Algeria*

yafadjr@yahoo.fr

The present work aims to evaluate the antioxidant activity by the FRAP and DPPH test and to test the synergistic effect of the methanolic and aqueous extracts of *Zingiber officinale*, *Piper nigrum*, *Curcuma longa*, as well as the determination of the contents total polyphenols and flavonoids. The results show that the three extracts are rich in polyphenolic compounds. Moreover, the DPPH and FRAP test showed that the antioxidant activity is higher for black pepper by an IC₅₀ (0.21 mg / ml) compared to the other two spices. The synergistic effect is noted for the two tests, DPPH and FRAP, which confirms the data obtained in subsequent work despite their scarcity.

Keywords: *Zingiber officinale*, *Piper nigrum*, *Curcuma longa*, antioxidant activity

**(26341) PHENOLIC COMPOUNDS AS MARKERS OF BIODIVERSITY
OF THE ALGERIAN ASTRAGALUS GENUS**

Bellebcir Leila¹, Mokrani Djamila¹, Abidli Nacira²

¹ *Mohamed Kheider University, Biskra, Algeria*

² *Department of Natural Sciences, Ecole Normale Supérieure (Ens) Kouba, Algiers 16006, Algeria.
Algeria*

leila.bellebcir@univ-biskra.dz

Phenolic compounds occupy an impressive place in molecular biochemistry; they correspond to a very wide range of chemical structures and exhibit an extraordinary capacity of biosynthesis of plants. Natural products especially from plants sources have the ability to reduce oxidative stress by acting as antioxidants capacity which allows using them in varied fields as well in pharmaceutical industry and food preparations. In Algeria, Fabaceae play an important role in the balance of the natural environment and in the fight against desertification. Astragals are a good example of plants that are important in arid and semi-arid areas. In addition, spontaneous plants such as astragals (which are part of the family Fabaceae) are currently coveted for their richness in term of phenolic compounds; these biologically active molecules are accumulated under conditions of biotic and / or abiotic stresses. Indeed, these astragals occupy a place in ethnopharmacology, as well as their roles in traditional medicine. The present work aims to: the quantification of the phenolic compounds according to different extract from aerial part of two *Astragalus* spp and to explore their antioxidant potentialities.

Keywords: Phenolic compounds, Fabaceae, Biodiversity

(26694) EMPATHY AND PRO-SOCIAL BEHAVIOR IN RATS

Lalazar Nazarova, Aytac Ahmadzada

Baku Engineering University, Azerbaijan

lalanazarova87@gmail.com

Whereas human pro-social behavior is often driven by empathic concern for another, it is unclear whether nonprimate mammals experience a similar motivational state. But it has previously been shown that rats behave in a pro-social manner in response to a conspecific's distress, and that there are biological roots of empathy. To test for empathically motivated pro-social behavior in rodents, we placed four free rats in an area with a cagemate trapped in a plastic restrainer. After several sessions, the free rats, occasionally hearing distress calls from its compatriot they learned to intentionally and quickly open the restrainer and free the cagemate. Rats did not open empty or object-containing restrainers. They released cagemates even when social contact was prevented. When liberating a cagemate was pitted against chocolate contained within a second restrainer, rats opened both restrainers and typically shared the chocolate. Thus, rats behave pro-socially in response to a conspecific's distress, providing strong evidence for biological roots of empathically motivated helping behavior.

Keywords: Rats, Plastic Package

(27071) BIOCHEMICAL PLANT PROTECTIVE RESPONSES OF CEREALS UNDER THE ACTION OF BIOTIC AND ABIOTIC FACTORS

Olga Molodchenkova¹, Olga Ryshchakov A², Jaroslav Fanin²

¹ *Plant Breeding & Genetics Institute-National Center of Seed and Cultivar Investigation, Ukraine*

² *Plant Breeding&Genetics Institute -National Center of Seed and Cultivar Investigation, Ukraine*

olgamolod@ukr.net

The biochemical aspects researches of a plant resistance to environmental stresses always are actual and directed to solution of the problem obtaining high yield of agricultural plants. The process of plant resistance formation to biotic and abiotic stress factors is connected with transformation of a protein and enzyme complex, oxidizing and antioxidizing processes and phenolic and carbohydrate metabolism. It is known that trypsin inhibitors, chitinase, β -1,3-glucanase, lectins, phenylalanine ammonia-lyase, dehydrins, sucrose phosphate synthetase take part in the plant protective mechanisms to stresses of different nature. A certain role in the regulation of plant responses to different nature stress factors belongs to salicylic (SA) and jasmonic (JA) acids. SA and JA may be triggers that activate plant protective mechanisms at the diseases and abiotic stresses. The present study investigated varieties, lines of winter wheat (*Triticum aestivum* L.), spring barley (*Hordeum vulgare* L.), corn (*Zea mays* L.) significantly different on the level of resistance to fungal pathogens (agents of fusariosis, *Alternaria spp.*) and drought-heat tolerance. Using biochemical and molecular methods, we showed that restructuring of metabolic processes connected with the accumulation and redistribution of protective proteins (proteinase inhibitors, lectins, dehydrins), change of enzymes activity (chitinase, β -1,3-glucanase, lipoxygenase, phenylalanine ammonia-lyase, sucrose phosphate synthase), directed generation of mediators of signaling systems in the plant tissues form the basis of biochemical mechanisms of plant resistance formation of cereals to infection of fungal pathogens and the influence of abiotic stress factors. It was elucidated that the changes of activity of the studied protective proteins and enzymes in cereals at the action of factors of different nature are controlled by different mechanisms. These changes depend from the expression of defense genes and intensity of processes of protein biosynthesis. It was established that one of displays of protective action of jasmonic and salicylic acids is their skill to induce the changes of protective proteins activity in the plant tissues of cereals. Lines of evidence about the change of protective proteins activity under the action of salicylic and jasmonic acids, lectin show the involvement of these compounds in the chain of signaling pathways that lead to the expression of protective genes and the formation of plant resistance of cereals to fungal pathogens and abiotic stress factors. The carried out research allowed to develop a conception of biochemical reactions formation and connection of different cereal crops within the processes of development of plant adaptive response to biotic and abiotic factors, to make theoretical grounds and experimentally realize new biochemical approaches to evaluation of plant resistance to fungal diseases and abiotic stressors. It was got four Ukrainian patents for new express methods for selection of Fusarium-resistant and drought-resistant or heat-resistant cereal crops genotypes using biochemical parameters (patent #12639, declarative Ukrainian patent #43280, declarative Ukrainian patent #69859, declarative Ukrainian patent # 49643).

Keywords: Cereals, fungal pathogens, drought and heat tolerance, protective proteins, plant resistance

(27916) BACTERIAL DEGRADATION OF PAPER PULP WASTEWATER

Aysegul Ozer¹, Fulya Ay Sal², Ali Osman Belduz³, Sabriye Canakci³

¹ *Karadeniz Technical University, Turkey*

² *Karadeniz Technical University, Turkey*

³

aysegul_ozер_61@hotmail.com

Many toxic pollutants are released during the production of paper pulp. When these pollutants come together, they form a complex, colored waste with high COD and BOD. Due to this high level of pollution and dark color, paper pulp wastewaters cause serious water and soil pollution. Various physical and chemical treatment methods or combinations of these methods have been reported, but these methods are not cost effective and sometimes increase the COD value of the treated wastewater with large sludge formation. Therefore, efforts are being made to develop cost-effective, environmentally friendly and efficient methods for the biological treatment of paper and pulp waste waters. For this purpose, bacterial strain of *Raoultella ornithinolytica* which was isolated from wood chips by our research group and determined to have bioremediation potential was applied to paper pulp wastewater. The bacterium was applied to the paper pulp wastewater for five days and samples were taken every day for measurements. According to the results the highest degradation rate was found as 46%. Based on these results, it was found that this bacterium has a high potential for environmentally friendly applications.

Keywords: Bacteria, bioremediation, wastewater

(27917) DETERMINATION OF DETOXIFICATION CAPACITY OF A NEW STRAIN OF LIGNINOLYTIC BACTERIA

Aysegul Ozer, Fulya Ay Sal, Ali Osman Belduz, Sabriye Canakci

¹ *Karadeniz Technical University, Turkey*

aysegul_ozер_61@hotmail.com

The paper and pulp industry uses large amounts of water and different chemicals during the cellulose pulp production processes from plant samples and produces toxic and dense colored wastes on a large scale. The primary contributing factors to the color and toxicity of wastewater are lignin and chlorinated phenols, because these compounds are resistant to conventional wastewater treatment processes and generate serious environmental pollution and toxicity. Due to the high pollution load and color-contributing substances, paper and pulp factory wastes cause serious water and soil pollution. This blocks photosynthesis in aquatic systems and reduces the level of dissolved oxygen and thus negatively affects flora and fauna by causing toxicity. In polluted soil, they cause accumulation of toxic pollutants and metals. Chlorinated compounds are highly toxic and cause carcinogenic, mutagenic, clastogenic and endocrine effects. Biological bleaching methods of these wastewaters have become important because they are both environmentally friendly and also remove colored compounds and low molecular weight chloro lignins. The black liquor, which is a pulp wastewater was treated with a new isolated ligninolytic bacterium *Pseudocitrobacter*. According to the results, approximately 51% lignin degradation rate was determined. In addition, it was determined that the black pigments precipitated in the pellet part as a result of the centrifugation of the culture obtained as a result of the treatment with black liquor.

Keywords: Biological bleaching, detoxification, environmentally friendly

(27919) DETERMINATION OF PULP BLEACHING CAPACITY OF LIGNINOLYTIC BACTERIA

Aysegul Ozer, Fulya Ay Sal, Ali Osman Belduz, Sabriye Canakci

¹ *Karadeniz Technical University, Turkey*

aysegul_ozar_61@hotmail.com

Environmentally friendly and cost-effective technologies for the pulp and paper industries can be important and efficient if they are applied carefully by industrial units. This biotechnology is designed to use less hazardous chemicals that cause environmental pollution. The use of less chemicals means less water consumption in the washing of bleaching chemicals from bleached pulp. The search for this environmentally friendly bleaching system in the pulp and paper industry has been focused on ligninolytic bacteria. Because lignin is the substance to be removed in paper pulp bleaching. In this study, ligninolytic bacteria were isolated and they applied to two different paper pulps (pine and eucalyptus kraft pulp) with different lignin contents. Pine kraft pulp has a high lignin content and high kappa number and so it is very difficult to bleach. Eucalyptus kraft pulp has a lower lignin content and is easy to bleach according to pine kraft pulp. The kappa numbers of the paper pulps which treated with bacteria were determined and thus the pulp bleaching capacity of the bacteria were revealed.

Keywords: Bacteria, bleaching, kraft pulp

(27920) IDENTIFICATION OF A NEW ESTERASE PRODUCING BACTERIUM AND CHARACTERIZATION OF ITS ESTERASE

Aysegul Ozer, Fulya Ay Sal, Ali Osman Belduz, Sabriye Canakci

¹ *Karadeniz Technical University, Turkey*

aysegul_ozel_61@hotmail.com

Carboxylesterases and lipases are belonging to the hydrolase family groups (EC 3.1.1.1) and (EC 3.1.1.3), which have different biochemical properties and substrate specificities. Esterases are inactive against emulsions of water-insoluble esters as olive oil which are specifically cleaved by lipases. Esterases prefer to catalyze the hydrolysis of the ester bonds of short chain triglycerides. The potential application of these enzymes have interest of industrial fields like foods, cosmetics and pharmaceuticals. This study can be considered as a step to obtain an industrially suitable esterase and lipase. A textile factory and an olive processing factory (Soke / Aydin / Turkey) waste waters pure isolates were obtained previously. Identification at the species/genus level was performed by 16S rRNA. Two bacteria were selected which have an esterase and lipase activity and partial characterizations were performed. According to the 16S rRNA genes, it was determined that FAD6 isolate was included in the genus *Pseudocitrobacter* and FAD12 isolate was included in the species *Pseudomonas stutzeri*. The optimum temperature for carboxylesterase and lipase activities were observed to be 40°C and 50°C, respectively. The optimum pH for carboxylesterase and lipase activities were observed to be pH 8.0.

Keywords: esterase, characterization, *Pseudocitrobacter*, *Pseudomonas*

(27921) DECOLORIZATION OF RBBR AND CONGO RED BY BACTERIA

Fulya Ay Sal, Aysegul Ozer, Sabriye Canakci, Ali Osman Belduz

Karadeniz Technical University, Turkey

fulyasal@gmail.com

The textile industry is threatening environmental health because of the synthetic dyes mixed into the waste water it produces. Synthetic dyes are toxic substances with potential negative effects on the environment and human health as they are released to the environment in significant amounts in the form of wastewater from the textile industries. The presence of dyes in the environment is of concern because they are resistant to degradation and the degradation products of most of these dyes can be toxic. Approximately 50,000 tons of textile dyes are discharged from the dyeing processes in the world. Since some dyes can be seen even at concentrations as low as 0.005 mg l⁻¹, they are considered the most visible indicator of water pollution. It is emphasized that the necessity of developing an effective strategy for dye removal in most of the current approaches (chemical methods) used in dye color removal and treatments is limited to high cost and secondary pollution problem. Therefore, biological decolorization methods involving the use of bacteria have gained importance. In this study, isolated bacteria were applied to MSM containing two different dyes and after one week of incubation, the percentage of decolorization was calculated by measuring the appropriate absorbance for each dye. According to the results the maximum decolorization rate was 43.15% for RBBR and 96.86% for congo red. It can be said that these bacteria are potential candidates for biological decolorization, especially considering the results obtained for congo red decolorization.

Keywords: Bacteria, decolorization, dye

**(27922) SCREENING OF LIGNINOLYTIC BACTERIA AND
APPLICATION TO BLACK LIQUOR**

Fulya Ay Sal, Aysegul Ozer, Sabriye Canakci, Ali Osman Belduz

Karadeniz Technical University, Turkey

fulyasal@gmail.com

Lignin is one of the most abundant polymers in nature. It has a complex structure and is therefore very difficult to degrade. Lignin biodegradation is central to the earth's carbon cycle because lignin is second only to cellulose in abundance and, perhaps more significantly, because lignin physically protects most of the world's cellulose and hemicelluloses from enzymatic hydrolysis. Therefore, microorganisms capable of degrading lignin are noteworthy and studies on these microorganisms are increasing. In this study, 8 different bacterial species were isolated and examined for ligninolytic properties. The bacteria were inoculated into petri dishes containing kraft lignin as only carbon source. After overnight incubation the petri dishes were treated with two different solution and the best lignin degradation zone forming bacteria were selected. Bacteria with lignin degradation potential were applied to black liquor and lignin degradation rates were determined. Thus, lignin degradation capacity of bacteria was revealed and it was determined whether they can be used in industrial applications.

Keywords: Black liquor, degradation, lignin

**(27923) BIOCHEMICAL CHARACTERIZATION OF
EXTRACELLULAR LIPASE FROM A NEW STRAIN BACILLUS SP.
FAD9**

Fulya Ay Sal, Aysegul Ozer, Sabriye Canakci, Ali Osman Belduz

Karadeniz Technical University, Turkey

fulyasal@gmail.com

Lipases are serine hydrolases (EC 3.1.1.3), which act on ester linkages of glycerides at water-oil interface. They hydrolyze the ester bonds, trans-esterify triglycerides and resolve racemic mixture, and also synthesize ester bonds in non-aqueous media. Lipases are produced by various organisms but lipases of microbial origin, mainly bacterial and fungal, represent the most widely used enzymes in chemistry and biotechnological applications. Thus, to search for new lipases with different characteristics will always be important research topics. FAD9 was isolated from wastewater samples that were obtained from a textile factory and an olive processing factory in Soke, Aydın, previously and genomic DNAs were isolated and identified at the species/genus level by 16S rRNA and determined as *Bacillus* sp. Lipase activity of FAD9 was detected in Rhodamine B and olive oil-containing medium. Enzyme was produced in LB medium for 48 h and optimum temperature, pH, substrate specificity and thermal stability were determined. Hydrolase activity of the enzyme was shown in the gel. The best substrate for the enzyme was determined as p-NP butyrate (C4). Lipase was found to have an optimum pH of 8.0 and an optimum working temperature of 40°C.

Keywords: Bacillus, characterization, lipase

(27924) SELECTING PECTINASE PRODUCING BACTERIA AND PRODUCTION OF PECTINASE FROM WHEAT BRAN

Fulya Ay Sal, Aysegul Ozer, Sabriye Canakci, Ali Osman Belduz

Karadeniz Technical University, Turkey

fulyasal@gmail.com

Pectinases are enzymes that catalyzes pectic substance degradation through depolymerization and deesterification reactions. Pectinases hold a leading position among the commercial industrial enzymes. These enzymes are being used in various industries like wine, food, paper industry for bleaching of pulp and waste paper recycling; in the processing of fruit–vegetables, extraction of vegetable oil and scouring of plant fibres. Pectinase activity screening was performed on bacteria isolated previously from textile factory and an olive processing factory wastewater in Soke, Aydın due to this wide usage in industry and identified at species/genus level by means of 16S rRNA. The phylogenetic tree of the best pectinase producing bacterium was constructed. FAD2, FAD3, FAD4 and FAD12 were found to have pectinase activity from isolates grown on a medium containing substrate as pectin. Bacteria with the best pectinase activity was grown in distilled water containing wheat bran and pectinase activity was measures in the presence of pectin as a substrate.

Keywords: bacteria, pectinase, wheat bran

(27937) PROTEASE ACTIVITY SCREENING OF HOT SPRING BACTERIA ISOLATED FROM AEGEAN REGION/TURKEY

Fulya Ay Sal ¹, Aysegul Ozer ², Dilsat Nigar Colak ³, Sabriye Canakci ⁴, Ali Osman Belduz²

¹ *Karadeniz Technical University, Turkey*

² *Karadeniz Technical University, Turkey*

³ *Dereli Vocational High School, Dereli, Turkey*

dilsatnigar@hotmail.com

Proteases are one of the most important enzymes used in industrial applications for years. Thermophilic proteases are especially very suitable tools because of their high specific activities and stabilities. Besides proteases, amylases and cellulases are also used in biotechnology. In this work, thermophilic isolates were screened for protease activity. The isolates that showed protease activity were also screened for amylase and cellulose activity. Formerly isolated thermophilic strains from Karakoc, Kaynarca, Nebiler (Izmir), Alangullu and Camkoy (Aydin) hot springs were used in this work. A total number of 85 isolates were inoculated into agar plates supplemented with Skim milk (10%). After an incubation period of two days at 50 °C, positive strains were selected. Protease positive strains were inoculated into agar plates supplemented with starch (10 g/L) for amylase, and carboxymethyl cellulose (5 g/L) for cellulose activity separately and incubated at same conditions. Positive strains were determined based on clear zones formed around colonies. The screening results have revealed that 16 of the strains were exhibited protease activity. Among these 16 strains, 14 of them showed good amylase activity and only three of them showed cellulase activity. The most effective strain for all of three enzyme activities were determined as C9/3. Characterization and optimization studies will be carried out for C9/3 and further analysed for industrial applications.

Keywords: Amylase, cellulose, protease, thermophilic

**(27962) ACUTE TOXICITY OF LOW DOSE DIAZINON PUPA STAGE
OF ROSE TORTRIX *Archips rosana* (LINNAEUS, 1758)
(LEPIDOPTERA: TORTRICIDAE)**

Utku Guner¹, Mitat Aydogdu², Fulya Dilek Gokalp³

¹ *Trakya University, Faculty of Science, Department of Biology, Turkey*

² *Trakya University, Faculty of Science, Department of Biology, Turkey*

³ *Trakya University Science Faculty, Turkey*

uguner@trakya.edu.tr

In modern agriculture, obtaining crops of sufficient quantity and quality without pesticides is an important problem today. Therefore, pesticides in agriculture are increasingly used more and more. Basudin is one of the pesticides used against rose tortrix *Archips rosana*. Basudin active ingredient diazinon (active substance content: 630 g / l) was used as test substance. All pupa was collected in selected study areas (pesticides unused land, Edirne-Thrace) and pupae were collected in Petri dishes with artificial diet. We maintained each individual pupa in large Petri plates (10 cm diameter) containing a 50% solution of diluted honey embedded in cotton pieces, which we used as the food source during the experiments. Diazinon, prepared in different doses, was sprayed on organophosphorus pesticides cherry leaves. These leaves made discs with a diameter of 5 cm and dipped into the test solutions for 10 seconds and allowed to dry laboratory conditions at $25 \pm 2^{\circ}\text{C}$, 16:8 hours Light: Dark cycle and 70% relative humidity. The concentrations were selected according to active ingredient diazinon recommended dose (r.d) (441 μm) in agricultural use and half of r.d and 10-1, 10-2, 10-3, 10-4, fold diluted concentrations of r.d. were exposed in laboratory conditions on pupae of *A. rosana*. After single dose application, mortality ratios were obtained after 7, 12 and 15 days. Mortality ratios were calculated after 7 12 and 15 days. LC50 values were calculated for diazinon at the end of the experiment. The 7-day LC50 value is 0.137 ppm daily while the 12-day LC50 value decreases by 0.001 ppm. In many studies using this method, a high mortality rate was observed even at doses much lower than the recommended doses. In most cases, the recommended dose was affected not only pests but also beneficial organisms (such as parasitic wasps). The use of pesticides below the recommended dose leads to insignificant reduction in pest control, while reducing the risk of pesticide residues. It is seen that pesticides below the recommended dose cause effective death even in long periods (15 days). The use of pesticides under the recommended dose (r.d.) may be important for the survival of beneficial organisms. A pesticide applied under the recommended dose (r.d.) is sufficient to kill target organisms. New application methods can help reduce these problems. It is important to study the concentrations that are effective on pests. Therefore, this approach may be helpful for integrated pest management programmes for to save environment and may contribute to reducing the use of pesticides.

Keywords: *Archips rosana*, Diazinon, Insecticide, Pupae, recommended dose, LC50

(27973) EFFECTIVE CONCENTRATIONS OF DIAZINON ON LARVAL STAGE OF *Archips rosana* (LINNAEUS, 1758) (LEPIDOPTERA: TORTRICIDAE)

Fulya Dilek Gokalp¹, Utku Guner², Mitat Aydogdu³

¹ *Trakya University Science Faculty*

² *Trakya University, Faculty of Science, Department of Biology, Turkey*

³ *Trakya University, Faculty of Science, Department of Biology, Turkey*

fulyadilek@trakya.edu.tr

The rate of pesticide use in agricultural areas is continuing to rise in many countries. Due to its harmful effect to living organisms, pesticide use should be reduced, or provide biological control to avoid or minimize the exposure of living organisms. Diazinon (0,0-diethyl-0-(2-isopropyl-4-methyl-6-pyrimidinyl phosphorothionate) is a thionophosphorous organophosphate pesticide used to control a variety of insects in agriculture and domestic settings. Most studies have confirmed the genotoxic and cytotoxic effects of diazinon on animals. So it is important to minimize the use the insecticide. For this purpose one of the common pest *Archips rosana* was used as test object. As it is known the pests' life cycle, it is possible to use the insecticide at its different life cycle stages. Larval stage of the insect were chosen to be tested. In the present study we aimed to identify the effective concentrations of the insecticide Diazinon on larval stage of *Archips rosana* (Linnaeus, 1758), using its commercial form. The insecticide was tested at field recommended concentration (RC), half of RC, and 1/10-1, 1/10-2, 1/10-3, 1/10-4, 1/10-5 fold diluted concentrations of RC on Larvae of *Archips rosana*, 24, 48 and 72 h mortality ratios were observed after one exposure. It was found that LC50 concentrations were 25 µM (24 h), 12 µM (48 h), 4 µM (72 h). It was shown that diluted concentrations of Diazinon insecticide still have 70% mortality at larvae stage after 72 h, almost have 100 % effectiveness with the exposure of half concentration of RC after 24 h. The results might be helpful for to minimize the pest use in agricultural areas.

Keywords: Diazinon, *Archips rosana*, LC50, Larva

(27974) DETERMINATION OF LC₅₀ CONCENTRATION OF DIAZINON ON *Archips rosana* (LINNAEUS, 1758) (LEPIDOPTERA: TORTRICIDAE) ADULTS

Mitat Aydogdu¹, Fulya Dilek Gokalp², Utku Guner³

¹ *Trakya University, Faculty of Science, Department of Biology, Turkey*

² *Trakya University Science Faculty*

³ *Trakya University, Faculty of Science, Department of Biology, Turkey*

mitataydogdu@trakya.edu.tr

In order to increase crop yield in agriculture, high amount of pesticide have to be used. These pesticides contaminate living organisms and cause toxic effects. So, it is important to lower pesticide use in agricultural areas. One of the main groups of these pesticides is organophosphates insecticides. Diazinon is used against Lepidoptera pests. It is important to minimise use of these insecticides for environmental protection. For this purpose it might be useful to find lethal concentrations at different life cycles of pests. *Archips rosana* (Lepidoptera: Tortricidae) feeds on large variety rose family (Rosaceae). Diazinon was widely used as an insecticide to control of *A. rosana* and other pests in agriculture. It is aimed to investigate mortality ratio after exposed with diluted concentrations of Diazinon (Basudin 60 EM) on adult forms of *A. rosana*. Commercial form of pesticide, Diazinon (Basudin 60 EM) IUPAC number: O,O-Diethyl O-[4-methyl-6-(propan-2-yl)pyrimidin-2-yl] phosphorothioate was used as test substance at recommended dose (r.d.) (441 µm), and half of r.d. and 1/10-1, 1/10-2, 1/10-3, 1/10-4, 1/10-5 fold diluted concentrations in laboratory conditions. After a single dose application mortality ratios and LC₅₀ values were determined after 24, 48 and 72 h. Application of half of recommended concentration on *A. rosana* adults induced 100% mortality in 24 h. More diluted concentrations of this pesticide has also lethal effect on pest. 102 fold diluted concentrations of r.d. induced mortality more than 50 % after 48h. In the present study it was found LD₅₀ concentrations of Diazinon for adult forms of *A. rosana* were 5.38±0.035-213.5, 0.78±0.174-2.66, 0.21±0.117-0.362 for 24, 48 and 72 h respectively. Low concentrations of the pesticide may be used on adult forms due to its high effectiveness. The effective concentration of pesticide use might be decreased for environmental safety.

Keywords: Rosaceae, Diazinon, *Archips rosana*, mortality, LD₅₀

(28020) CITIZEN SCIENCE IN CROATIA: “WHERE DID THE SEA URCHINS DISAPPEAR?” CAMPAIGN CASE STUDY

Danijela Poljuha¹, Mirela Uzelac¹, Tim Weber², Barbara Sladonja¹

¹ Institute of Agriculture and Tourism, Croatia

² University of Westminster, Faculty of Liberal Arts and Sciences, Department of Life Sciences, UK

danijela@iptpo.hr

Citizen science (CS) as the active involvement of the wider public in scientific projects is growing bigger and globally more attractive. In ecological projects it has been identified as the most acceptable sustainable environmental model, since efficient urban ecosystem management requires bringing science, policy, and citizen participation together. Citizen involvement in data collection and monitoring offers the public an appealing opportunity to participate in research, and allows them to benefit from the learning. On the other hand, the CS approach allows scientists to overcome the financial and technical problems associated with collecting large amounts of data in short time frames. There are some lingering concerns regarding the quality of data gathered on CS projects, such as the lack of training that might lead to citizens providing poor quality or incorrect data or even data bias due to specific alternative interests of public groups. However, this approach offers numerous advantages in particular phases of scientific research. Here we present a case study of biological recording of sea urchins (*Paracentrotus lividus*, *Arbacia lixula* and *Sphaerechinus granularis*) in the Adriatic Sea using a participatory citizen model. “Where did the sea urchins disappear?” campaign was launched in July 2019 by the Invasive Species Centre (ISC) at the Institute of Agriculture and Tourism Poreč (Croatia). The initial aim of the campaign was to quickly determine whether the reports of dying sea urchins in coastal waters around the city of Poreč are a part of a larger trend. The campaign was soon extended to the national scale. Within 48 hours after launching the appeal on ISC website and social networks (FB, Instagram), ISC got 102 reports on the presence, abundance and changes in sea urchins populations throughout the Croatian Adriatic coast, with social media statistics of 60 738 post reach and 272 shares. Based on collected data the geographic map of detected die-off cases was created and the conclusion on the local character of urchins dying problem was made. More than 98% of locations where the die-offs were detected were on the narrow area (45°08'47" N, 13°35'44" E to 45°28'27" N, 13°30'28" E) of western coast of Istrian Peninsula. The most relevant regional and national institutions involved in the benthos research and monitoring were contacted. Based on available data, spontaneously formed network of experts debating possible causes of urchins' die-offs. Possible reasons, such as sea water quality, a sudden rise of seawater temperature in narrow waters of North Adriatic caused by climate change or the presence of invasive algae *Ostreopsis ovata* or different bacteria are currently investigated. Sea field work was performed but samples of sea urchins were not collected because of the impossibility to find any live specimen at specific locations. More research is needed to explain the phenomenon. In cases like this one where we have an easily recognizable species and therefore more reliability of the collected data, we consider the citizen science model as a good example of fast, reliable and affordable way of data gathering that would otherwise, in regular scientific process, require significant material and time resources. The success of the campaign speaks of the need for a certain type of institutionalization and acceptance of CS protocol not only as a bottom-up concept but also as a form of official data stream.

Keywords: citizen science, sea urchins, die-offs, Adriatic Sea

**(28084) *Helichrysum arenarium* INDUCED PHENOLOXIDASE
ACTIVITY IN *Galleria mellonella* HEMOLYMPH**

Gulsum Akkus, Serhat Kaya, Bulent Gunduz

Canakkale Onsekiz Mart University, Turkey

cyrtopodion@gmail.com

The therapeutic plant *Helichrysum arenarium* contain an etheric oil, flavones and flavon glycosides, sterins, bitter substances and tannins having various coumarins. This plant is thought to have features such as diuretic effect, anti nephrolith, digestive systems abnormalities, immune system supporters, antibiotic and antioxidant effect. Model organism *Galleria mellonella* are a commonly used for studying human pathogenesis, antimicrobial and immune responses studies. The immune system of insects has an similarities with innate immune response of mammals, which makes this model organisms best candidate for such studies. Humoral and hemocyte mediated immune responses are main parts of insect immunity. Humoral responses are consisting of melanization, coagulation and antimicrobial peptides. The enzyme of phenoloxidase has a key role in melanization process. Which is released from hemocytes. In this study, dried *H. arenarium* samples extracted with %70 ethanol. After evaporation, samples were diluted as concentration 0,1%; 0,25%; 0,5% and 1% in 10% DMSO. *G. mellonella* last instar larvae were chosen ($0,18 \pm 0,02$ g) and 5 microliter experimental concentration were injected for each. After injection of the *H. arenarium* concentration samples exposed 24 hours. The samples were bleed and 10 ml hemolymph collecting and mixed with 10 microliters ice-cold anticoagulant in microcentrifuge tube. That mixture diluted with 80 microliter phosphate buffer (pH:7.0) and read at ELISA plate reader at 492 nm. Obtained results evaluated with SPSS statistic program. According to the results, *H. arenarium* extracts increased phenoloxidase enzyme activity in all doses except 0.1% dose. As emphasized in the literature, the results of this study have an immune-promoting effect of the *H. arenarium* plant.

Keywords: *Helichrysum arenarium*, *Galleria mellonella*, phenoloxidase, immune response

**(28085) EFFECTS OF DIMETHYL SULFOXIDE ON THE HEMOCYTE
CONTENT OF *Galleria mellonella***

Emine İnci BALKAN*, Serhat KAYA, Bülent GÜNDÜZ

*Department of Biology, Faculty of Arts and Sciences, Canakkale Onsekiz Mart University, Çanakkale,
TURKEY,*

* *balkaninci@gmail.com*

Dimethyl sulfoxide (DMSO) is a water-miscible solvent with broad applications in cell biology. It functions as a cryoprotective agent in various cells and tissues since it allows long term storage at subzero temperatures. It is also known to act as a stimulant of cellular differentiation and as a free radical scavenger. The invertebrate model organism *Galleria mellonella* (Linnaeus) is preferred for studies due to its short life cycle, larval size, ease of breeding and ability to show results within a few days. Insect immunity consists of humoral and hemocyte-mediated immune responses. Hemocyte-mediated immune responses include phagocytosis, nodule formation and encapsulation. To determine the effect of dimethyl sulfoxide on the hemocyte counts of *G. mellonella*, 5 µl, 5%, 15%, 20%, 25%, 30%, 35%, 40% and 50% doses were injected into the larvae. 5 samples per replicate were used for each dose, a total of three replicates per dose. 4 µl hemolymph collected from each injection sample was added to microcentrifuge tubes containing 36 ml anticoagulant. 10 µl of the prepared mixture was taken and loaded onto a neuber hemocytometer and counted with Olympus BX51 phase contrast microscope. According to the results, lowest total hemocyte count observed at 50% dosage. The 15%, 40%, 45% and 50% injection group have a significant differences than control group. Some studies in the literature indicate that the use of DMSO decreases the hemocyte count and our findings support that results. The aim of this study is to determine which dose is more effective and to clarify the different results in the literature.

Key words: Hemocytes, *Galleria mellonella*, Dimethyl sulfoxide

**(28096) EFFECTS OF DIFFERENT CONCENTRATIONS OF
DIMETHYL SULFOXIDE ON *Galleria mellonella* HEMOLYMPH
PHENOL OXIDASE ACTIVITY**

Serhat Kaya, Seranay Turkdogan, Bulent Gunduz

Canakkale Onsekiz Mart University, Turkey

seranayturkdogan@gmail.com

Dimethyl sulfoxide (DMSO) is a solvent that can be widely used in biological studies and aerosolized. DMSO is often used as a cyroprotectant and prevents extracellular and intracellular crystal formation during cell thawing and freezing. Other important properties of DMSO include penetration enhancing solvent excipient and active anti-inflammatory pharmaceutical agent. The model organism *Galleria mellonella* is frequently used in antimicrobial and pathogen-based studies, it is also a good invertebrate for immune system research. It is a general assumption that the immune system of insects is the origin of the innate immune response of mammals. Humoral responses are an important part of insect immunity and are related to melanization, coagulation and antimicrobial peptide responses. Hemocytes release phenoloxidase enzyme for melanization response. Different concentrations of DMSO for the experiment were prepared in stages from 5% to 50%. The concentrations of DMSO above 50% are LC50 (Letal Concentration 50) for *G. mellonella*. The larvae of the appropriate size *G. mellonella* were selected for the experiment (0.18 ± 0.02 g) and 5 μ l of each of the prepared concentrations were injected. 24 hours after injection, the samples were bleed and 10 μ l of hemolymph were collected and mixed with 90 μ l of ice-cold anticoagulant-phosphate buffer (10:80 μ l) (pH: 7.0) in a microcentrifuge tube. This prepared mixture was read at 492 nm on the ELISA plate reader. DMSO increases phenoloxidase enzyme activity at lower doses (5%-30%), but there is no effect at higher doses (35%-50%), when compare to control group. According to our study results, it is understood that the use of DMSO, which is frequently preferred as a solvent in biological experiments, less than 30% may have a negative effect on the test results. Although the use of DMSO higher than this ratio did not alter the phenoloxidase activity, its effects it may have on other parameters should be considered.

Keywords: Dimethyl sulfoxide, *Galleria mellonella*, phenoloxidase, immune response

(28099) REVIEW OF LITERATURE ON STUDENTS' ALTERNATIVE CONCEPTIONS ABOUT PHOTOSYNTHESIS AND ENERGY TRANSFORMATION: DIDACTICAL IMPLICATIONS

Abdeljalil Métioui¹, Louis Trudel²

¹ *Université Du Québec À Montréal, Canada*

² *Université D'ottawa, Canada*

metioui.abdeljalil@uqam.ca

The study of photosynthesis occupies a central place in the curricula of most countries from elementary schools to the university. How about the learning of the photosynthesis? A body of research in science education shows that primary and secondary students' alternative conceptions (10 - 16 years old) about photosynthesis and energy transformation are often inconsistent with the scientific knowledge they are expected to learn (Bell, 1985; Haslam & Treagust, 1987; Skribe Dimer & Jelka, 2017). The present study is intended to review some of the work carried out on the secondary students' alternative conceptions about photosynthesis and energy transformations. We also summarize some of the works highlighted that students' concepts should be a point of departure in teaching to create conceptual conflicts. These conflicts are indispensable for learning (Posner et al., 1982). Thus, a review of these works will present, followed by a critical analysis. Conclusively, we propose some conceptual change strategy to change alternative conceptions about photosynthesis. The history of science, concept mapping, and analogies are central to those strategies.

Keywords: Photosynthesis, energy transformation, students, alternative conceptions, teaching and learning, conceptual conflicts

**(28291) EXTRACELLULAR COLD-ALKALINE PROTEASE FROM
Stenotrophomonas maltophilia TK-4**

Tuna Karaytug¹, Nihan Arabaci², Burhan Arikan²

¹ *Cukurova University, institute of Science, Turkey*

² *Cukurova University, Turkey*

tunakaraytug@gmail.com

In this study, it was aimed to produce and characterize an extracellular cold-alkaline protease from a native strain and investigate the industrial application fields of this enzyme. The strains isolated from snow-covered highland were screened for protease production on skim milk agar (SMA) at 10°C and pH 9.0. To determine the optimum enzyme biosynthesis conditions, the highest protease producing strain was incubated at different temperatures (4-35°C) and pH values (6.0-12.0). Accordingly, the optimum enzyme biosynthesis was observed at 10°C and pH 11.0. The enzyme was produced at predetermined optimum conditions and partially purified by acetone precipitation. The protease exhibited its maximum activity at 10°C and pH 10.0. It was stable between pH 6.0-12.0 and 1-40°C for 24 h with an average of 81% and 87%, respectively. In the presence of 5 mM TLCK, EDTA, PMSF, and 1,10-phenanthroline, the protease showed 67, 72, 16 and 16% activity for 1 h, respectively. It exhibited 60, 68, 54, and 53% activity in the presence of MgCl₂, CaCl₂, ZnCl₂, and NH₄Cl (5mM). The end products of casein were detected as tyrosine, histidine, cysteine, and glycine by thin-layer chromatography. In conclusion, the enzyme produced by the *S. maltophilia* TK4 is a cold-alkaline serine metalloprotease. It is moderately stable in presence of metal ions and has high stable in a wide pH and temperature range. Besides, the hydrolytic activity of the enzyme was also found to be high by chromatographic analysis. Because of its characteristics, it may have a great potential for applications in special industries, such as detergent (additive), leather (dehairing), food (cheese manufacturing), medical/other pharmaceutical industry, and bioremediation. This research (project code: FDK-2017-9584) was supported by Cukurova University Scientific Research Projects Coordination Unit

Keywords: *Stenotrophomonas maltophilia*, Extracellular, Cold-alkaline Protease, Thin Layer Chromatography

**(28488) EFFECTS OF HYPERICUM PERFORATUM ON HEMOCYTE
COUNT OF *Galleria mellonella***

Cagla Cakaloglu, Emine Inci Balkan, Bulent Gunduz

Canakkale Onsekiz Mart University, Turkey

caglacakaloglu@yahoo.com.tr

St John's wort (*Hypericum perforatum* L.) is a perennial herb species with different local names and widely known for its therapeutic effects. It is known that various extracts of *H. perforatum*, which have spread in our country and in many continents, are used as antidepressant, wound healing, antimicrobial, antiviral and antioxidant. Greater wax moth *Galleria mellonella* (L.) is an invertebrate model organism used to study the effects of fungal and viral pathogens. In insects, immunity is of two types: humoral and cell-mediated. Hemocytes play a key role in both immune types. Therefore, changes in hemocyte counts are important for immune responses. The yet blooming specimens of *H. perforatum* collected in May-July season were dried in a dark and airy room. These dried samples were passed through the grinder to make flour bran size. Experimental groups were formed by mixing 0.5%, 1.25%, 2.5% and 5% of *H. perforatum* grinded samples into artificial food prepared for feeding of *G. mellonella* larvae. Hemocytes were counted from hemolymphs collected from a total of 15 samples in 5 replicates. 4 µl hemolymph collected from each individual for hemocyte count was added to microcentrifuge tubes with 36 µl anticoagulant. 10 µl of the prepared mixture was taken and loaded onto a Neubauer hemocytometer and counted with Olympus BX51 phase contrast microscope. As a result, 2.5% dose gave a higher average than the control. Accordingly, side effects that may occur as a result of high doses (overdose) of *H. perforatum* are not known.

Keywords: Hemocytes, *Galleria mellonella*, St, John's wort, immune system

(28513) THE EFFECTS OF *Salvia officinalis* EXTRACT ON *Galleria mellonella* PHENOLOXIDASE ACTIVITY

Gulsum Akkus, Serhat Kaya, Bulent Gunduz

Canakkale Onsekiz Mart University, Turkey

cyrtopodion@gmail.com

The leaves and flowers of common sage (*Salvia officinalis* L) are evaluated economicall and the oil obtained is also used in the treatment of throat infections and oral wounds due to its antiseptic and antibiotic effects. In addition, there are studies indicating that it treats skin diseases with its antifungal effect, supports the excretion of toxins from the body and improves brain functions. *Galleria mellonella* is a model organism used for immunological experiments. Insect immune responses are evaluated in two categories; humoral and cell mediated. Phenoloxidase is a key element of the melanogenesis process with insect humoral immune response. In this study, 70% ethanolic extraction of *S. officinalis* was dissolved in 40% dimethyl sulphaphoxide at 0.1%, 0.25%, 0.5% and 1%. These extracts were injected into the larvae of *G. mellonella* last instar (0.18 ± 0.02 g) with 5 μ l per dose. It was waited for 24 hours for the extracts to take effect. At the end of this period, 10 μ l of larvae were collected and injected into ependorf tubes containing 10 μ l of anticoagulant. 80 μ l of phosphate buffer solution was placed on it. This mixture was read on ELISA plate reader for 30 minutes every 5 minutes at 492 nanometer wavelength to determine phenoloxidase activity. According to our results, a significant increase in phenoloxidase activity was observed at a dose of 1% compared to the control group. Our results support the literature information. Further studies will reveal the effect of *S. officinalis* on the immune system.

Keywords: *Salvia officinalis*, Phenoloxidase, *Galleria mellonella*, immune system

A POTENTIALLY TOXIC ALGAL BLOOM OF *Euglena sanguinea* Ehrenberg IN A MEDITERRANEAN CREEK (ANTALYA, TURKEY)

F. Banu Yalim¹, Ozgur Baytut², Ozgur Aktaş¹, Talip Özgen³

¹*Mediterranean Fisheries Research, Production and Training Institute, Antalya, Turkey*

²*Ondokuz Mayıs University, Faculty of Science, Department of Biology, Samsun, Turkey*

Gazipaşa Directorate of District Agriculture and Forestry, Antalya, Turkey

fatmabanu.yalim@tarimorman.gov.tr, banuyalim@yahoo.com

Algal blooms are often reported in many marine and freshwater systems of the world. This research is aimed to evaluate an euglenoid algae bloom (*Euglena sanguinea*) observed in Uluhendek Creek (Gazipaşa, Antalya, Turkey). The blooms were seen as a thick red algae layer in water surface in September of 2013. Water samples were taken for collecting phytoplankton and nutrient analyses. Analyses were carried out instrumental methods in the laboratory. The specimens were examined and photographed. The study is the first report on the blooms of *E. sanguinea* in Turkish freshwater systems. This species is cosmopolite and is often found in shallow and eutrophic freshwater systems. It is well known that *E. sanguinea* may produce very toxic substances around the world's aquatic systems. There are serious observations about mass fish kills during the bloom periods.

Key words: *Euglena sanguinea*, algal bloom, Uluhendek, Gazipaşa, Turkey

(28515) SYNTHESIS OF CARVACROL DERIVATIVES AS ANTIOXIDANT AGENTS

Fatih Sonmez¹

¹ *Sakarya University of Applied Sciences, Pamukova Vocational High School, Turkey*

fsonmez@sakarya.edu.tr

Many plants and their components have acted an important role in conventional implementation of medicine. Carvacrol (5-iso-propyl-2-methyl-phenol) is the main bioactive monoterpen isolated from many medicinal herbs such as *Thymus vulgaris* and *Origanum vulgare*. It has been found to possess various pharmacological and biological properties, such as antioxidant, antiviral, antifungal, antitumor, anti-inflammatory and antibacterial activities. Reactive oxygen species (ROS) play an important role in the formation of various serious diseases; such as cancer, heart diseases, diabetes, arteriosclerosis and cataracts. The harmful effects of free radicals that cause potential biological damage are called oxidative stress. Free radicals in the human body play a pathogenic role in the formation of many chronic degenerative diseases such as cancer, autoimmune, inflammatory and cardiovascular neurodegenerative diseases. In this study, a series of carvacrol derivatives was synthesized and their DPPH activities were evaluated as antioxidant properties.

Keywords: Carvacrol, Carbamate, Antioxidant

(27970) PREPARATION OF POLY (N-[TRIS (HYDROXYMETHYL) METHYL] ACRYLAMIDE-CO-1-VINYL IMIDAZOLE-CO-EGDMA) (THMMA-CO-VIM-CO-EGDMA) BASED HYDROGEL FOR REMOVAL OF BORON FROM AQUEOUS SOLUTIONS

Bahire Filiz Senkal¹, Sare Naz Ciftci², Ebru Tekneci², Erdem Yavuz²

¹ *Istanbul Technical University, Turkey*

² *Istanbul Technical University, Turkey*

bsenkal@itu.edu.tr

Boron is a widely occurring element in minerals found in nature. We intake this element from food stuffs, because it is a dietary requirement for plants although boron is an element which is not considered a dietary requirement. An excessive intake of boron may cause acute boron toxicity with nausea, headache, kidney damage, and death from circulatory collapse. According to the World Health Organization (WHO) guideline value for boron in drinking water is 2.4 mg l⁻¹ and for most of the world, the concentration of boron in drinking-water is judged to be below 0.5 mg l⁻¹ [1]. Therefore, the boron and its compounds need to be removed from water with elevated concentrations. In this study, poly (N-[Tris(hydroxymethyl)methyl] acrylamide-co-1-vinyl imidazole-co-EGDMA) (THMMA-co-VIM-co-EGDMA) based hydrogel was synthesized with free radical polymerization method using potassium persulfate as initiator at 80°C. This hydrogel was used to remove boron from aqueous solutions. The effect of the amount of adsorbent and effect of different boron concentration for boron sorption was investigated for hydrogel and for its composites. Maximum boron loading capacity of the THMMA-co-VIM based hydrogel was found 4.0 mmol per gram sorbent. Furthermore, effect of foreign ion such as Ca²⁺ and Mg²⁺ on boron sorption capacity was researched. Besides, capacities of boron sorption were considered with varying pH value between 2.3 to 10 (non-buffered). Adsorption isotherm models that Freundlich, Langmuir and Tempkin were investigated for maximum sorption capacity of the hydrogel. Pseudo first order, pseudo second order and intra-particle diffusion kinetics models were performed in order to understand the efficiency of the hydrogels. All hydrogels conformed to the Freundlich isotherm and the second order rate equation. On the other hand, desorption of the hydrogel was examined. Amount of boric acid, which was recovered of the loaded hydrogel, is 2.25 mmol/g at the first cycle. When desorption experiments were investigated on desorbed hydrogel, desorption capacity of the hydrogel was found as 3.60 mmol/g. Finally, swelling kinetics experiments were done for hydrogel. This research has been supported by Scientific Research Project Coordination Center of Istanbul Technical University (project number: TYL-2018-41845).

Keywords: Hydrogel, Boron removal, polymeric sorbent

(27992) SYNTHESIS AND CHARACTERIZATION OF NEW URETHANE BASED HYDROGEN-BONDED LIQUID CRYSTALLINE COMPOUND

Burak Korkmaz¹, Bahire Filiz Senkal¹, Yesim Gursel¹, Mustafa Okutan²

¹ *Istanbul Technical University, Turkey*

² *Yildiz Technical University, Turkey*

kormkazaburk@hotmail.com

The application of non-covalent or supramolecular interactions, such as hydrogen bonding, to form liquid crystals is an area of considerable scientific interest mainly due to their interesting electrical and optical properties which makes them good candidates for applications in microelectronic devices ranging from optical data storage and nonlinear optics [1–3]. The isocyanate group is highly reactive and plays the main role in polyurethane chemistry. Isocyanates are derivatives of isocyanic acid (H–N=C=O), where alkyl or aryl groups are directly attached to the N=C=O moiety with the nitrogen atom. To form an H-bonded liquid crystalline compound one bond donor and one bond acceptor is required so properties of both are very important to enhance the compounds properties. Carbamates have quite unique functionalities to maintain these requirements as both hydrogen bond acceptor and donor. Because of their amide nitrogen's non-bonded electron pair and H atom paired with this nitrogen forming inter and intramolecular hydrogen bonds for urethane-based materials are indeed easy. Thus, for this purpose this type of materials are very efficient tools and shows important advantages. Preparation of LC11 with DEGME-MBPI A new urethane-based molecule (DEGME-MBPI) was prepared starting from 2-(2-methoxyethoxy) ethan-1-ol (DEGME) and bis (4-isocyanatophenyl) methane. 2-(2-methoxyethoxy) ethan-1-ol (DEGME) was mixed with about 2:1 molar ratio bis (4-isocyanatophenyl) methane in DMF as solvent. 3 drops of dibutyl tin laurate (DBTL) as catalyst was added to the mixture. The reaction content was heated at 60°C for 24 h. Then the reaction mixture was taken into hexane and phase separation occurred in order to remove the unreacted isocyanates. Remaining hexane was evaporated by rotating evaporator and obtained solid product was dried under vacuum. Biphenyl based mesogens are very well-known calamitic molecules which have been vastly used for many applications and research. Bearing a cyano group at one side of the molecule and having a long alkyl chain at the other side of biphenyl rings provide applicable properties which cause liquid crystalline phase behaviours. These molecules synthesized by reaction between 4'-hydroxy-4-biphenylcarbonitrile and in this works case 11-bromo-1-undecanol in the presence of K₂CO₃ as acid scavenger and DMSO as solvent at 110°C. To prepare H-Bonded liquid crystalline compound 2 eq. LC11 as an H-bond donor and 1 eq. DEGME-MBPI as an H-acceptor molecule were interacted in the DMF and mixture was let to evaporate slowly to form hydrogen bonds under room temperature for a week. The resulting hydrogen bonded liquid crystalline solid product was dried under vacuum for 24 h. The new H-bonded liquid crystalline compounds properties were investigated with polarized optical microscope and DSC. Liquid crystalline phase transition temperatures were detected with DSC thermogram and nematic textures of compound during cooling were observed by POM. This work is a part of PhD project which is supported by the Scientific Research Project Center of the Istanbul Technical University (Project number: 42129)

Keywords: Liquid Crystals, Hydrogen Bonding, Urethane, Calamitic Mesogen, Polarized Optical Microscope

(28003) INVESTIGATION OF THE INTERACTION BETWEEN NEW PEG DERIVATIVES AND POLYPHENOLIC COMPOUNDS

Gulcemal Yildiz¹, Bahire Filiz Senkal¹, Burak Korkmaz¹, Ebru Tekneci²

¹ *Istanbul Technical University, Turkey*

² *Istanbul Technical University, Turkey*

gyildiz@itu.edu.tr

Polyphenols are micronutrients found in some plant-based foods. Its most important properties are that they are filled with antioxidant properties and possible health benefits. Polyphenols are thought to improve or treat digestive problems, weight management difficulties, diabetes, neurodegenerative diseases, cardiovascular diseases. Polyphenols are also known to have anticarcinogenic effects. Many studies have confirmed the effectiveness of polyphenol antioxidants in fruits and vegetables to reduce neuronal death and reduce oxidative stress. Antioxidant activity of polyphenols that act as natural neuroprotective agents against certain neurodegenerative diseases such as Parkinson's or Alzheimer's diseases. Polyphenolic antioxidants appear to give hope to delay the onset of age-related diseases. Therefore, a better understanding of the interaction mechanisms associated with polyphenolic compounds reinforces the hope that it can lead to better health and new therapeutic approaches in health and in diseases [1-3]. Although polyphenolic substances are very valuable, they have a significant disadvantage. The clinical significance of some phenolic agents is largely limited by its low water solubility, which is defined by the presence and distribution of hydrophobic / hydrophilic functional groups, respectively. This, in turn, affects the bioavailability of these substances. Thus, in the broad sense, considering only these factors, the bioavailability of polyphenols is directly related to their water solubility [4, 5]. PEG is a hydrophilic molecule. PEG is generally considered to be biologically neutral and safe. PEG is also used as adjuvant in many pharmaceutical products. PEG is widely used in the final formulation of pharmaceutical products and shows superior solubility of polyphenols over ethanol or water. Therefore, the PEG supported solvent medium provides ease of processing of polyphenols [6]. In this study, methoxy PEG (550) lactate ester and PEG (200) dilactate ester were synthesized and characterized using spectroscopic methods. The interactions between newly synthesized PEG derivatives and polyphenolic compounds (curcumin and morin) were investigated. Significant increase in solubility of polyphenolic compounds in water was observed in the presence of new PEG derivative. The mechanism of interaction was examined. This study was financed by the Research Foundation of ITU with the project number of TGA-2017-40916.

Keywords: PEG, Polyphenols, Water Solubility, Curcumin, Morin

(28138) MICROWAVE PELLETIZING- HEATING OF WASTE AGGREGATE MIXTURES WITH COAL SLIME AS FERTILIZER

Yildirim Tosun¹

¹ *Sirnak University, Turkey*

yildirimismailtosun@gmail.com

The suitability of microwave pelletizing, heating of waste mixtures as soil remediation was investigated to improve the fertility of land. The microwave heating ability was considered. During induction and microwave heating, the waste mass containing conductive particles was exposed to an alternative electromagnetic field according to the kilohertz resistivity. The induction energy and the metallic fibers of the microwave are heated by high frequency alternating electromagnetic fields which can induce Eddy currents in electrically and magnetically sensitive materials. Heat energy is softened and spread to the waste binder with an increase at the temperature. The waste and coal slime mixture can be softened quickly because the oil binder temperature acts as a Newtonian fluid when the temperature rises above the softening point of the binder. It has been found that micro fractures in the mixture samples can be effectively cured at a heating temperature of 75 ° C, and advanced softening of waste mixtures above 70 ° C could be provided.

Keywords: Microwave Pelletizing, Waste Aggregate, Coal Slime, Fertilizer

(28079) CARBON NANOMATERIALS PRODUCTION FROM THE GAS PRODUCT OF COMPOSITE PACKAGING WASTE PYROLYSIS

Ece Yapici¹, Aysun Ozkan¹, Zerrin Gunkaya¹, Goktug Gunkaya², Mufide Banar¹

¹ *Eskisehir Technical University, Turkey*

² *Anadolu University, Turkey*

eceturan@eskisehir.edu.tr

Carbon nanomaterials have been produced from composite low density polyethylene (C/LDPE) waste feedstock via a two stage process; pyrolysis and chemical vapor deposition (CVD) process. At the first stage, C/LDPE wastes were grinded and then pyrolyzed in a nitrogen-swept fixed bed stainless steel reactor operated at three different temperatures (400, 600, 800° C) and at three different heating rates (5, 10, 20° C/min). As a result of this stage, the highest gas product yield was obtained at the conditions of 600°C and 20° C/min. At the second stage, the conditions of first stage were kept constant (20°C/min and 600° C) and the pyrolysis gas was passed through the tubular quartz CVD reactor. The CVD reactor was operated with two different catalysts (iron and nickel) at 600 °C. To determine the optimum conditions of carbon nanomaterials growth, scanning electron microscopy (SEM) and X-ray diffraction (XRD) analyzes were carried out.

Keywords: carbon nanomaterials, chemical vapor deposition, C/LDPE, pyrolysis

(28081) LIFE CYCLE ASSESSMENT OF MULTI WALLED CARBON NANOTUBES SYNTHESIS VIA CHEMICAL VAPOR DEPOSITION

Ece Yapici¹, Kubra Cebeci Topbas², Aysun Ozkan¹, Zerrin Gunkaya¹, Mufide Banar¹

¹ *Eskisehir Technical University, Turkey*

² *Eskisehir Technical University, Turkey*

eceturan@eskisehir.edu.tr

Carbon nanotubes (CNTs) specifically has a significant role in a wide range of industrial applications and products owing to their invaluable mechanical, thermal and electrical properties. Chemical vapor deposition (CVD) is the commonest synthesis method of CNTs on account of its higher degree of control and scalability. Life cycle assessment (LCA) is a useful method to assess the environmental effects of processes and products. In this study, an LCA has been carried out to determine the environmental performance of multi-walled carbon nanotubes (MWCNT) synthesized via a laboratory scale CVD. A cradle-to-gate approach has been employed for this assessment. The functional unit was considered a typical laboratory 'batch' of the MWCNT grown. Inventory data was collected through onsite measurements, material/energy consumption and Ecoinvent database. The environmental impact assessment was carried out using CML-IA method for the selected impact categories (abiotic depletion, global warming, toxicity, acidification and eutrophication). The results of the study showed the hot points which significant environmental benefits and "greener" CNTs could be achieved.

Keywords: Carbon Nanotubes (CNT), Chemical Vapor Deposition (CVD), environmental impacts, Life Cycle Assessment (LCA)

(28114) ENHANCING OF BIOGAS PRODUCTION WITH CARBON OR METAL BASED MATERIALS

Sevgi Demirel¹, Hamdi Muratcobanoglu¹, O. Begum Gokcek²

¹ *Nigde Omer Halisdemir University, Turkey*

² *Nigde Omer Halisdemir University, Turkey*

sevgi.demirel@gmail.com

Increased energy demands, the depletion of fossil fuels and concerns about sustainability increase the interest in the production of renewable energy resources. In term of renewable energy source, one of big competition is enhancing biogas and biomethane production per feeding material. Many physicochemical like chemical, physical, thermal and thermochemical processes have been applied to anaerobic digesters for enhancing biogas production efficiency. Recently, besides these processes, supporting anaerobic digestion (AD) system with carbon or metal-based conductive materials like graphite, magnetite, carbon cloth, etc. is one of the trend topics. The main difference between these two methods is physicochemical processes focused on disassembling the complex feeding materials to easily biodegradable compounds and conductive materials focused on supporting the microbial community with direct interspecies electron transfer (DIET) and syntrophic relations between different microbial species. In this study, the effect of metal-based and carbon-based conductive materials and their combination on biogas production were investigated. According to literature, by using metal-based conductive material (Fe₃O₄) CH₄ production rate can be increased up to 50% and using carbon-based conductive materials can be increased CH₄ production up to 18 times. However, recent studies show that metal-based conductive materials (especially Fe oxides by dissimilatory iron reduction) stimulate decomposition of organic materials and carbon-based conductive materials support syntrophic conversion of fermentative intermediates to methane via DIET. It is also taking into account that major limiting factor affects the whole AD process depending on acidogenesis or methanogenesis stage. In addition, the effect of supporting material on AD can be change to depend on the type of feeding material such

Keywords: Renewable energy, anaerobic digestion, biogas, conductive materials

(28442) NOBLE METAL NANOPARTICLES: EMERGING THREAT TO PLANTS

Jakub Siegel¹, Angelini Jindřiška², Ruslan Klassen², Olga Valentová², Václav Švorčík²

¹ *University of Chemistry and Technology Prague*

² *Uct Prague, Czech Republic*

jakub.siegel@vscht.cz

The contamination of nanoparticles produced by human activity grows every day, as this progressive technology has been spread into many industrial areas. Nanoparticles produced nowadays are completely new entities, so far unknown for the natural environment. Therefore, at the end of useful lifetime of nanoparticle improved product, these entities may enter the environment, possessing potential risk. We study the possible ways of entries of silver and gold nanoparticles into *Arabidopsis thaliana* and their impact on the subcellular changes in this model plant. The changes in cytoskeleton dynamic often indicate early stress response, especially when threatening factor could come through plasma membrane. Dynamic of epidermal microtubes was changed in a few minutes after the exposition to gold (AuNPs) and silver (AgNPs) nanoparticles. Wounding and pathogens induce callose deposition in plant tissues in order to protect non-affected parts. Callose deposition was monitored in wild-type of *A. thaliana* or its *gl-1* mutant after AuNPs treatment for 24h. NPs were applied into the liquid growth medium and only plant roots had contact with this medium. Such plantlets displayed deposition of callose in roots and leaves.

Keywords: Silver, gold, nanoparticles, arabidopsis thaliana

**(27978) WOUNDS HEALING ACTIVITY OF *Galium Tunetanium*
POIRET EXTRACT OINTMENT**

Harzallah Daoud¹, Gaamoune Sofiane², Leblalta Amina³

¹ *Laboratory of Applied Microbiology, Faculty of Nature and Life Sciences, University of Ferhat Abbas, Setif 1, Algeria*

² *National Institute of Agricultural Research, Setif, 19000, Algeria*

³ *Agronomy Department University Ferhat Abbas Setif1, Algeria*

harzaldaoud@yahoo.co.uk

Plants and their extracts have immense potential for the management and treatment of wounds. The phytomedicines for wound healing are not only cheap and affordable but are also purportedly safe as hypersensitive reactions are rarely encountered with the use of these agents. The wound healing activity of methanolic extract of *Galium tunetanium* Poiret was evaluated on excision model, in albino rats by using eighteen rats divided into three groups of six rats each, Group I was considered as control, group II served as the reference standard treated with 0.25 % w/w MYCOCIDE® ointment and in the group III animals were treated with the 5% w/w methanolic extract prepared ointment. Wound healing was monitored on days 3, 6, 9 and 14. Methanolic extract prepared ointment showed significant response in the wound types tested when compared with the control group and the group treated with MYCOCIDE®. The present study demonstrates the wound healing effects of *Galium tunetanium* Poiret extracts for excision model due to the significant content of the most important phytochemicals like flavonoids, total phenolic compounds, saponins, and tannins.

Keywords: *Galium Tunetanium*, phenolic compounds, wound healing, ointment

**(27887) CHALLENGES IN NEXT-GENERATION SEQUENCING (NGS)
ANALYSIS FOR CANCER RESEARCH**

Rodica Martea¹, Viorel Munteanu², Valeri Tutuianu², Maria Duca³

¹ *Str. Academiei 3/2, Str. Academiei 3/2, Republic of Moldova*

² *“Dimitrie Cantemir” State University, Chisinau, Republic of Moldova*

³ *State University "Dimitrie Cantemir", , Republic of Moldova*

rodica.martea@gmail.com

Molecular profiling is critical for identifying and characterizing the unique somatic mutations that accrue in cancer cells. Comprehensive tumor and blood profiles can help to identify biomarkers that are prognostic or predictive, relevant in clinical trials, or cited in recent clinical studies. As cancer is a multiparametric molecular disease, the simultaneous screening of a large number of genes should be intuitively more effective than a gene-by-gene approach. So, molecular diagnostics in cancer have dramatically changed in recent years. The introduction of next generation sequencing (NGS) in the routine diagnostic setting is still in the development phase and has been limited by its complexity. NGS offers high sensitivity, ease of use, and accurate data quality for identifying even rare mutations successfully. These advantages are driving increased adoption of NGS in clinical cancer research. In conclusion, analysis of somatic mutations in solid tumors and hematologic malignancies using targeted NGS-based assays has become part of routine oncology practice as well as clinical trials.

Keywords: cancer, next generation sequencing (NGS)

(28108) ENZIMATIC STATUS IN PATIENTS WITH PANCREATITIS ACUTA

Jovanka Tuteska¹, Mila Arapcheska²

¹ *University “St. Kliment Ohridski”, High Medical School, - Bitola, Macedonia*

² *University “St. Kliment Ohridski”, Faculty of Biotechnical Sciences – Bitola, Macedonia*

jtuteska@yahoo.com

Pancreatitis acuta is an inflammatory condition of the pancreas. It is commonly caused by biliary tract disease or alcohol abuse. Aim of this study was to analyze the enzymatic status of patients with pancreatitis acuta. In the study were included patients with pancreatitis acuta (n=30; females=14 and males=16). Causes of condition were: biliary tract disease in 53.3% of patients; alcohol abuse (20%), and idiopathic reason (13.3%). Serum and urine samples were taken on admission in the hospital, and at 3th, 7th and 10th day during hospitalization. Changes in concentration of: amylase, lipase, ALT, AST, ALP, GGT and LDH in serum, and amylase and lipase in the urine were analyzed by biochemical analyzer COBAS Integra 400 plus. Obtained results have shown significantly ($P<0.01$) higher values of analyzed enzymes on patients' admission in hospital. Concentrations of serum amylase and lipase were 79.15% and 64.68% higher than referent values. In 80% of patients, concentrations of amylase and lipase in urine samples were 32.04% and 70.70% higher than referent. On admission in hospital higher concentrations of ALT (39.66%), were noted in 86.66% of patients; 100% of patients had higher AST values (43.32%); 46.66% had higher ALP values (36.23%). Higher GGT values (60.60%) were noted in 66.66% patients and 60.00% of patients had higher LDH values (15.11%). On 3th day of hospitalization, values of serum amylase and lipase were still significantly higher than referent ($P<0.01$). Normalization in enzyme concentrations was noted from 7th to 10th day after admission. After 10th day of hospitalization, 93.3% of patients had enzymes values in referent range. Biochemical analysis plays important role in diagnosis of pancreatitis acuta, and most commonly used biochemical markers are serum amylase and lipase.

Keywords: enzyme, pancreatitis acuta

(27900) IN SILICO SCREENING AND EXPERIMENTAL VALIDATION OF NEW DRUG TARGETS FOR THE TREATMENT OF CO-MORBID MULTIFUNCTIONAL DISEASES

Ralf Hofestädt¹, Victor Dosenko²

¹ *University Bielefeld, Germany*

² *Bogomoletz Institute of Physiology, Ukraine*

ralf.hofestaedt@uni-bielefeld.de

During the realization of the “Trilateral Partnership - Cooperation Project of the Volkswagen Stiftung” between Scholars and Scientists from Ukraine (Kiev), Russia (Tomsk and Novosibirsk) and Germany (Bielefeld) (2016-2018) we have obtained important data and results concerning pathogenetic factors of such important comorbidity as combination of hypertension and asthma. The relevant medical data and medical part of this project presenting the focus to asthma and hypertension was done in TOMSK. Based on this data the computational part was done in NOVOSIBIRSK. Using computational methods, a list of relevant target genes could be identified in Novosibirsk. For further discussion the target gene IL10 was discussed in KIEV based on knock out experiments. These experiments could show the relevance of IL10 for the comorbidity of asthma and hypertension. Using methods of database integration and information fusion BIELEFELD could develop and implement the GeCoNet information system representing the positive and negative drug list of asthma and hypertension as the basic result, which is relevant for doctors and patients. Furthermore, this information system represents the relation of drugs, genes and diseases. Therefore, the key results of this project are the identification of candidate genes (IL10 as the top candidate), experimental proof of the relevance of IL10 based on knock out experiment. The focus of relevant target genes and the information fusion of the molecular knowledge present the positive and negative list of drugs, which are used for patient treatment. This information fusion process was done in BIELEFELD and based on the relevant drugs announced by Tomsk. The presentation of this talk will give an overview of the project and will focus to the web-based system GenCoNet. This work was supported by the International DFG Research Training Group GRK 1906/1 and the Volkswagen Stiftung Trilateral Partnerships - Cooperation Projects between Scholars and Scientists from Ukraine, Russia, and Germany “In silico screening and experimental validation of new drug targets for the treatment of co-morbid multifactorial diseases”, No. 90335.O. V. Saik, P. S. Demenkov, T. V. Ivanisenko, E. Yu. Bragina, M. B. Freidin, V. E. Dosenko, O. I. Zolotareva, E. L. Choyznov, R. Hofestädt, V. A. Ivanisenko Search for New Candidate Genes Involved in the Comorbidity of Asthma and Hypertension Based on Automatic Analysis of Scientific Literature Journal of Integrative Bioinformatics 15(4), 2018.

Keywords: drug targets, treatment of co-morbid diseases, text mining, information fusion

(28004) ANTI-INFLUENZA VIRUS ACTIVITY OF THE METHANOL EXTRACT FROM SUCCULENT PLANT *Graptopetalum paraguayense* E. WALTHER

Ivayla Dincheva ¹, Ilian Badjakov ², Petia Genova-Kalou ³, Nadezhda Markova ⁴, Venelin Enchev ⁵

¹ *Agrobiointitute, Agricultural Academy, Bulgaria*

² *Agrobiointitute, Agricultural Academy, Bulgaria*

³ *National Reference Laboratory "Rickettsia and Tissue Cultures", Department of Virology, National Centre of Infectious and Parasitic Diseases, Sofia, Bulgaria*

⁴ *Institute of Organic Chemistry with Centre of Phytochemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria*

⁵ *Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria*

ibadjakov@gmail.com

Influenza virus infection is one of the most common worldwide and causing significant morbidity and mortality. Currently, the treatment of influenza viruses based on four inhibitors: two neuraminidase (oseltamivir and zanamivir) and two M2 ion-channel blockers (amantadine and remantadine). However, the administration of these drugs often leads to the side effects, toxicity and antiviral resistance. Therefore, the development of novel anti-influenza pharmaceuticals to prevent and control future influenza epidemics is necessary. Medicinal plant extracts have proved to be a rich source of candidate compounds for the development of new therapeutically agents with anti-influenza virus activity. The aim of the present study was to evaluate *in vitro* the anti-influenza virus activity of methanol extract of succulent plant *Graptopetalum paraguayense* E. Walther (GP) and three main fraction A (lipids), B (amino and organic acids, carbohydrates) and C (phenolic acids). Methanol extract from leaves of GP was obtained by standard method. The composition of each fraction was determined by GC-MS analysis. The antiviral effect and cytotoxicity were investigated on MDCK SIAT cells, which were infected with two human influenza virus strains: A/Puerto Rico/8/34 (H1N1) and B/Yamagata/16/88. To evaluate the anti-influenza activity after virus infection *in vitro* we performed the following post treatment assays: MTT-test, virus-induced cytopathic effect (CPE) and hemagglutination inhibition test (HI). The results were expressed as 50% inhibitory concentration of the viral effect (IC₅₀). Oseltamivir phosphate (with trade name Tamiflu®) was used as positive control. All tested fractions and total GP extract exhibited low cytotoxic effect *in vitro*. The results were dose-dependent. The fraction C and methanol GP extract significantly inhibited H1N1 virus replication on MDCK SIAT cells in concentration range 0.001 – 1 mg/mL, when compared to the positive control. GP extract applied in maximal nontoxic concentration (0.01 mg/mL) reduced viral yield by $\Delta\log_{10} 1$, which IC₅₀ was 10 times lower (0.1 mg/mL). Using representative strains of influenza virus it was shown that apparently the inhibitory effect was strain-specific. The phenolic fraction C effectively suppressed the replication of influenza virus type A by 87.3%, compared with antiviral drug Tamiflu®, which protects infected MDCK SIAT cells almost 95%. This is the first report on the anti-influenza virus activity of the total extract and fractions isolated from *Graptopetalum paraguayense* E. Walther. The results of this study shed light that fraction C and total GP extract could be promising inhibitors of influenza A virus. Therefore, characterization of the plant's active compounds and investigation of the mechanism of antiviral action are suggested. This work was supported by the Bulgarian National Science Fund under Grant DN 19/16/2017.

Keywords: *Graptopetalum paraguayense* E. Walther, phenolic fraction, influenza virus type A and type B, anti-influenza virus activity, cytotoxicity

(28045) DNA PROFILING OF *Leucojum aestivum* (SUMMER SNOWFLAKE) AND *Narcissus confusus* L. BY RAPD AND AFLP MARKERS

Ilian Badjakov¹, Ivayla Dincheva², Jaume Bastida³, Violeta Kondakova⁴, Carles Codina⁵

¹ *Agrobioinstitute, Agricultural Academy, Bulgaria*

² *Agrobioinstitute, Agricultural Academy, Bulgaria*

³ *Department of Biology, Healthcare and Environment, Faculty of Pharmacy, University of Barcelona, Spain*

⁴ *Agrobioinstitute, Agricultural Academy, Sofia, Bulgaria*

⁵ *Department of Biology, Healthcare and Environment, Faculty of Pharmacy, University of Barcelona, Spain*

ibadjakov@gmail.com

Leucojum aestivum (summer snowflake) and *Narcissus confusus* are main sources traditionally used for galanthamine production. In regard to study of genetic diversity samples from various geographically distinct populations from Bulgaria and the Spain were subjected to DNA profiling by Random Amplified Length Polymorphism DNA (RAPD) and Amplified fragment length polymorphism (AFLP) markers. The two sets of naturally accessions were analyzed. The first one *Leucojum aestivum* L. individuals was collected from different habitats in Bulgaria and the second one *Narcissus confusus* L. was collected from Spain. Our study reveals genetic diversity between and within natural populations, fingerprinting of accessions as well as DNA markers linked to alkaloid pattern chemotypes. Our results confirmed discriminatory effectiveness of RAPD and AFLP methods for genetic diversity assessment within the species. Although RAPD and AFLP are dominant DNA marker systems, it nevertheless provides baseline information on the population structure of *Leucojum aestivum* L. and *Narcissus confusus* L. This study was financially supported by EC FP7 ID 219795: SUSTAINABLE PRODUCTION OF GALANTHAMINE BY BOTH IN VITRO CULTURE AND AGRICULTURAL CROPS OF HIGHLY GALANTHAMINE - CONTAINING PLANTS.

Keywords: *Leucojum aestivum* L., *Narcissus confusus* L., RAPD, AFLP, Galanthamine

**(28597) GAINING CONSCIOUSNESS OF AGRICULTURAL
PRODUCTION AT AN EARLY AGE**

Hulya Culhaoglu Imrak¹, Derya Kaya¹, Zeynep Yalcin¹

¹ *Ministry of National Education, Turkey*

hculhaoglu@gmail.com

In this research, 60 children who were pre-school aged 5-6 and hasn't meet the agricultural production and soil living in the city were involved in various stages of production, to gain knowledge about food production techniques from garden to table and to integrate children with nature at an early age. Thus, in this period when urbanization increased rapidly and agricultural areas decreased, the interest of the new generation was drawn to agricultural production and the aim was to raise awareness on the subject. For this purpose, germination tests of vegetable and stone fruit seeds were sown in plant pots (filled with soil) in the classroom by the children. The conditions required for plant growing were explained with practice to the children. In order to explain clearly this stage, a 'Hobby Garden' was established in the school yard to grow vegetable and fruit plant and children were enabled to be active at all stages from seed and seedling to harvesting. The importance of water is emphasized by using rainwater collected in containers for watering these plants. Children were allowed to observe every step in the formation of plant products. The matured plant products were harvested by children. A seed box was made in the classroom and children were put in some stone fruit seed to box. It was ensured that these seeds were collected and planted in various places in spring nature trip. As a result, what is absolutely necessary for agricultural production (soil, water and light) is explained with practice. Since children had the opportunity to experience each stage, they learned by internalizing the value of labor and production. Children's sensitivity to nature was observed and awareness was formed. Their interest in healthy food production and consumption has increased.

Keywords: Agriculture, Production, Early Age

(26509) VALUE CHAIN ANALYSIS OF MELON “EGUSI” (*Citrullus lanatus* Thunb. Mansf) AMONG RURAL FARM ENTERPRISES IN SOUTH EAST, NIGERIA

Chigozirim Onwusiribe¹, Jude Mbanasor²

¹ *Michael Okpara University of Agriculture, Nigeria*

² *Michael Okpara University of Agriculture, Nigeria*

ndubuisichigo@gmail.com

Egusi Melon (Citrullus Lanatus Thunb. Mansf) is a very important oil seed that serves a major ingredient in the diet of most of the households in Nigeria. *Egusi Melon* is very nutritious and very important in meeting the food security needs of Nigerians. *Egusi Melon* is cultivated in most farm enterprise in South East Nigeria but the profitability of its value chain needs to be investigated. This study analyzed the profitability of the *Egusi Melon* value chain. Specifically, this study developed a value chain map for *Egusi Melon*, analysed the profitability of each stage of the *Egusi Melon* Value chain and analysed the determinants of the profitability of the *Egusi Melon* at each stage of the value chain. Multi stage sampling technique was used to select 125 farm enterprises with similar capacity and characteristics. Questionnaire and interview were used to elicit the required data while descriptive statistics, Food and Agriculture Organization Value Chain Analysis Tool (FAO's VCA Tool), profitability ratios and multiple regression analysis were used for the data analysis. One of the findings showed that the stages of the *Egusi Melon* value chain are very profitable. Based on the findings, we recommend the provision of grants by government and donor agencies to the farm enterprises through their cooperative societies, this will provide the necessary funds for the local fabrication of value addition and processing equipment to suit their unique value addition needs not met by the imported equipment.

Keywords: Melon, value, chain, profit

(27783) PLANT TASTE AND THERAPY IN HAUSA TRADITIONAL MEDICINE

Bala Sidi Aliyu Aliyu

Bayero University, Kano, Nigeria

balasidi@gmail.com

A study was conducted in Kano metropolitan area of Kano State, Nigeria. It covers about 499km² and comprises of eight local government areas with a population of 2,828,861. Tastes of medicinal plants have been used as a basis for plant selection to treat different diseases or disease categories in various traditional medicine practices around the world. In this study some plants locally used as medicine to treat some of the most commonly cited diseases were selected to represent different taste categories from an ethno-botanical survey conducted. The survey revealed that Hausa traditional medicine classifies taste of medicinal preparations into nine different categories as; bitter, astringent, contraction, sweet, pleasant, pungent, salty, sour and Insipid/bland. 199 plants were documented out of which 166 were identified as used in treating 124 different ailment categories. A total number of 24 informants participated in the tasting of plants preparations, most of the participants agreed on tastes of the medicinal plants, but could not actually identify all the plants preparations based on their taste alone. Extraction and phytochemical screening of the selected plants was done following standard procedures described by Vishnoi, 1979; Sofowora, 1993; Yadav and Munin, 2011; Trease and Evans, 2002 (for carbohydrates, monosaccharides, reducing sugars, tannins, free anthraquinones, glycosides, terpenoids, saponins, flavonoids, and alkaloids). The phytochemical screening of the various extracts revealed that the plants contain potent phyto-compounds, *that* justify the local use of the plants as medicine. *However*, the study could not establish a clear scientific relationship between the taste of the plants and their therapeutic activity because there is a great number of phytochemicals in these plants each having a different mode of action on the human body. It was thus concluded that tastes of medicinal plants alone is not enough a criterion for selecting plants to treat diseases, as is done in Hausa traditional medicine.

Keywords: Taste, phytochemicals, medicinal plants, ethnomedicine

(27857) PROTECTION OF ENDANGERED PLANTS SPECIES OF TALISH FLORA (AZERBAIJAN REPUBLIC)

Elshad Gurbanov¹

¹ *Baku State University, Azerbaijan*

e.gurbanov0201@gmail.com

Talish flora is quite rich. At the present time it is actual more usage of natural plant raw in the local industry, as well as investigation of more perspective plants for medicinal, fodder, decorative and other purposes. They have been used for obtaining of tanning and dyeing substances. Due to widely usage of plant resources the protection and restoration of plant species is very important. It is observing destruction of decorative and useful plants by people. That's why it is demanding urgent measures on protection and rational usage of plant resources. Main rare, relict, endemic plant species are under threat. Due to regularly and intensive collection of useful plants the reserve of some species are decreased. These plants can be splitted to threatened species, species with reducing areal, as well as plants reducing their reserves. From these species *Lilium ledebourii* Boiss., *Tritillaria grandiflora* A. Grossh., *Ornithogalum hyrcanum* A. Grossh., *Danae racemosa* (L.) Moench, *Ruscus hyrcanus* G. Woron., *Iris camillae* A. Grossh., *Iris iberica* Hoffm., *Ophrys caucasica* G. Worot., *Ophrys apifera* Huds., *Orchis militaris* L., *Himantoglossum formosum* C. Koch., *Anacamptis pyramidalis* (L.) C. Rich., *Cephalanthera damasonium* (Mill) Druce, *Epipogium aphyllum* Sw., *Alnus subcordata* C.A.Mey, *Quercus costaneifolia* C.A.M., *Zelkova carpinifolia* (Pall) Dipp., *Nelembium caspicum* Fisch., *Paeonia tomentosa* N. Busch., *Parrotia persica* (D. C.) C.A.M., *Albizzia julibrissin* Durazz., *Gleditschia caspia* Desf., *Buxus hyrcana* Pojark., *Ilex hyrcana* Pojark., *Franqula grandifolia* (F. et M.) Grub., *Alcea Lenkoranica* Iljin., *Hedera pastuchovii* Woron., *Diospyros lotus* L. are distributed only in the territory of Talish, from them 4 species are Caucasus endemics, 2 - are Azerbaijan endemics.

Keywords: rare, endangered, flora, endemic, Talish

**(28021) RESPONSE OF SOME PEPPER (*Capsicum annuum* L.)
VARIETIES AGAINST WILT DISEASE CAUSED BY *Verticillium dahliae*
Kleb**

Furkan Coskun¹, Yasar Alptekin², Semra Demir³

¹ Kahramanmaraş Sutcu Imam University, Turkey

² Kahramanmaraş Sutcu Imam University, Turkey

³ Yuzuncu Yil University, Turkey

furkan54777@gmail.com

Pepper, one of the economically important vegetable crops in green house and field in Turkey, has no effective method of management against Wilt Disease caused by *Verticillium dahlia*. However, the use of resistant varieties is the most effective method in the management against the disease. This study was carried out under controlled climatic conditions in order to determine response of some economically grown pepper varieties in Turkey against some isolates of *V. dahliae*. Bafra F1, Ergenekon F1 hybrid varieties and Sena, Sera Demre 8, Doru 16 registered domestic peppers (*Capsicum annuum* L.) varieties were used in the study. Bisak 16, Kahramanmaraş, Karpuz-2, Karpuz-4, Kayseri isolates isolated from different regions were used as an inoculums of *Verticillium dahliae* isolates. The study was designed as a completely randomized plot design with three replications. Plant inoculation was carried out by dipping pepper seedlings into the spore suspension, which was determined before spore density for 5 minutes. Disease severity was calculated according to the wilt examination of leaves and stem proportion (0-5 scale for leaves and 0-3 scale for stem proportion). According to the results of the study; using to the 0-5 and 0-3 scale, the disease severity values of Kahramanmaraş isolate was 55% -53% and were found to be the most virulent isolate. This isolate is followed by Bisak 16 (50% -35%) and Kayseri (46% -11%) isolates respectively. Among the inoculated pepper cultivars, the most sensitive pepper cultivar was Sera Demre 8 and the most resistant pepper cultivar were Ergenekon F1. This study is a part of TUBITAK / 1002 / 119O059 project

Keywords: Pepper, Wilt, *Verticillium dahlia* Kleb., Resistance

(28186) ANALYSIS OF ANTHOCYANINS IN MAIZE GRAINS FROM THE NATIONAL GENE BANK OF AZERBAIJAN

Leyla Valiyeva¹, Victor Deineka², Victor Deineka², Gulshan Rahimova¹, Natiga Nabiyeva¹

¹ *Genetic Resources Institute of The National Academy of Sciences of Azerbaijan*

² *Belgorod National Research University*

l.valiyeva@yandex.ru

Maize (*Zea mays* L.) is an important cereal that is widely cultivated throughout the world and has high nutritional value. Among the many components useful for human nutrition and health, the phytochemical composition of various organs of maize includes flavonoid compounds - anthocyanins. The interest in this class of plant pigments is caused by numerous data on their biological activity beneficial to the health of living organisms: antioxidant, antimicrobial and anticarcinogenic (Liu et al. 1999, Wang et al., 2008, Kocic et al. 2011, Tsuda, 2012, Cassidy et al. 2013, Jennings et al. 2014, Amini et al., 2017, Medic et al., 2019). The combination of nutritional value with healthy properties of anthocyanin-rich maize kernels allows its use as a functional food (Rodriguez et.al., 2013, Petroni et al., 2014, Dolmatova et.al., 2016). Although some of these results are contradictory, studying the biochemical pathways and genetics of anthocyanin biosynthesis in different plants, elucidating the mechanisms of the beneficial effects of their molecules in various diseases of humans and model animals and ways to increase their content in the diet remain relevant. The biosynthesis of anthocyanins in maize is controlled by a system of structural and regulatory genes, the combination of various allelic variants of which provides a variety of grain colors. 21 maize samples with dark-colored grain including self-pollinated lines, hybrids and varieties were selected from the collection of the National Genebank of Azerbaijan. Local forms represent a potential source of genetic variation adapted to environmental conditions, including the anthocyanin biosynthesis genes. In order to identify promising samples for selection to increase the content of anthocyanins in maize grains, the total content and components of the anthocyanin complex were analyzed. The method of reversed-phase version High Performance Liquid Chromatography (HPLC) with spectrophotometric and mass spectrometric detection was used. The 3-glucosides of cyanidin and pelargonidin, as well as their malonated derivatives to varying degrees were identified in the grain extracts of the studied samples. The total accumulation of anthocyanins was in the range of 0.007- 0.027g per 100g. dry weight. A particularity of the studied maize samples from the National Genebank of Azerbaijan is the presence of specimens with a high relative content of pelargonidin derivatives, up to their prevalence over the usual for dark maize (according to published data) cyanidin derivatives.

Keywords: maize, dark color graine, anthocyanin, benefit for health, HPLC

(28205) THE INDUCTION OF POLYPLOIDS IN ‘*Iris sari* SCHOTT EX BAKER’ VIA IN VITRO TECHNIQUES

Selay Dogan¹, Gulat Caglar²

¹ *Aegean Agricultural Research Institute*

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selayedogan@hotmail.com

I. sari SCHOTT ex BAKER is an endemic plant which has a natural distribution area in Turkey. The plant, which has showy flowers, is also known as “Ana kurtkulađı, Bahar ieđi”. Tetraploids were induced successfully from *in vitro* plantletss of *I. sari* by treating microbulbs with colchicine. The colchicine doses tested with *I. sari* were: 0.1 and 0.5 % (2, 4 and 6 hours). Ploidy levels could be easily determined by flow cytometry. From a total of 45 surviving plantlets, 3 tetraploids were detected. The most efficient condition for inducing tetraploids seemed to be treatment with 0.1 % colchicine for 4 hours. Comparison the survival rate of control and tetraploid plants *in vitro*, there are significant difference. Additionally, the induced tetraploids in *I. sari* was accompanied by larger stomata and decrease in stomata density, compared to control plantlets.

Keywords: *I. sari*, in vitro propagation, polyploidization, endemic ornamental plants

(28555) THE EFFECT OF IMAZAMOX USAGE ON PHYTOHORMONE LEVELS IN SUNFLOWER CULTIVATION (*Helianthus annuus* L.)

Hayati Arda¹, Gulcin Alyuruk¹

¹ *Trakya University, Turkey*

hayatiarda@hotmail.com

In this study, imazamox, an imidazolinone (IMI) herbicide commonly used in sunflower agriculture, and sunflower varieties thought to be resistant to this herbicide group were used. The effects of different concentrations of herbicide applications on phytohormone levels of sunflower varieties were investigated. In the study, four different types of sunflower were used as normal group (unresisting to IMI) SN:8 and resistant groups to IMI SN:9, SN:10 ve SN:14. Three different concentrations (3.125 ml/liter, 6.25 ml/liter and 9.375 ml/liter) of herbicides were applied to sunflower seedlings which reached to 4-6 leaf phase. Leaf samples were taken 7 days after the herbicide application and hormone analyzes were performed. When the results were evaluated, the highest IAA (23.62 ppb) was observed in 6.25 ml/liter herbicide application in SN:8 cultivar and the lowest IAA (3.49 ppb) was observed in 6.25 ml/liter herbicide application in SN: 14 cultivar. The highest value for GA3 (19.62 ppb) SN:8 cultivar 3.125 ml/Liter herbicide application, the lowest value (4.75 ppb) SN: 14 was obtained in the control group. The highest value in ABA (42.43 ppb) SN:8 cultivars of 6.25 ml herbicide application, the lowest value (12.96 ppb) was found in the control group of SN:10. The highest JA value (174.02 ppb) was obtained in the control group of SN:9 and the lowest value (15.53 ppb) was obtained in 3.125 ml/liter herbicide application of SN:8. In terms of SA amount, the highest value (176.13 ppb) was observed in 9.375 ml/liter herbicide application of SN:9 cultivar and the lowest value (47.59 ppb) was observed in 3.125 ml/liter herbicide application of SN:9 cultivar. Significant differences were obtained in phytohormone levels of sunflower varieties treated with different concentrations of herbicides.

Keywords: *Helianthus annuus* L., Imazamox, Phytohormone, Stress

**(25231) OBSERVATIONS FOR THE DETERMINATION OF
GERMINATION RATE OF *Juniperus excelsa* SUBSP. POLYCARPOS
(TURKESTAN JUNIPER) SEEDS**

Elshad Gurbanov ¹, Afag Rzaeva ²

¹ *Baki State University*

² *Baku Engineering University, Azerbaijan*

afrazayeva@beu.edu.az

Although juniper has been grown up mainly by shootings, the question of its seed propagation was always in the spotlight. The article is devoted to the improvement of seed propagation methods of juniper plant. Currently, juniper seeding is not considered effective for very low percentage of germination and this fact is explained by the thick and solid seed bark of this plant. In presented article we have proposed a model of complex stratification and scarification for increasing germination rate of juniper seed. Compared to other propagation methods, this method is not very effective but is very important for providing genetic richness

Keywords: seed propagation, germination rate, *Juniperus*, stratification, scarification

**(27998) TRANSCRIPTIONAL ACTIVITY OF SOME GENES
IMPLICATED IN REINFORCEMENT OF CELL WALL IN
SUNFLOWER AGAINST INFECTION WITH**

Maria Duca ¹, Olesea Tabara ¹, Ana Mutu ¹, Rodica Martea ²

¹ State University "Dimitrie Cantemir", Moldova

² Str. Academiei 3/2, Str. Academiei 3/2, Moldova

teolesea@gmail.com

Orobanche cumana Wallr. (broomrape) is one of the most devastating pathogenic angiosperms of sunflower (*Helianthus annuus* L.). The damage caused by the parasite varies greatly depending on the local climatic conditions favorable to the development of the disease, the quality of agro-technical measures and the sensitivity of commercial germplasm to different races of broomrape. Thus, the study of resistance of sunflower to broomrape presents an important aspect for breeders. Thus, the aim of this study was the evaluation of transcriptional activity of 15 genes involved in reinforcement of cell wall (phenylpropanoid pathways, biosynthesis of callose, *esterification of pectin*, carbohydrate metabolism) during infection with broomrape in dynamics (2, 6, 12 and 24 hours after infestation). To estimate the immediate changes in the sunflower roots (*pre-attachment* resistance) the infested host plants were cultivated in Petri dishes with perlite substrate. For evaluation of relative expression RNA and cDNA samples were obtained from the sunflower roots. The relative expression level of the genes was quantified by real-time PCR. The nucleotide sequencing of the primers was developed based on the complementarity with the ESTs known in *H. annuus* in the NCBI database by using the bioinformatics tools. Analysis of the gene expression profile at the *pre-attachment* stage in two resistant (Favorit, PR64LE20) and one susceptible (Performer) genotype revealed different regularities in transcripts patterns. Thus, the first resistant genotype was not characterized by essential changes in gene expression. Only in 25 from a total of 60 analyzed cases, the gene expression has been changed, the ratio between up regulated and down regulated genes being 12/13. The results indicate that this genotype can maintain the homeostatic balance of the transcriptional activity of the studied genes. In the case of second resistant genotype (PR64LE20) the genes were mostly up regulated (19 cases) than down regulated (8 cases). Comparative to resistant genotypes in the susceptible genotype Performer the majority of genes were down regulated (9 cases more of subexpression than overexpression). The analysis of 15 genes demonstrated different expression profiles between sensitive and resistant genotypes, as well as between both resistant genotypes, which denote the different defense response for the same physiological reaction (resistance). This study are supported by the National Agency for Research and Development of the Republic of Moldova [project for young researchers "19.80012.05.08F - The immediate effect of *Orobanche cumana* Wallr. phytoparasite on sunflower (*Helianthus annuus* L.)"].

Keywords: Sunflower, broomrape, gene expression

**(28007) PECULIARITIES IN THE YIELD STRUCTURE OF
ACCESSIONS COMMON WINTER WHEAT WITH DIFFERENT
ECOLOGICAL ORIGIN**

Galina Mihova¹

¹ *Dobrudzha Agricultural Institute*

gmihova71@abv.bg

Stress affects plants to various degrees, with different pressure and duration. The response is specific and ranges from perishing of the plant to complete compensation of the negative effect. In the recent decades, genetic and molecular investigations on cereals identified genetic systems which play key role in their development, including such related to their response to stress. This type of investigations allows not only understanding the mechanism of crops' adaptability but also differentiating their specificity. Dobrudzha Agricultural Institute is a main breeding center in Bulgaria and has a large plant gene pool of field crop species. The chamber for long-term storage contains a collection of 3435 accessions of genus *Triticum*. A working collection of Bulgarian and foreign breeding, which consists of 1745 varieties, is grown under field conditions, as well as lines with specific traits. Sixty of them were evaluated for main economic indices during four harvest seasons (2015 – 2019). The aim of this investigation was to follow the changes in the yield structure of accessions common winter wheat with different ecological origin. The experiment was designed in plots of 10 m², in two replications. Phenological observations and biometric analysis were done on 25 plants per plot. The methodologies of UPOV and IPGRI were used. The accessions were well differentiated according to: mean number of productive tillers; number of grains in spike and weight of 1000 grains. Within the period of investigation, the Bulgarian wheat varieties, which realized highest yield, were Rada and Dragana, and the highest yielding cultivars of European breeding were Andalou, Basmati, NS 407 and Sofru.

Keywords: wheat, genetic resources, yield structure

(28010) THE EXPERIMENTAL REINTRODUCTION OF *Salix lapponum* L (DOWNY WILLOW) – SHORT-TERM RESULTS OF THE STUDIES

Magdalena Pogorzelec¹, Barbara Banach-Albińska¹, Agnieszka Szczurowska^{1, 2}, Marzena Parzymies¹,

¹ *University of Life Sciences in Lublin, Poland*

magdalena.pogorzelec@up.lublin.pl

Salix lapponum L. (downy willow) was recognized as a threatened species in every populations existing outside its natural range in Europe. We studied the biology and ecology of the species in Poland for last 10 years and we observed that the number of populations decreased, so that we decided to propagate and reintroduce plants into natural habitats. The described activities relate to all stages of reintroduction process, from obtaining the plant material, through its propagation *ex situ*, acclimatization, till translocation to the new habitat and a one-year monitoring the studied species. On the basis of the results and observations we stated that plants produced in *ex situ* conditions are able to survive in natural habitat for at least one year. However, *Salix lapponum* individuals' condition depends on the way of reproduction and acclimatization process. The results of our experiment allow us to conclude that in the case of *S. lapponum* the first evaluation of reintroduction success may be conducted already after the first year from the reintroduction.

Keywords: endangered species, condition, acclimatization, transplantation

(27237) FERMENTATION MODELING / STABILIZATION BY PHAGE RESISTANT STARTER CULTURE (REVIEW)

Nazenin Eftekhari¹, Asiye Esra Eren², Ihsan Yasa²

¹ *Ege University, Faculty of Science, Biology Department, Izmir, Turkey*

² *Ege University, Turkey*

eftekhari.n9@gmail.com

Lactic acid bacteria and yeasts play an important role in the process of industrial food fermentations. However, bacteriophage contamination is one of the biggest problems encountered in fermentation which affected quality of the final fermented product. starter culture is a microbiological culture which performs beginning of the fermentation process. This culture is utilized to assist preparation of various hygienic fermented foods and drinks with standard taste, aroma and consistency. The most important characteristic of an individual strain is insensitivity to a wide variety of phages. During production, the technological process parameters as well as the characteristics of the cultures that are used as starters, are very important, so active cultures with high reproductive abilities and physiological productivity, resistant to bacteriophages and non-lysogen should be selected as starter culture. In most bacteria and archaea, there is a genomic natural defense system called CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) that developed during evolution and work as immune system against invasive DNAs such as bacteriophages and plasmids. In addition, in last decades CRISPR-Cas technology is very common in genetic engineering and modifications methods. In this study we discuss about lactic acid bacteria (LAB) carrying genomic natural CRISPR-Cas anti-phage system isolated from different sources. These isolates could be employing as starter culture for production and fermentation modeling/stabilization.

Keywords: Starter culture, anti-phage system, Lactic acid bacteria, Fermentation, CRISPR

(28019) USE OF CRISPR-CAS SYSTEMS IN VIRAL DISEASES

Hatice Yildiz¹, Ali Riza Babaoglu²

¹ *Yuzuncu Yil University, Turkey*

² *Yuzuncu Yil University, Turkey*

htcyldz8@gmail.com

In recent years, research on the diversity of viruses has revealed that viruses are the most diverse and abundant biological assets in the world. The RNA-guided genome editing tool CRISPR-Cas9 (Clustered Regularly-Interspaced Short Palindromic Repeats/ CRISPR-associated nuclease 9) was first introduced to mammalian organisms in 2013. Compared to conventional methods, the CRISPR-Cas9 offers advantages like simple to design, easy to use and multiple gene editing at the same time. CRISPR and CRISPR-associated (Cas) systems are RNA-guided sequence-specific prokaryotic antiviral immune systems. In prokaryotic organisms, small RNA molecules direct the effect of Cas or endonucleases to the invasion of foreign genetic elements in a manner that is linked to the DNA sequence. Viruses are distinguished from prokaryotes because they are organisms that utilize receptors for cell entry, need the cellular functions of the host to replicate their genomes and propagate new generation virions, in short, complementing replication cycles on the host. CRISPR-Cas9 systems, which are used for targeted and precise genome regulation in eukaryotic cells, are also used to target animal and human pathogenic viruses as a potential new antiviral strategy. Nowadays, CRISPR-Cas systems are used to determine the replication strategies of many viruses such as HIV, Zika, Hepatitis B and Hepatitis C, Epstein-Barr virus (EBV) and oncogenic viruses. In this review, the possibilities of using CRISPR-Cas systems on viruses will be discussed. Ease of use and reproducibility ability of the CRISPR-CAS system, to investigate the interaction of virus-host systems, and new targets make it advantageous for the determination.

Keywords: Cas, CRISPR, Viruses

**(28166) CYTOTOXICITY OF NATURAL AND SYNTNHTIC
COLOURANTS USED IN TRADITIONAL MARDIN BLUE ALMOND
TOFFEE**

Nurcan Arslan ¹, Mehmet Ozaslan ¹, Isik Didem Karagoz ², Ibrahim Halil Kilic ¹

¹ *Gaziantep University, Turkey*

² *Gaziantep Univeristy, Biology Department, 27310, Sehitkamil/Gaziantep, Turkey*

karagoz@gantep.edu.tr

Colourant (Indigo blue) used in blue almond toffee is obtained from hydrolysis and oxidation of Indicane B from *Isatis tinctoria* folia. All ground surface tissues produce indicane B when plant grows under sun. The cost of natural indigo is too expensive, hard and taking long time so researchers investigated the molecular structure and produced as synthetically. Since then natural indigo blue give its place to the synthetic. Indigo blue is used as blue colourant in textile and medical sectors together with its benefits. Approximately 17.000 tons synthetic colourant have produced every year in world. Besides its usage in textile and medical industry, it has not used in food industry. However, famous traditional blue almond toffee has been stained with it and it has not known potential risk for human health. In this perspective, we aimed to investigate the cytotoxic potential of natural and synthetic indigo blue colourants by MTT. As a result, natural indigo blue is safer than synthetic for food industry.

Keywords: *Isatis tinctoria*, Indigo blue, Cytotoxicity

(28167) POTENTIAL UV PROTECTION OF WASTE FROM *Prunus cerasus* L. RESULT IN FRUIT JUICE INDUSTRY

Ugur Vural ¹, Ibrahim Halil Kilic ², Islam Sahbudak ³, Isik Didem Karagoz ⁴

¹ *Aksaray University, Turkey*

² *Gaziantep University, Turkey*

³ *Gaziantep University, Turkey*

⁴ *Gaziantep Univeristy, Biology Department, 27310, Sehitkamil/Gaziantep, Turkey*

kilic@gantep.edu.tr

From the birth of humunity, plants have been used for nutritional purposes and have also been the first source of treatment for time. Raw materials of drugs developed against many diseases are known as plants. In addition to medicinal purposes, plants are among the main substances that we frequently come across in the cosmetics and dyestuff industry. Since every organ (fruit, root, leaf, etc.) is used, plants are considered as important sources for industry. It is also known to be used as a source of aroma in recent years. For example, lemon, mint, lavender, blackberries, strawberries are used extensively in cosmetic field as the main aroma sources. The sunscreens used to protect against the harmful rays of the sun contain oxybenzone and retinol palmitate. Studies have shown that these two compounds have a lot of side effects. Therefore, the discovery of new components with the least side effects that can protect the sun from harmful rays has gained importance. For this purpose, it has been investigated whether the shells of cherry waste in fruit juice production have protective effect from sun rays. The sour cherry juice obtained from the market was squeezed and the shells were obtained. The obtained shells were subjected to lyophilization and extraction to obtain water and methanol extracts. UV extractive potentials of these extracts were determined by using plasmids pBR322, H₂O₂ and UV-B. According to the results obtained from the studies, it was determined with the experimental findings that the peels which are accepted as sour cherry waste have protective properties.

Keywords: *Prunus cerasus*, uv protection,pBR322

(28210) INVESTIGATION OF CYTOTOXIC POTENTIALS OF *Phoenix dactylifera* (PALM FRUIT)

Evan Sahbah Ahmed ¹, Mehmet Ozaslan ², Ibrahim Halil Kilic ², Isik Didem Karagoz ³

¹ *Gaziantep University, Turkey*

² *Gaziantep University, Turkey*

³ *Gaziantep Univeristy, Biology Department, 27310, Sehitkamil/Gaziantep, Turkey*

ozaslanmd@gantep.edu.tr

The increasing population of the world has brought about health problems. The rapid developments and advances in science and technology in today's world necessitated the use of natural resources for multipurpose purposes. Medicinal and aromatic plants are used in traditional medicine, as a food additive and as medicinal plants among the public, in the fields of pharmaceutical and phytotherapy. China, Egypt, Iran, and India are the first civilizations to use these plants, and although they have been used commercially for a long time, only a small proportion of these medicinal plants are cultivated and cultivated under field conditions. Development of pharmaceutical systematic it started in the 3000s. In China, over 350 different plant parts are used as medicines in medical treatment. In many developing and developing countries, the use of medicinal and aromatic plants in medicine and alternative medicine is increasing. Date palm, rich in energy, vitamins and minerals, is a food product with high nutritional value. It is said to contain vitamins A, B1, B2 and niacin, is a good source of potassium, calcium and magnesium, and contains some copper, sulfur and phosphorus. The development of resistance to existing anticancer agents creates a field of research for new anticancer agents. However, it is very difficult to develop a new agent that can selectively inhibit the proliferation of cancer cells without or with minimal effect on normal cells. For this reason, cancer chemotherapy is very important for medical chemists and studies are underway to develop new chemotherapeutic agents that may have anticancer activity on various types of cancer. Therefore, in the present study, it was aimed to investigate the cytotoxic potentials of the date palm (*Phoenix dactylifera*). For this purpose, the cytotoxic activity of the methanol and water extracts of the date palm fruit was studied.

Keywords: *Phoenix dactylifera*, MTT, anticancer, phytotherapy

(28005) BIOINFORMATIC AND MOLECULAR-GENETIC RESEARCH OF CHICKPEA HERBICIDE RESISTANCE GENES

Nataliia Volkova¹, Aryna Korchmarova¹, Anna Kryvenko², Olga Zakharova¹, Vyacheslav Sychkar²

¹ *Cotecna Ukraine Ltd, Ukraine*

² *Odessa State Agricultural Research Station of NAAS of Ukraine, Ukraine*

natavolki@ukr.net

Chickpea (*Cicer arietinum* L.) is an economically important agricultural crop in many countries, including Ukraine, due to certain advantages, in particular, well withstanding temperature fluctuations, adaptation to arid spring, ease of harvesting. The problem with chickpea cultivation is weed protection, which can be solved by the creation of varieties with natural herbicide resistance. Modern plant breeding is impossible without the use of molecular markers of target genes. One of the most popular molecular marker technologies is the Kompetitive Allele Specific Polymerase Chain Reaction (KASP) for Identification of Single Nucleotide Polymorphism (SNP). The aim of our research is bioinformatic and molecular-genetic studing of the gene encoding acetohydroxyacid synthase and development of KASP markers for the evaluation and selection of herbicide-resistant genotypes of chickpea.

Acetohydroxyacid synthase (AHAS) is the first enzyme that catalyzes the biochemical synthesis of branched chain amino acids. Due to inhibition of the AHAS enzyme, herbicides inhibit the further growth and development of susceptible plants, including weeds. For bioinformatic analysis material is 85 nucleotide sequences of mRNA of the AHAS2 chickpea gene and its homologues, presented in the National Center for Biotechnology Information, for molecular genetic - 10 varieties and 29 samples of chickpea. DNA extraction was performed from the milled seeds (100 mg) by the CTAB-method. Real-time amplification was performed using KASP technology on a QuantStudio 5 Real-Time PCR System (Applied Biosystem, USA) thermocycler. The high level of conserved sequence of AHAS mRNA homologs within families, including among the representatives of the legume family was found. The distribution of clusters corresponds to the taxonomic position of the studied plant species. For the functional analysis, polymorphism of mRNA of the chickpea AHAS gene was investigated. SNP was identified at position 581, potentially associated with herbicide resistance: C / T. According to the results of homologous modeling, two models of the AHAS enzyme were constructed. It has been proved that the replacement of C / T, which leads to the replacement of the amino acids of alanine by valine, leads to a change of conformation in the protein chain A. The nucleotide sequences polymorphic to both different families and species of the same family were determined and a KASP system was designed to investigate the diversity of chickpea genotypes by resistance to imidazolinone herbicides. Chickpea samples were genotyped by the AHAS gene marker. As a result of the KASP analysis, clustering of chickpea genotypes containing both the "wild" non-mutant C-allele and the mutant T-allele was obtained.

Keywords: molecular markers, SNP, RT-PCR, chickpea, breeding, herbicide resistance

(28285) INDUCED MUTATION IN BREAD WHEAT (*Triticum aestivum* L.) GENOTYPES FOR IMPROVE YIELD COMPONENT AND QUALITY PARAMETERS

Irfan Ozturk¹, Ayse Sen²

¹ *Trakya Agricultural Research Institute, Edirne, Turkey*

² *Istanbul University, Faculty of Science, Department of Biology, Turkey*

ozturkirfan62@yahoo.com

In the study, conventional gamma ray mutagenesis was used to develop mutant lines, which have such characters moderate or high yielding, high quality, semi dwarf and early maturing. In the study cultivar Saban and seven advanced genotypes were irradiated with 170, 200, and 250 Gy gamma ray. In M1 population, observation was recorded for days of heading, plant height, peduncle length, spike length, number of spikelet per head, number of kernel per spike, 1000-kernel weight, test weight, and protein ratio. To compare non-treatment (control) and mutant lines, the highest plant height, peduncle length and spike length was determined in non-treatment. The increase in the dose of gamma rays, reduced the plant height, peduncle length and spike length. The spike number and kernel number in spike in M1 populations was less than over the control (non-treatment) population (non-treatment). The similar results were also obtained in 1000-kernel weight and test weight in genotypes. The data showed that in comparison with the control population protein ratio in the mutagen treated population was higher than non-treatment. The phenotypic and agronomic correlations revealed that days of heading were negatively associated with plant height ($r=-0.984^*$), and 1000-kernel weight ($r=-0.975^*$). Various positive correlation was determined between plant height with peduncle length ($r=0.968^*$), flag leaf area ($r=0.984^*$), spikelet number per spike ($r=0.962^*$), and 1000-kernel weight ($r=0.983^*$). In the present study, a strong positive correlation was determined between flag leaf area with spikelet number ($r=0.989^*$) and kernel number ($r=0.956^*$) per spike and TKW ($r=0.989^*$). The results of correlation showed that protein ratio was negative association with plant height, peduncle length, flag leaf area, spike length, spikelet number per spike, kernel number per spike, and 1000-kernel weight. Results of the study showed that protein ratio was higher in the mutagen treated population.

Keywords: Bread wheat, gamma ray mutagenesis, yield component, quality characters

**(28441) CHARACTERIZATION OF ALKALINE AND THERMOPHILE
PROTEASE ENZYME PRODUCED FROM BACILLUS SP SB-23
STRAIN ISOLATED FROM SALT LAKE TURKEY**

Sureyya Kocamaz¹, Selma Gurz², Burhan Arikan²

¹ *Cukurova University Art and Science Faculty, Biology Department, Turkey*

² *Cukurova University Art and Science Faculty Biology Department, Turkey*

bamenzim@gmail.com

Thermostable and thermophile alkaline protease enzyme produced by *Bacillus sp.* SB-23 was isolated from Salt Lake in Turkey. There was a slight variation in protease synthesis on skim milk agar medium within the pH range 8.0 to 13.0. Analyses of the enzyme by SDS-PAGE revealed a single band which, showed proteolytic activity detected in 1% (w/v) skim milk gel. The molecular mass of the partially purified enzyme was estimated to be 85 kDa. The enzyme was highly active between at 70-100 °C (average 95%) an optimum activity at pH 9.5 and 90 °C. The partially purified enzyme was highly active in alkaline range of pH (8.5-11.0 for 96%). The enzyme was stable between 20-40 °C 100%, 20-110 °C by 93.4% after pre-incubation for 60 min at 20-110 °C. Remaining activity of enzyme in the presence of 0.4% of Triton X-100 and 5% of SDS was 95% and 82% respectively. The enzyme activity was decreased to 94% by 5 mM EDTA but it was slightly increased (110%) by 10 mM EDTA. In contrary, surprisingly, protease activity was highly increased (153% and 266%) 5 mM and 10 mM by 1,10-Phenanthroline at 37 °C for 60 min respectively. On the other hand, enzyme activity was reduced to 25% by 3 mM of PMSF, while concentrations dependent slightly inhibition was occurred in the presence of 5 mM Zn²⁺ (12%), which determine the enzyme is a serine protease. The enzyme was stable at 37 °C approximately 77% between pH 9.0-11.0 for 15 h and 73% at pH 9.0-11.0 for 21 h respectively. Consequently, results showed that, the enzyme was both alkaline, thermostable, thermophile, pH stable, and resistant to chelator and detergents. It is suitable to use as an additive in detergent formulations and other biotechnological applications. This research (project code: FDK-2019-12012) was supported by Cukurova University Scientific Research Projects Coordination Unit.

Keywords: Thermostable; *Bacillus sp.*; Salt Lake, Alkaline, Thermophile

(28072) ANTIVIRAL EFFECTS OF *RUBUS IDAEUS* L. AND *PLANTAGO MAJOR* LEAF EXTRACTS AGAINST HERPES SIMPLEX VIRUS TYPE 1 AND ADENOVIRUS 5 IN VITRO

Zagorodnya S.¹, Palchykovska L.², Likhanov A.³, Shyryna T.², Yefanova D.², Dorovskikh A.⁴

¹*D. K. Zabolotny Institute of Microbiology and Virology NASU, 154, Zabolotnogo Str., Kyiv, Ukraine, 03143*

²*Institute of Molecular Biology and Genetics NAS U, 150, Zabolotnogo Str., Kyiv, Ukraine, 03143*

³*Institute for Evolutionary Ecology NASU, 37, Academic Lebedev Str., Kyiv, Ukraine, 03143*

⁴*CEO SPJ «International Medical Center SmartMed», 16, Lutheran Str., Kyiv, Ukraine, 01024*

efanova.dasha1998@gmail.com

Viral diseases have always been one of the world issues of people health. Thus, the search for new non-toxic, effective antiviral agents is a crucial goal. The aim of this study was to evaluate the antiviral activity of *Rubus idaeus* L. and *Plantago major* L. leaf extracts against HSV-1 and ADV-5 and to examine their effect on *in vitro* RNA and DNA synthesis. The *R. idaeus* leaf extract reduce the titer of HSV-1 by 89% and ADV-5 more than 50% at concentration 0.5 and 0.05 µg/ml, respectively. The *P. major* leaf extract reduce the titer of HSV-1 by 89 and ADV-5 more than 50% at concentration 1.0 and 0.045 µg/ml, respectively. Both plant extracts inhibit *in vitro* RNA and DNA synthesis in the similar value of concentrations.

Keywords: *Rubus idaeus* L. and *Plantago major* L., antiviral activity, mechanism, RNA and DNA synthesis

**(28089) COMPARATIVE ANALYSIS OF FATTY ACIDS
COMPOSITION BETWEEN GRASS AND LUCERNE FORAGE**

Mila Arapcheska¹, Jovanka Tuteska², Zehra Hajrulai - Musliu³, Risto Uzunov³

¹ *University "St. Kliment Ohridski", Faculty of Biotechnical Sciences – Bitola, Macedonia*

² *University "St. Kliment Ohridski", High Medical School, - Bitola, Macedonia*

³ *University "Ss. Cyril and Methodius", Faculty of Veterinary Medicine – Skopje, Macedonia*

arapceska@yahoo.com

Forages represent a major part of ruminant diets. Fatty acids composition of forage feed has major influence on energy intake and productivity of animals and also has significant effects on nutritional quality of milk and meat. The fatty acids composition of forages depends on many factors, including: species, variety, climate, growth stage, growth period, fertilization and conservation method. The aim of this study was to perform comparative analysis of fatty acid composition between grass and lucerne forage. Reliability and accuracy of the analytical method for the detection of fatty acids was ensured by use of the certified reference matrix consisted of mixture of 37 FAME standards (Supelco 37 Component FAME mix, Sigma-Aldrich). The content of the particular component was expressed as percentage from the sum of all analyzed fatty acids. According obtained results from analysis of fatty acid profile of feed samples higher content of saturated fatty acids was noted in samples of grass forage (41,87 %), compared with lucerne (31,24 %). The contents of monounsaturated fatty acids in samples of grass forage was 11,28 % and 11,08 % in samples of lucerne forage, while contents of polyunsaturated fatty acids in samples of grass forage was 41,93 % and 52,78 % in samples of lucerne forage. The contents of unsaturated fatty acids in meat and milk depend of their contents in animal feed. Forage feeding is main approach to increase the supply of beneficial fatty acids from plants into ruminant products. Analysis of fatty acids profiles of grass and legume forage is very important because of their effect on nutritional quality of and health benefits of ruminant products.

Keywords: fatty acids; GC-FID; grass forage, lucerne forage

(28098) HEALTH BENEFITS OF CONJUGATED LINOLEIC ACID

Mila Arapcheska¹, Jovanka Tuteska², Zehra Hajrulai - Musliu³, Risto Uzunov³

¹ *University "St. Kliment Ohridski", Faculty of Biotechnical Sciences – Bitola, Macedonia*

² *University "St. Kliment Ohridski", High Medical School, - Bitola, Macedonia*

³ *University "Ss. Cyril and Methodius", Faculty of Veterinary Medicine – Skopje, Macedonia*

arapceska@yahoo.com

In recent years, the bioactive compounds present in food, even though in minor amounts, have received increased attention because they may have an important nutritional role. Conjugated linoleic acid (CLA) is a generic term used to describe a group of geometric and positional isomers of linoleic acid with a conjugated double bond mainly at carbons 9 and 11 or 10 and 12. Milk fat is the richest natural source of CLA. The CLA-isomers are produced via biohydrogenation of the unsaturated fatty acids presented in animal feed into saturated by rumen bacteria and by the enzymatic activity of the $\Delta 9$ -desaturase in the mammary gland. Numerous physiological properties have been attributed to CLA including action as an antiadipogenic, antidiabetogenic, anticarcinogenic, antiatherosclerotic agent and chronic inflammatory diseases. In addition, CLA has effects on bone formation and the immune system as well as fatty acid and lipid metabolism and gene expression in numerous tissues. Because potential health benefits have been associated with dietary consumption of CLA, enhancement of CLA concentrations in meat and milk is an important objective in nutrition research.

Keywords: milk fatty acids; CLA; human health

(28119) GREEN TEA EFFECTS ON MITOCHONDRIAL ACTIVITY OF VIRUS-ASSOCIATED CELLS AND IN VITRO RNA AND DNA SYNTHESSES

Svetlana Zagorodnya ¹, Kristina Naumenko ¹, Tatyana Shyrina ², Larisa Palchykovska ², Yelyzaveta Danylenko ³

¹ *D. K. Zabolotny Institute of Microbiology and Virology Nasu, 154, Zabolotnogo Str., Kyiv, Ukraine,*

² *Institute of Molecular Biology and Genetics Nasu, 150, Zabolotnogo Str., Kyiv, Ukraine,*

³ *Institute of Molecular Biology and Genetics, Ukraine*

deliza17@gmail.com

The aim of this study was to evaluate the effect of Green tea extract on mitochondrial activity of virus-associated cells and examine its influence on *in vitro* RNA and DNA synthesis. It was shown that the cytotoxic effect of Green tea extract on malignant cell lines (lymphoblastoid cell lines, B95-8 cells which are chronically infected and produce EBV) are twice higher than on normal cell lines (CEF, CHO). This result may be explained by effect on viral reproduction in cells Green tea extract effectively inhibits *in vitro* RNA and DNA synthesis. Thus, *suppression of viral reproduction* in cells is probably *due to* the inhibition of *viral* replication or transcription by Green tea extract.

Keywords: Green tea extract, cytotoxic effect, RNA and DNA synthesis

(26663) ROLE OF PROCESSING ON FLAVOR DEVELOPMENT IN MEAT

Semanur Yildiz ¹, Guliz Haskaraca ¹

¹ *Sakarya University, Turkey*

gyaldirak@sakarya.edu.tr

Flavor is one of the leading sensorial impressions of meat quality that affects the consumer purchase decision towards meat products. Fat and low molecular weight water soluble compounds play a major role in the formation of meat flavor. Some processes that applied to meat after slaughtering can generate some changes in these precursors and lead to the development of meat flavor. Since consumers demand safe meat products with high quality, extended shelf life, natural flavor and taste, nonthermal technologies or alternative mild processing methods have been implemented for preservation and decontamination of meat products to satisfy the consumers' requests. High Pressure Processing (HPP), irradiation, biopreservation, use of natural antimicrobials, and active packaging are some of the alternative technologies that promise natural attributes and flavor in addition to safety. Thus, this study was focused on the recent advances on development of meat flavor after processing by thermal and nonthermal technologies.

Keywords: Nonthermal technologies, mild processing, meat flavor, flavor formation

(26702) FACTORS INFLUENCING CONSUMPTION OF MEAT IN TURKEY

Guliz Haskaraca¹, Bengisu Kandil¹, Nazli Kubra Inozu¹, Nisanur Kocanlar¹, Sinem Sancaktar¹

¹ *Sakarya University, Turkey*

gyaldirak@sakarya.edu.tr

Proteins of animal origin have a great importance in meeting a daily protein need in a healthy and balanced diet due to its high protein content, amino acid pattern and good digestibility. Also they play an important role in protection of individuals' health and improving the life quality with its vitamin and mineral content. But on the other hand, high consumption of meat and meat products can cause some health problems. Therefore, an adequate and balanced consumption of meat and meat products are very important in terms of maintaining healthy life. This study was aimed to investigate the meat (red and white meat) consumption habits of individuals who lives in Turkey and the factors that affect their meat consumption habits. For that aims survey study was carried out with the participation of 717 people from Turkey. Consumption habits of people were evaluated with the data obtained from 27 questions by comparing the demographic properties, consumption frequencies, purchasing habits and knowledge levels. It was determined that the most important factor that positively influence the consumers red or white meat consumption preference is its taste while high prices of red meat and low quality assurance of white meat are the most important factors that reduced the consumers demand. Among the surveyed individuals 66% of them think that there are not enough controls about hygiene and food safety at the slaughterhouse, processing plants and in meat sales points and %62 of them believe that the meat offered for consumption is now unhealthier comparing to previous years. It was observed that individuals did not trust the meat they consumed in terms of safety and animal diseases and had low knowledge about the health effects of meats. To ensure this trust and to raise awareness of consumers, accurate and detailed information should be delivered to the consumers by experts such as food scientists, food engineers and veterinary surgeons.

Keywords: Meat consumption habits, consumer preferences, red meat, white meat, healthy diet

(28057) THE EFFECTS OF MICROBIAL TRANSGLUTAMINASE (MTG) ENZYME USAGE ON SENSORY PROPERTIES OF HATAY CHEESE

Nuray Guzeler¹, Huseyin Mert¹, Cagla Ozbek¹

¹ *Cukurova University, Turkey*

nsahan@cu.edu.tr

Hatay Cheese is a kind of cheese produced in and around Hatay with its own shapes and sizes. In this study, the use of microbial transglutaminase enzyme was tried to improve the textural structure of Hatay cheese which is in fresh cheese class. Enzymatic modification of milk proteins by microbial transglutaminase enzyme has been applied in the production of half-fat Hatay cheese with different pre-ripening time applications and some sensory properties of the cheeses have been investigated such as external appearance, internal appearance, texture, odor and taste during 60 days of storage. In this study, four different Hatay cheese were produced as control sample (A), 30 minutes pre-ripening with enzyme (B), 45 minutes pre-ripening with enzyme (C) and 60 minutes pre-ripening with enzyme (D). When the sensory properties of the cheeses were examined, it was observed that the application of different pre-ripening time significantly affected the external appearance, internal appearance, texture and taste scores on the 60th day of storage ($p < 0.05$), and storage time caused significant differences on the appearance scores of A, B and C cheeses ($p < 0.05$). Storage time caused significant differences on the internal appearance scores of all cheeses except cheese A ($p < 0.05$). The effects of storage time on texture scores were not significant ($p > 0.05$). The effects of different pre-ripening periods and storage time on the odor scores of the cheeses were not significant ($p > 0.05$). Taste scores of cheese D were significantly affected by storage time ($p < 0.05$). As a result of all sensory analyzes, it was found that the cheeses supplemented with MTG enzyme were more liked and the scores given to the cheeses increased as the pre-ripening period increased. As a result, the most admired cheese was D cheese.

Keywords: Microbial transglutaminase, Hatay cheese, Sensory properties

(28058) TRADITIONAL CHEESE DESSERTS AND KUNEFE

Nuray Guzeler¹, Ahmet Refik Cay¹, Firuza Koboyeva²

¹ *Cukurova University, Turkey*

² *Cukurova University, Turkey*

nsahan@cu.edu.tr

Cheese which has rich nutrient content, is used in making various desserts in Turkish cuisine. Traditional cheese desserts made in our country can be listed as Hışmerim, Kemalpasha (also known as a Hayrabolu, Curd and Biga dessert), Cheese Halva, Kunefe and Kadayif dessert. The Antakya Kunefe which has an important place among these desserts received the geographical indication certificate in 2007. On the other hand, an application was made in 2018 for the geographical indication of Kunefe cheese used in the traditional dessert of Antakya. Unsalted fresh cheese is generally used in desserts. For example, Kunefe cheese used in making the Kunefe dessert is a soft type cheese which contains no additives and which consumed without ripening. The most important features to be considered in the structure of this cheese are: creep ratio, odor, smooth and shiny structure, hardness-softness rates. The national adoption of the Kunefe also contributed to an increase in the demand of Kunefe cheese. This cheese is mostly produced in the Eastern Mediterranean Region, especially in Antakya. The requirement for this cheese in other regions of Turkey is provided from Hatay. According to the studies, besides the production of fresh Kunefe cheese made from raw milk, there are also the production of salted Kunefe cheese (chestnut cheese) and tube type Kunefe cheese, made with or without adding melting salt, in Hatay. Tube type Kunefe cheese is usually used in the production of frozen Kunefe dessert. Kunefe cheese made from pasteurized milk is not used in the dessert because of the negative melting feature. Apart from Hatay, there are also some dairy plants produced Kunefe cheeses in other cities. In these plants, for the production of Kunefe cheese tube type Kunefe cheese production method is preferred. This cheese is produced by dry boiling of curd without adding salt and it is generally used in making desserts and patties in restaurants. In this research, the production and characteristics of cheese desserts made in Turkey were given. Also, different production methods of Kunefe cheese which is used in the making of the most important dessert of Hatay such as Kunefe were examined and discussed.

Keywords: Turkey, Traditional desserts, Kunefe, Kunefe cheese

(28152) NANOTECHNOLOGICAL STRATEGIES TO IMPROVE STABILITY AND BIOAVAILABILITY OF ASTAXANTHIN

Osman Kadir Topuz¹

¹ *Akdeniz University Fisheries Faculty, Turkey*

oktopuz@akdeniz.edu.tr

Astaxanthin is a carotenoid pigment and commonly used as coloring and antioxidative agent in nutraceutical, cosmetics, food and feed industries. Astaxanthin is synthesized by algae and distributed in aquatic animals. Astaxanthin is available as a food supplement, but, like other carotenoids, is a very lipophilic compound and has low bioavailability within the human gastrointestinal tract. Bioavailability of lipophilic compounds has been received the growing interest in food and pharmaceutical areas, during few past decades. Since the solubility of bioactive compounds determines their bioavailability, the slow dissolution or solubilization of lipophilic compounds in the aqueous based systems, causes their low absorption rate and consequently, their low bioavailability. In this case, nanotechnological colloidal systems such as nanoemulsions, liposomes, nanogels, nanoparticles, nanoencapsulation etc., may increase bioavailability of astaxanthin. Nanoscale systems have considerable potential within the food industry, but they must be carefully designed to ensure that they are safe, economically viable and effective. This study highlights the challenges associated with nanotechnological incorporating of astaxanthin into nanoscale food systems to improve stability and bioavailability of astaxanthin.

Keywords: Astaxanthin, Bioavailability, Nanoemulsion, Stability

(28153) FOOD-GRADE EMULSIFIERS: SOURCE, PROPERTIES AND APPLICATIONS IN NANOTECHNOLOGY

Osman Kadir Topuz¹

¹ *Akdeniz University Fisheries Faculty, Turkey*

oktopuz@akdeniz.edu.tr

Emulsion-based systems are being increasingly studied for their potential applications within the food and pharmaceuticals industries to encapsulate, protect, and release lipophilic bioactive compounds, such as polyunsaturated fatty acids, flavonoids, carotenoids, vitamins, and drugs. Emulsifiers play a key role in the development of nanoemulsion formulations because they facilitate the formation of small droplets during homogenization by adsorbing to the oil-water interface and reducing the interfacial tension, and also protect the droplets from aggregation after their formation by generating repulsive interactions between the droplets. A large number of emulsifiers are available for the formulation of emulsions and nanoemulsions, including polysaccharides, proteins, phospholipids, natural extracts, and synthetic surfactants. The selection of an emulsifier for a particular application depends on its physicochemical properties, as well as its ease of utilization, legal status, and cost. This study provides a review of recent studies on the identification, characterization, and utilization of food grade emulsifiers used in nanoemulsions.

Keywords: Emulsifiers, Food nanotechnology, Surfactant, Nanoemulsions

**(28155) MARINE PHOSPHOLIPIDS: IMPORTANCE,
CHARACTERIZATION AND APPLICATIONS IN FOOD INDUSTRY**

Osman Kadir Topuz¹

¹ *Akdeniz University Fisheries Faculty, Turkey*

oktopuz@akdeniz.edu.tr

Marine phospholipids have different properties from other type of phospholipids such as soybean, egg yolk, etc. Phosphatidylcholine is the most abundant phospholipids (PL) found in marine sources, including salmon, tuna, mackerel, bonito, herring, trout etc. The second abundant maine PL is phosphatidylethanolamine and followed by phosphatidylinositol, phosphatidylserine, sphingomyelin, and lysophosphatidylcholine. Phospholipids derived from marine sources have been the focus of much attention, since polyunsaturated fatty acids (PUFA), such as eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in phospholipid forms has better bioavailability compared to PUFA in triglyceride form. Nevertheles marine PL is sensitive to lipid oxidation since it contains higher content of PUFA. Marine PLs have amphiphilic properties and therefore they are natural surfactants for emulsion and liposom preparation. Due to the numerous advantages of marine PL, there is a growing interest of using marine PL as ingredient for food fortification. In this review study, the attention is focused to give a basic idea about its sources, characterization techniques, importance in food fortification and applications in food systems.

Keywords: Marine phospholipids, Phosphatidylcholine, Emulsions, Liposomes, Oxidation

(28221) STRUCTURAL CHARACTERIZATION OF MIXED MICELLES FORMED IN THE PRESENCE OF MEDIUM- AND LONG-CHAIN FATTY ACIDS BY MOLECULAR DYNAMICS SIMULATIONS

Esra Tuncer¹, Beste Bayramoglu²

¹ *Trakya University, Turkey*

² *Izmir Institute of Technology, Turkey*

esratuncer@trakya.edu.tr

Lipophilic nature of some nutrients makes their utilization by the body difficult. Their bioavailability depends on the degree of their solubilization within duodenal mixed micelles (MM), i.e. their bioaccessibility. MMs are self-assembled structures formed by bile acids and phospholipids. The presence of fatty acids (FA) also influences the bioaccessibility of lipophilic nutrients as they may also be incorporated in the MMs. Therefore, it is important to thoroughly understand the self-assembly process and the morphology of MMs in the presence fatty acids to develop nano-delivery systems intended to improve the bioavailability of lipophilic nutraceuticals. Molecular dynamics simulations provide a powerful tool to study such self-assembly phenomena. The aim of this study is to understand the self-assembly and detailed structure of MMs in the presence of saturated fatty acids with different chain lengths. For this purpose, cholate, POPC (1-palmitoyl-2-oleoyl-sn-glycero-3-phosphocholine) and medium- and long-chain fatty acids (lauric (12:0) and stearic (18:0)) were used. The coarse-grained Martini Force Field was used in simulations, which were carried out using GROMACS simulation package. The physiological conditions at fed state in duodenum were mimicked, i.e. 310 K, 1 bar, 150 mM of NaCl and 20:20:5 mM of FA: cholate: POPC. Simulations were run for 8 μ s including equilibration and production runs. Besides the size and shape of MMs, their internal structure was investigated through radial distribution functions and order parameters. The positioning of the molecules in the micelles showed similar pattern: the hydrophobic core is formed by POPC tails, cholates are placed on the micelle surface forming wedges between POPC and fatty acid head groups, and fatty acids are positioned as such their tails are pointing to the MM's center of mass. The size of the micelle with stearic acid was found to be larger. The information gained by this study will be used in further studies to investigate the solubilization of lipophilic nutrients.

Keywords: Self-assembly, Mixed micelles, Cholate, POPC

**(28450) DETERMINATION OF SOME CHEMICAL PROPERTIES,
MINERAL CONTENTS AND FATTY ACID COMPOSITIONS OF
PUMPKIN SEED (*Cucurbita pepo* L.) FLOURS**

Dilek Dulger Altiner¹, Yasemin Sahan², Merve Sabuncu³

¹ *Department of Gastronomy and Culinary Arts, Tourism Faculty, Kocaeli University, Kocaeli, Turkey*

² *Food Engineering Department, Faculty of Agriculture, Bursa Uludag University, Bursa, Turkey*

³ *Graduate School of Natural and Applied Sciences, Bursa Uludag University, Bursa, Turkey*

dilek.dulgeraltiner@gmail.com

Nowadays, new functional food products that support human health are developed based on the changing life conditions. For this purpose, the number of food products produced with various flour additives is increasing day by day, particularly within the scope of bakery products. *Cucurbita* species of summer pumpkin (*Cucurbita pepo* L.) from the Cucurbitaceae family, which can be cultivated throughout the whole year in Turkey, is a vegetable that has significant economic and nutritional value. Its peel, fruit, pulp and seeds are utilized in several industries including food, pharmaceutical and cosmetics industries. Also having a wide area of use in alternative medicine, pumpkin seeds have an effective role in preventing breast and prostate cancer and kidney and urinary diseases. Within the scope of this study, some chemical properties (moisture, ash, protein, fat, carbohydrate content) and functional properties (total diet fiber, fatty acid composition, mineral substance content) of pumpkin seed flours obtained from three different pumpkin types peculiar to their respective areas they are grown (Edirne, Urgup and Nevsehir) will be determined. Considering the macro and micro elements that should be taken daily, it was determined that pumpkin is a good source of Na, P, K, Fe, Zn, Mn and Cu. It was determined to be a good source also in terms of linoleic acid and oleic acid. In conclusion it was determined that, although pumpkin seeds are commonly cultivated, its use in food industry is still restricted. Furthermore, although it is mainly used as an appetizer, pumpkin seeds has the properties that makes it fit for being used as a functional component in food formulations. In addition, it can be used for the purpose of enriching food in terms of protein, diet fiber, mineral matter and beneficial fatty acids. In this way, by creating different areas of use for pumpkin seeds, as one of Turkey's regional products, its added value can be increased.

Keywords: *Cucurbita pepo* L., functional food, pumpkin seed flours, mineral content, fatty acid composition

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(28477) QUALITY CHARACTERISTICS OF FUNCTIONAL FRESH ORANGE JUICE FORTIFIED WITH REISHI (*Ganoderma lucidum*) EXTRACT

Bengu Ozturk¹, Gizem Kuscu²

¹ *Yeditepe University, Faculty of Engineering, Department of Food Engineering, Turkey*

² *Yeditepe University, Turkey*

benguozturk@gmail.com

Reishi (*Ganoderma lucidum*) mushroom is known with its highly referred health promoting ingredients and accepted as miracle mushroom for human consumption. In this study, a functional beverage, fresh orange juice fortified with reishi (*Ganoderma lucidum*) extract was produced and its quality parameters were investigated. Commercial package size of 330 mL and 200 mL of freshly squeezed orange juice samples containing different amounts (5 or 10 mL) of reishi extract were prepared. Quality parameters of fortified orange juice samples were compared with the control sample, fresh orange juice without the extract. Brix and pH of the samples ranged from 10.9±0.8 to 11.5±1.2, and 3.66 to 3.68, respectively. Ascorbic acid content (mg/100mL) and total carbohydrate content (g/L) of the samples were found between 54.5±2.2 and 64.8±8.5, and 12.96±4.19 - 17.34±4.94, respectively. Total phenolic contents of the samples were determined as 313.6±3.3 - 329.5±3.3 µg GAE/100 mL. Color measurements indicated no significant difference between the control and the fortified samples. Five-point hedonic scale (65 volunteers) and ranking tests (29 volunteers) were applied for analyzing sensorial quality of the fortified orange juices, and the results showed that the recommended daily intake dose of the extract (10 mL/day) was acceptable when it was added to 330 mL of orange juice. Functional orange juice containing reishi extract was observed as the alternative beverage with acceptable quality properties for the consumers.

Keywords: Functional orange juice, reishi extract, physicochemical properties, sensory properties

**(28517) ANTIOXIDANT ACTIVITY OF TOTAL ANTHOCYANINS
EXTRACTED FROM SWEET CHERRY CULTIVARS**

Fatih Sonmez¹

¹ *Sakarya University of Applied Sciences, Pamukova Vocational High School, Turkey*

fsonmez@sakarya.edu.tr

Fruits and vegetables are important in terms of nutrition and human health due to their low energy content, high content of minerals and vitamins. The regular consumption of fruits and vegetables are widely recommended in dietary guidelines worldwide because of their richness in nutrients. Sweet cherry (*Prunus avium* L.) is one of the most popular table fruits and a member of the Rosaceae family. Sweet cherry cultivars contain polyphenols consist of flavonoids, flavan-3-ols, and flavonols and non-flavonoid compounds, such as hydroxycinnamic and hydroxybenzoic acids. Total anthocyanins were extracted from eleven sweet cherry cultivars grown in Sakarya, Turkey. The DPPH activities of the extracts were investigated as antioxidant properties. The results exhibited that 'Churchill' and 'Merton Premier' have high antioxidant activity with 74.102% and 73.503% DPPH activity, respectively.

Keywords: Cherry, Anthocyanins, Antioxidant

(26661) THE EFFECTS OF POTASSIUM LACTATE ON QUALITY CHARACTERISTICS AND SHELF LIFE OF MISKET MEATBALL

Guliz Haskaraca¹, Ozlem Ozturk¹

¹ *Sakarya University, Turkey*

gyaldirak@sakarya.edu.tr

The aim of this study was to determine the effects of different amounts of potassium lactate (PL) on the chemical, microbial and sensory quality parameters of Misket meatballs (sphere shaped meatball) produced from chicken meat, during storage. For that purpose, potassium lactate was added to misket meatball dough at ratio of 0%, 1%, 2% and 3% and four different groups were formed. After the production, misket meatballs were packed with MAP (30% CO₂+ 70% N₂) and stored at 4°C for 2 months. pH and thiobarbituric acid reactive substance (TBARS) analyses, total mesophilic aerobic bacteria (TMAB), total yeast and total mould counts, and sensory analyses were done during storage. PL showed its most important effect on the number of TMAB of misket meatballs and it was determined that TMAB loads decreased significantly in parallel to the increasing PL concentration ($p < 0.05$). It was also observed that the 3% PL added group had the lowest TBARS level during the storage period. Differences between the groups in regard to total yeast and total mold counts and pH results, were not found significant during storage ($p > 0.05$). The addition of PL in any concentration did not adversely affect sensory quality characteristics of misket meatballs ($p > 0.05$). The results showed that the addition of PL with the ratio of 3% to misket meatballs produced from chicken meat improves the microbiological quality of the products and the shelf life can be extended up to 63 days without any loss of sensory and chemical quality.

Keywords: Meat product, shelf life, potassium lactate, meatball

**(26692) AN EVALUATION ON FISH CONSUMPTION HABITS: THE
CASE OF SAKARYA, TURKEY**

Guliz Haskaraca¹

¹ *Sakarya University, Turkey*

gyaldirak@sakarya.edu.tr

Since the fishes are rich in fatty acids, iron, vitamin B12 and calcium they play a very important role in individuals daily diet and its consumption is recommended at least two times a week by The American Cancer Society and the American Heart Association. But some factors such as environmental conditions, consumers' characteristics, eating habits plays an important role in fish consumption of people. Turkey has great potential for fish farming due to its geographical position and because of three sides of Turkey is surrounded by sea, fish farming gives possibility for consumption of great variety of fish species. But unfortunately, Turkish Statistical Institute reported that fish consumption rate is decreasing day by day in Turkey. Sakarya is one of the cosmopolite city of Turkey which has seaside to black sea and has developed fishing in seaboard. This study was aimed to determine the factors that affect the fish consumption and fish consumption habits of people over 18 age which are live in Sakarya, Turkey. With that aims, a survey study was carried out with the participation of 607 people who live in Sakarya. Fish consumption preferences of individuals were evaluated by comparing demographic structure and some consumer perception parameters.

Keywords: Fish consumption habits, eating habits, balanced diet, healty diet

(27226) AMINO ACID PROFILES OF WHITE WINES FROM THREE AUTOCHTHONOUS GALICIAN VARIETIES

José M. Mirás-Avalos ¹, Yolanda Bouzas-Cid ¹, Emiliano Trigo-Córdoba ¹, Ignacio Orriols-Fernández ¹, Elena Falqué-López ²

¹ *Estacion De Viticultura E Enologia De Galicia (Evega-Agacal)*

² *Química Analítica, Facultad De Ciencias, As Lagoas S/N. University of Vigo, Spain*

efalque@uvigo.es

Amino acids play a relevant role in wine aroma and sensory characteristics. Several studies proved that amino acid profiles have been useful for classification of white wines according to grape variety, vintage, geographic origin and winemaking practices. In the current work, the amino acid profiles of white wines from three grapevine varieties (Albariño, Godello and Treixadura) grown in Galicia (NW Spain) were characterized over three consecutive vintages. The three varieties were grown on the same vineyard and under the same conditions (soil, climate, agricultural practices) and were harvested at optimum maturity. Wines were made following the same protocol for the three varieties. The concentrations of primary amino acids were determined by high-performance liquid chromatography with DAD detection. During the study period, Treixadura vines showed more negative stem water potential values when compared to Albariño and Godello. Moreover, Treixadura vines had the lowest number of clusters per vine and the lowest vegetative growth, but the highest cluster weight among the three varieties. In contrast, Godello yielded more than the other two varieties. Musts from the three varieties differed in acidity, pH, malic and tartaric acid concentrations, but not in total soluble solids. In the wines, total acidity was greater in Albariño, while pH was higher in Treixadura. The amino acid content of wines from the three varieties was within the range of values reported for other European wines. Treixadura showed the highest concentration of amino acids, while wines from Albariño were characterized by substantially lower amounts of free amino acids. Aspartic acid, glutamic acid, lysine, arginine, asparagine, alanine and histidine were the most abundant amino acids after proline, which appeared in extremely high concentrations due to yeast release. Principal component analysis was able to separate wines by variety and year according to their amino acid profiles. Therefore, these profiles could be a useful tool for classifying white wines according to grape variety and vintage by means of statistical methods.

Keywords: Nitrogen fraction, Principal component analysis, *Vitis vinifera* (L.), Wine classification

(27846) COLOUR CHANGES IN DIFFERENT OILS USED IN A CANNED EEL

Lucia Gómez-Limia¹, Inmaculada Franco¹, Hiar Villar¹, Sidonia Martínez Suárez¹

¹ *University of Vigo, Spain*

sidonia@uvigo.es

Canned fishes are products of economic importance in many countries, supporting a significant market demand because of its convenient and affordable use. These products are normally canned in vegetable oils, having a preserving effect and contributing to make the product more palatable. Processing can cause changes in the sensory and physical properties of the oils. Colour is one of the most important parameter to determine changes in quality food. The aim of this work was to study the effect of different treatment and storage on the colour of different oils used as filling medium during European eels (*Anguilla anguilla*) canning. Sunflower oil and olive oil were selected as filling mediums. In addition, a canned eels was made using olive oil with garlic in the frying, and then pepper and chilli pepper was added to the inside of the canned during the sterilization process. Samples of the different oils were sampled, raw, after the frying of the fish and after the sterilization treatment. Samples were also sampled after two months and one year of storage. The CieLab system was used to determine the colour parameters. It was carried out using a Konica Minolta portable colorimeter mod. CR-400, which allows to measure the colours that are reflected from the surfaces with the help of the trichromatic coordinates: lightness (L^*), redness (a^* , red-green) and yellowness (b^* , yellow-blue). Difference in colour (ΔE), hue angle (H°), and saturation index or chroma (C^*). It was observed that L^* increased during the frying and sterilization treatment and remained constant during storage for the sunflower oil. On the other hand, the initial luminosity of the olive oil, was higher than in sunflower oil, however in this oil L^* decreased with frying and the sterilization treatment. Using only olive oil, during storage, there was an increase in luminosity. With regard to spicy olive oil the luminosity increased during the first months of storage, but decreased in the 12-month preserve. In sunflower oil, a^* values decreased with frying and sterilization. During storage, it remained stable at the beginning (2 months), but it decreased again after 12 months of storage. The olive oil and spicy olive oil showed higher a^* values after frying and sterilization, remained stable at the beginning of storage and decreased after 12 months of storage of the preserves. The parameter b^* was lower in sunflower oil than in olive oil. In respect of sunflower oil, it increased during frying, but not during sterilization. It was stable during the first months of storage and increased to 12 months. In olive oil, b^* value remained stable during frying and sterilization treatment, decreased at the beginning of storage of the preserved and increased to 12 months of storage. However, the spicy olive oil, the b^* value decreased with the two heat treatments under study and at the beginning of storage, but increased after 12 months of storage of the preserves. The fresh sunflower oil showed H° values higher than olive oil. The frying treatment decreased this parameter in sunflower oil, but not in olive oil. There were no changes in any of the oils under study after sterilization. After 12 months of storage, it decreased in the three coverage fluids. The parameter C^* was lower in sunflower oil than in fresh olive oil. Frying produced an increase in C^* in sunflower oil, but did not significantly change the C^* values in olive oil and spicy olive oil. During storage, the C^* values increased. ΔE were greater in spicy olive oil and during storage.

Keywords: Olive oil, sunflower oil, canned eel, oxidation, colour

(27933) EFFECTS OF PROCESSING TECHNIQUES AND STORAGE ON OXIDATIVE STABILITY OF DIFFERENT OILS IN A CANNED EEL

Lucía Gómez Limia¹, Inmaculada Franco², Hiar Villar¹, Sidonia Martínez Suárez¹

¹ *University of Vigo, Spain*

lugomez@uvigo.es

The European eel (*Anguilla anguilla*) is an important fish in some countries of Europe and Asia. However, its excessive capture of juveniles and the impossibility of captive breeding have made the eel a very limited product. The European eel was one abundant species in all rivers in the Iberian Peninsula in the early 20th century. However, at present the species is absent from more than 80% of rivers in the region. Capture of larger fish would facilitate the recovery of the species as well as enabling production of greater numbers of glass eels for aquaculture purposes. The elaboration of canned eels with these larger fish would be a good option to consume this fish throughout the year. In the food industry, virgin and extra-virgin olive oil, olive oil or seed oils are used as filling medium to prepare preserved fish. The quality of canned fish in-oil depends on the complex interactions between components of the fish and those of covering oils. During processing and storage, fish and oils undergo modifications because of mechanical and thermal degradation and hydrolytic and oxidative degradation (affecting the quality of oil and preserved food). The aim of this study was to determine the oxidative variation in different oils used as filling medium in a canned eel after frying and sterilizing treatment and during the storage at two months and one year. For the elaboration of eel canned three different oils were used: sunflower oil, olive oil and spicy olive oil. The spicy oil was made using olive oil with garlic in the frying, and then pepper and chilli pepper was added inside of the canned during the sterilization process. The oil used during frying it is not the same that it was used as filling medium. The peroxide value (PV) was determined according to the method of Official Methods of Analysis of Oils and Fats (1997). The content was expressed as meq O₂/kg of oil. The thiobarbituric acid index (TBA) was determined according to the Kirk and Sawyer (1991) method. The results were expressed as mg malonaldehyde/kg of oil. The frying and the sterilization treatment produced in the oil an increase of the peroxide index with respect to the crude oil. In sunflower oil, the increase was greater with the frying than in the olive oil. No significant differences were observed after the sterilization treatment between the three filling mediums. During storage, the peroxide index decreased. The TBA value increased after frying in the three oils under study. The sterilization treatment caused a decrease in the TBARS index in olive oil and spicy olive oil. It did not show significant changes in sunflower oil, with respect to fresh oil. The sterilization decreased the TBARS index in olive oil and spicy olive oil. Sunflower oil showed no significant changes, with respect to fresh oil. During the storage, no significant changes were observed in the sunflower oil. In olive oil, the TBARS index decreased after 2 months of storage and increase again at year of storage. No significant changes were obtained in the spicy olive oil after 2 months of storage, but it decreased at one year of storage.

Keywords: Olive oil, Sunflower oil, Canned eel, Lipid oxidation

(27938) QUALITY CHARACTERISTICS OF BEEF SAUSAGE CONTAINING DATES DURING RIPENING

Inmaculada Franco¹, Sihem Latrach¹, Lucia Gómez-Limia¹, Sidonia Martínez Suárez¹

¹ *University of Vigo, Spain*

inmatec@uvigo.es

The technology of raw-cured meats offers a wide range of possibilities and variations regarding ingredients and production processes, which has led to the development of a large number of products. Different studies have been carried out on the use of fruits and vegetables in the production of meat products, mainly in order to reduce fat and introduce specific functional properties. Dates are recognized as nutrient-rich fruits because of their rich content of essential nutrients, which include carbohydrates, salts and minerals, dietary fiber, vitamins, fatty acids, amino acids and protein. Moreover, the addition of dates could be used for making high value-added meat products and would further enhance the quality of final product above all thanks to its antioxidant capacity. In addition to the nutritional benefits, date have been related to various biological effects mainly due to the high value of antioxidants. An alternative to the reduction or elimination of animal fat in raw-cured meats is replacing it with oils. Olive oil has been widely used for this purpose. The aim of this work is to study the effect of the use of dates in the preparation of a cured raw beef sausage. For evaluation the effect of dates different batches of sausages were manufactured: A control batch without dates and three batches with different amounts of dates (3.5%, 6.7% and 10%, respectively). All sausages were manufactured with a 10% of extra virgin olive and other ingredients: NaCl, garlic, paprika and oregano. Samples at 0 (mix immediately before stuffing), 3, 7, 14 and 21 days, were taken for subsequent analysis. At each sampling time the units of sausage were individually weighted to calculate the weight losses. On the other hand, different biochemical parameters were analyzed. The sensorial characteristics of the final products were also determined both in control and in experimental sausages. Weight losses were significantly affected by days of manufacturing, increasing along the ripening process. Values of weight losses were around the 50% in the final product. Weight losses are produced basically because of the dehydration, so that its evolution will be opposite to dry matter. The initial moisture content of the sausages was similar in the four batches (control and mixed sausages) and around 60%. Moisture were significantly affected by the days of manufacturing. Values decreased progressively, reaching final mean values around 45% in the four batches. Fat content of the four batches of sausage remain practically constant along the manufacture process, with values near to 35% of the dry matter content. The evolution of pH values were very different when the four sausages were compared. In sausages made with dates the values decrease rapidly in the first three days of maturation. This evolution could be related to the high content of fermentable sugars in this fruit. Regarding to the sensorial analysis, consumers has a clear preference for sausages made with 10% of dates fruit.

Keywords: Dry cured sausages, date fruit, beef meat, biochemical parameters, sensory characteristics

(28002) ANTIOXIDANT ACTIVITY, TOTAL PHENOLIC AND FLAVONOID CONTENTS AND ANTINEURODEGENERATIVE ACTIVITY OF METHANOL EXTRACT OF PYRUS VARIETIES FRUIT FROM SERBIA

Aleksandra Savic¹, Ana Alimpić Aradski², Sonja Duletić-Laušević²

¹ *Natural History Museum In Belgrade*

² *Faculty of Biology, University of Belgrade, Serbia*

aleksandra.savic@nhmbeo.rs

The region of Serbia is rich in traditional and indigenous pear varieties (*Pyrus communis* L.), that can be found in organic production as single trees in households. Six traditional pear fruit varieties (Takiša, Lončara, Jeribasma, Vidovača, Lubeničarka, Karamanka), and one commercial (Williams Bartlett) were collected in Central Serbia (Šumadija) during July-October 2016. Whole fruits were stored at -20°C , and later extracted with methanol, separately flesh and peel, as well as mixed flesh and peel, to obtain crude extracts. Antioxidant activity of extracts were evaluated using DPPH, ABTS and FRAP assays, while total phenolic and flavonoid contents were determined spectrophotometrically. Antineurodegenerative activity was evaluated using acetylcholinesterase (AChE) and tyrosinase (TYR) inhibition activity. The extracts were tested at concentrations of 25 $\mu\text{g/ml}$ for total phenolic content and flavonoid content, DPPH, FRAP, ABTS assay, and of 25, 50 and 100 $\mu\text{g/ml}$ for AChE (%) and TYR (%) inhibition. Methanol extracts of flesh peel and mixed flesh and peel of six traditional pear fruit varieties showed a high amount of total phenol and flavonoid contents, significant antioxidant potential, and moderate antineurodegenerative activity. Commercial variety Williams Bartlett has average or lower activities compared to traditional varieties. Takiša showed the best results: the total phenolic content (2416.30 mg GAE/g), total flavonoid content (99.41 mg QE/g), DPPH reduction ($\text{IC}_{50} = 0.37$ mg/mL), ABTS reduction (24.05 mg AAE/g), and Fe^{2+} reduction (7328.63 $\mu\text{mol/Fe (II)/g}$) abilities, AChE inhibition (39.46%) and TYR inhibition (32.76%). The fruits of traditional pears from Serbia are rich in bioactive components and can be used in nutrition as a valuable source of healthy food, and for the prevention of diseases caused by oxidative stress.

Keywords: *Pyrus* sp., Traditional varieties, Antioxidant activity, Antineurodegenerative activity

(28035) EFFECT OF THE USE OF AUTOCHTHONOUS STARTER CULTURES ON THE COLOR CHANGES THAT TAKE PLACE THROUGHOUT THE DRYING-RIPENING PROCESS OF GALICIAN CHORIZO SAUSAGE

Miriam Rodríguez González¹, Francisco Javier Carballo García¹

¹ University of Vigo, Spain

mirrodriguez@uvigo.es

Raw-cured sausages are one of the oldest processed foods known to man. Chorizo Gallego is the most important raw-cured sausage among those made in the northwest of Spain. This product is characterized, among other attributes, by a marked reddish color resulting from the use of paprika in their manufacture, although the formation of nitrosyl-heme pigments also has a role in this sensory character. At present, this product is still elaborated in a totally empirical way, based on traditional recipes transmitted from generation to generation, in homes or small industries. The consequence of this is the great heterogeneity in the characteristics and quality of the products present in the markets, which often has a negative influence on the demand of these products by consumers and limits their diffusion to wider markets. The use of starter cultures specifically developed for this type of products, integrated by microbial strains isolated from artisanal productions, would allow, without renouncing to the differential sensory attributes of the product, the obtaining sausages with a marked personality and a high and constant organoleptic and sanitary quality. In this work the effect of the use as starter cultures of bacterial strains previously isolated from traditional home-made Galician sausages and selected based on their metabolic activities on the changes taking place in the colour of the Galician sausage has been studied. Three batches of sausage were manufactured in triplicate following the traditional standardized procedure. The first one was manufactured without the addition of starter cultures (control batch, CNT). The second was produced by adding as starter cultures *Lactobacillus sakei* LS131 and *Staphylococcus equorum* SB23 (batch EQU) and the third adding *Lactobacillus sakei* LS131 and *Staphylococcus saprophyticus* SB12 (batch SAP). The lactobacillus strain was added to the mix at a proportion of 106 CFU / g and those of staphylococci at a proportion of 107 CFU / g. After the preparation of the mix, it was stuffed in pork gut of 36-38 mm in diameter; Sausages were initially maintained for 9 days at 6 ° C and 80% H.R. and subsequently for 21 days at 12 ° C and 75% H.R. From each of the three replicas of each batch, samples were taken at 0 days (mix before stuffing) and after 2, 5, 9, 14, 21 and 30 days of maturation. In each of the samples, the moisture content (ISO 1442: 1997), the pH value (AOAC 14.022 method (AOAC 1980)), and the heme and nitrosyl-heme pigments (Zaika et al., *J. Food Sci.* 1976, 43:186-189) were determined. Also the color (CIEL* a * b system) (CIE (Commission Internationale de l'Eclairage) 1978) was assessed using a portable CR-400 colorimeter (Konica Minolta Sensing Inc., Osaka, Japan). The use of starter cultures did not have a significant effect on the luminosity (L*) of the sausages that decreased significantly throughout the drying-ripening process (values from 46-48 to 31-32) both in the control and in the inoculated batches. However, at the end of the manufacture process, the a * and b * values were significantly higher in the sausages inoculated with starter cultures than in the control sausages, thus maintaining a more intense red coloration. Similarly, the percentages of pigment (from heme to nitrosyl-heme) transformation at the end of the manufacture also were significantly higher in the inoculated batches (82.02% and 86.26% for the EQU and SAP batches, respectively) than in the control batch (81.88%).

Keywords: Raw-cured sausages, Chorizo Gallego, starter cultures and color

**(28662) ANALYSING OF SOME CONSERVED miRNAs IN HAZELNUT
(*Corylus avellena* L. AND *Corylus colurna* L.) BY REAL-TIME PCR**

Busra Yirmibes, Zehra Omeroglu Ulu, Salih Ulu, Nehir Ozdemir Ozgenturk

Yildiz Technical University, Molecular Biology and Genetic Department, Istanbul, Turkey

nehirozdemir@yahoo.com

Hazelnut is a important plant species that is used in food industry, dye industry, woodchopping and stock farming and it has also benefits for health due to nutrient component. *Corylus avellena* that has economical value and *Corylus colurna* used as rootstock play a part among the most common cultivars. There is no study in hazelnut yet, although many studies have been made about microRNA in plants so far. In this study, detection of miRNAs that play role in posttranscriptional regulation was aimed. miRNAs are 18-25 nucleotide, short and single strand non-coding RNAs. miRNAs called as post-transcriptional gene regulators cause repress or cleavage of their target binding to mRNA. In particularly in plants, they cause cleavage of mRNA and play role in developmental process, response to biotic and abiotic stresses like drought, salt, cold or UV. Conserved miRNAs are miRNAs that have same function in different plant species and are present from very old times to daytime. In this study, we aimed that analyzing of some conserved miRNAs (miR159, miR160, miR171, miR396, miR2919 and miR8123) in hazelnut (*Corylus avellena* L. and *Corylus colurna* L.) that is provided from Giresun Hazelnut Research Institute using by Real-Time PCR.

Keywords: Conserved microRNA, Hazelnut, *Corylus avellena* L., *Corylus colurna* L., Real-Time PCR,

(28545) THE DETERMINATION OF THEIR PERFORMANCES OF SOME WHEAT CULTIVARS IN TRAKYA REGION

Necmi Beser¹, Yalcin Kaya¹, Gizem Civi², Tugay Gumus²

¹ *Trakya University, Engineering Faculty, Genetics and Bioengineering Department, Turkey*

² *Tragen Ltd. Co, Turkey*

necmibeser@yahoo.com

Wheat is the most important crop both in Turkey and also in Trakya region which is European part of Turkey. The study was conducted to test performance of some wheat cultivars in Trakya Region conditions in 2017-2018 growing season. Yield trials were planted at two locations as Edirne and Kırklareli provinces and both provinces exist top fifteen wheat producer provinces in Turkey. Trials were planted by planter in 10 November in 2017 and harvested by harvest combine in 13 July in 2018. Experiment was conducted with four replications at Randomized Complete Block Design (RCB). 25 kg/da N and 5 kg/da P₂O₅ fertilizer were applied from planting to spiking stage periodically. 24 candidate wheat lines and five control cultivars which are the most planted and preferred wheat cultivars by farmers and flour industry in Trakya Region as Pehlivan, Gelibolu Rumeli, Esperia and Flamura-85 existed in yield trials. Based on experiment results, some cultivars exhibited higher seed yield performances over control cultivars and the average of seed yield was calculated as 767,4 kg/da. TRAGEN-10 was existed in top rank based on average seed yield and TRAGEN GB11, GB10, GB 8 followed this candidate. The candidate also evaluated and compared with control cultivars based seed and flour quality results. As results, TRAGEN Ltd wheat cultivars had favourable results based this study and promising ones will be tested again future trials and selected ones will send to registration trials to produce and then exist in Turkish seed market.

Keywords: Wheat, Trakya Region, Edirne, Kırklareli, Production, Seed yield, Yield traits

(28548) THE EVALUATION OF PERFORMANCE OF SOME IMI HERBICIDE RESISTANT CULTIVARS IN WHEAT IN TRAKYA REGION

Necmi Beser¹, Yalcin Kaya¹, Gizem Civi², Tugay Gumus²

¹ *Trakya University, Engineering Faculty, Genetics and Bioengineering Department, Turkey*

² *Tragen Ltd. Co, Turkey*

necmibeser@yahoo.com

Wheat is originated from Turkey and has been cultivated in large fields for 2000 years in Turkey. Since bread is the most common consumed food in the tables and Turkey exists the top bread consumer countries in the world. Therefore, wheat the most produced crop in Turkey and also remain as the essential crop in the rotation as wheat-sunflower in the Trakya region which is European part of Turkey. Clearfield System developed by BASF which combination of IMI (Imidazolinone) herbicide and resistant varieties commonly use many crops such as corn, sunflower, canola, etc. and started to use since the beginning of 21th century. However, neither any IMI resistant wheat not IMI herbicide for using in wheat production in Turkey. TRAGEN started first time in Turkey IMI resistant wheat cultivar breeding program and first candidate cultivars were developed and tested in 2017. The study was conducted to test performance of some IMI type wheat cultivars in Trakya Region conditions in 2017-2018 growing season in Edirne and Kırklareli locations. Trakya Region exists in the main wheat producing region in Turkey after middle Anatolia. Trials were conducted with four replications at Randomized Complete Block Design (RCB). 5 candidate wheat lines and four control cultivars which are the most planted and preferred wheat cultivars by farmers and flour industry in Trakya Region as Pehlivan, Gelibolu, Esperia and Flamura-85 existed in yield trials. Based on experiment results, some IMI cultivars exhibited higher seed yield performances over control cultivars and the average of seed yield was calculated as 724 kg/da. TRAGEN-101 IMI was existed in top rank based on average seed yield and TRAGEN TRAGEN-101 IMI, 103 IMI and IMI 102 followed this candidate. The candidate also evaluated and compared with control cultivars based seed and flour quality results. As results, TRAGEN Ltd IMI wheat cultivars having promising were sent to registration trials to produce and then exist in Turkish seed market firstly.

Keywords: Wheat, Trakya Region, Herbicide Resistant, Clearfield System, IMI (Imidazolinone) herbicide, Seed yield, Yield traits

(28549) THE EVALUATION OF YIELD PERFORMANCES OF SOME BARLEY CULTIVARS IN TRAKYA REGION

Necmi Beser¹, Yalcin Kaya¹, Gizem Civi², Tugay Gumus²

¹ *Trakya University, Engineering Faculty, Genetics and Bioengineering Department, Turkey*

² *Tragen Ltd. Co, Turkey*

necmibeser@yahoo.com

Barley is the second most produced field crop other than wheat in Turkey. Barley is commonly producing for animal feed and malt production in Turkey. Barley also exists main field crop in rotations in the agriculture production both in the Trakya region and also other parts of Turkey mostly replacing wheat together with other crops such as sunflower, forage crops, etc. in drylands and corn, sugarbeet, etc. in irrigated conditions. The study was conducted to evaluate of performances of some barley cultivars in Trakya Region conditions in 2017-2018 growing season in Edirne and Kirklareli locations. Trials were conducted with four replications at Randomized Complete Block Design (RCB). The experiments were planted by planter in 10 November in 2017 and harvested by harvest combine in 13 July in 2018. Experiment was conducted with four replications at Randomized Complete Block Design (RCB). 25 kg/da N and 5 kg/da P₂O₅ fertilizer were applied from planting to spiking stage periodically. Seven candidate barley lines and five control cultivars which are the most planted and preferred barley cultivars by farmers in Trakya Region as Sladoran, Harman, Hasat, Hazar and Bolayır existed in yield trials in the study. Based on trial results, three barley cultivars exhibited higher seed yield performances over control cultivars and the average of seed yield was calculated as 575 kg/da. TRAGEN-YK4 was existed in top rank based on average seed yield as 681 kg/da and TRAGEN-YK5 and YK3 followed this candidate. The candidates also were evaluated and compared with control cultivars based seed quality results such as hectolitre weight and thousand seed weight too. As results, some TRAGEN Ltd barley cultivars had promising results and the best ones will select based on future yield trials and will send to registration trials for existing in Turkish seed market firstly.

Keywords: Barley, Trakya Region, Adaptation, Seed yield, Yield traits

**(2849) A RESEARCH ON ELECTRONIC PROPERTIES OF
TEMPERATURE SENSORS USED IN ENGINEERING**

Aydın GULLU*¹, M. Ozan AKI¹, Hilmi KUŞÇU²

¹ *Trakya University Ipsala Vocational School Electronics and Automations Department
Ipsala, Edirne, Turkey*

² *Trakya University Engineering Faculty Mechanical Engineering Department
Edirne, Turkey*

**Corresponding author's e-mail: aydingullu@trakya.edu.tr*

Temperature is one of the most followed parameters in engineering. It needs to be monitored in many control processes. Some areas where temperature information is used; Food processing, heating and cooling systems, healthcare and production processes. For this purpose, many different methods have been developed to measure the temperature. In this study, the sensors used for temperature measurement will be examined. Parameters such as measuring the working conditions of these sensors, sensitivity of response times will be discussed. Some of the classical and commonly used thermistors (NTC, PTC), RTDs (PT100), thermocouples and semiconductor LM35, DS18B20, and other electronic chips produced in recent years will be discussed and their different aspects will be emphasized. In this way, information about the choice of temperature perceptions that can be used in academic or commercial applications will be presented.

Keywords: *Temperature Sensors, PTC, NTC, IC Sensor, Thermocouple.*

(28083) EFFECTS OF ENRICHED NUTRITION WITH INORGANIC SUBSTANCE ON GALLERIA MELLONELLA HEMOCYTES AND ENCAPSULATION-MELANIZATION RESPONSE

Serhat Kaya, Bülent Gündüz

Çanakkale Onsekiz Mart University, Turkey

cyrtopodion@gmail.com

Inorganic materials are an important part of our diet. These inorganic materials (such as Fe, Mg and Se) are effective in regulating immunity. Iron ion (Fe) is effective in hemolymph showing antibacterial effect and coagulation of hemocytes and phenoloxidase activity. Magnesium (Mg) ion is known to increase phenoloxidase activity. Selenium (Se) has an effect on inflammation and immunity. In recent years, *Galleria mellonella* has been preferred as a model organism in order to observe the effects of human pathogens and the active substances against them. Insect cell mediated immune responses include encapsulation, nodulation, and phagocytosis. Humoral immune responses are antimicrobial peptides, melanization and coagulation. In our study, hemocyte count and encapsulation melanization responses were investigated in *Galleria mellonella* model fed with nutrients enriched with Fe, Mg and Se. *Galleria mellonella* last instar larvae were used for this purpose. A total of three replicates, 5 samples per repetition, were completed. Sephadex A-10 chromatography beads were injected to determine the encapsulation-melanization responses of the selected larvae and samples were dissected 4 hours after the injection (short period) and 24 hours after the injection (long period) to evaluate the cell layers around the beads. In addition, the melanization response states observed in the cell layers around the beads were evaluated to determine the immune responses. In order to observe the changes in the number of hemocytes, 4 µl of hemolymph from the wound opened in the anterior segment of the first proleg of selected larvae were taken and mixed with 36 µl of anticoagulant. 10 µl of this mixture was loaded onto a hemolymph neuber hemocytometer and examined with a phase-contrast microscope. All data obtained were evaluated with one-way analysis of variance. According to the results of this study, hemocyte amount increased at 0.25% significantly compared to the control group. The other groups showed a significant decrease compared to the control group. Weak encapsulation increased at all doses within 24 hours, while strong encapsulation response decreased compared to control. According to the results of our study, as the dosage of nutrients rich in organic matter increases, the immunity was negatively affected.

Keywords: Hemocyte, Encapsulation-Melanization, *Galleria mellonella*, Inorganic substances.

Acknowledgment

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(27805) CHARACTERIZATION OF MALIGNANT LYMPHOMAS OF A POPULATION OF WESTERN ALGERIA

Zineb Mahi, Assia Aslaou, Abdoun Sihem, Khadir Yamina

USTO-MB, Algeria

z.mahiman@gmail.com

Malignant lymphomas are malignant proliferations of B, T / NK lymphoid cells. There are two main types, Hodgkin's disease characterized by the presence of Reed-Sternberg cells and non-Hodgkin's lymphoma. These lymphomas can be ganglionic or extra-ganglionic. The present study aims to characterize 38 cases of lymphoma in a population of western Algeria through the study of records patients admitted to the Hematology Department of the University Hospital of Oran and microscopic studies. pathological, histological, and immunohistochemical. to diagnose and define the type of lymphoma. The results show that, on the one hand, the sclerodular type predominates with 80% for LMH followed by classical Hodgkin's lymphoma with mixed cellularity with 18% and finally the predominantly lymphocytic LMH with a percentage of 02%. On the other hand, the histological type of large-cell LMNH predominate with a percentage of 61%, followed by small-cell BNL (17%), T-type LMNH (13%), mantle cell lymphoma (4%), follicular lymphoma (3%) and Malt lymphoma with 02%. Male subjects seem to be most affected by LMH with 60% of cases. The same goes for the LMNH with 68.31%. As for the frequency, the age group between 21 and 40 years, has the highest frequency with 76.79% for the LMH, while for the LMNH, the peak frequency is between 61 and 80 years (45.66%). It is also noted that this cancer affects lymph nodes preferentially with 53% by contribution to other organs (47%). Furthermore, it should be noted that 24% of patients smoke, 9% consume alcoholic beverages, 5% are exposed to pesticides in the workplace, 7% have H. pylori infection, 8% have EBV, 9% by hepatitis, 12% of patients have a family history and 26% of their disease is of unknown origin.

Keywords: Cancer, Hematopathy, Immunity, Epidemiology.

(27834) THE EXPRESSION OF SOME DEHYDRIN GENES IN DROUGHT-STRESSED SUNFLOWER GENOTYPES

Maria Duca, Steliana Clapco, Angela Port, Olesea Tabara, Ana Mutu

¹ State University "Dimitrie Cantemir", Moldova

stela.clapco@gmail.com

Sunflower is one of the most important oilseed crops in the world, widely cultivated for its edible seeds and high-quality oil. In the Republic of Moldova it has consistent planting areas (around 25% of total crop area) and is the third most cultivated crop after corn and wheat. According to FAO, Moldova is ranked 15–16th in the World Sunflower Seed Producers Rating. The agricultural production is largely influenced by the negative impact of climate change, the production losses determined by extreme temperatures and hydric stress being up to 50%. Considering the fact that Moldova is a predominantly agricultural country, the damage caused by unfavourable factors is dramatic for the national economy. Thus, the development of new hybrids with increased drought tolerance is one of the main objectives of breeders. Due to the lack information related to molecular mechanisms underlying drought resistance in sunflower, present study was focused on the comparative analysis of expression profile of some dehydrin encoding genes in cotyledonary leaves, root and stem of two local sunflower hybrids selected as drought-resistant, respectively, drought-sensitive based on the germination and physiological indices assays. To induce drought stress sunflower genotypes were treated by 10% and 20% PEG 6000 solutions. Dehydrins are known to be plant proteins, which respond to stress that causes dehydration at the cellular level, such as cold or drought. They are frequently observed in crops subjected to hydric deficit. According to our results, the transcriptional activity of *Sdi-5*, *Sdi-8* and *Cor47* genes varied depending on the type of genotypes, analysed tissue, as well as PEG concentration. The gene *Cor47* transcripts displayed lower level of accumulation, comparative to *Sdi-5* and *Sdi-8* in both genotypes and in all types of tissues, being mostly down-regulated comparing to control (without PEG). In plants subjected to more severe water deficit (20% PEG6000), the *Sdi-5* gene were up-regulated in all tissues of drought-resistant genotype and, respectively, down-regulated in sensitive genotype, while in the case of moderate hydric stress it is upregulated in both hybrids. The gene *Sdi-8* exhibited similar pattern of expression (over-expression) in both genotypes, with minor exceptions. Although *Sdi-5* and *Sdi-8* belong to the same protein family, they respond differently to hydric deficit, suggesting that they may have different functions in drought resistance.

Keywords: sunflower, abiotic stress, hydric stress, drought, dehydrins

(28076) MOLECULAR SPECIES IDENTIFICATION BY DNA BARCODING IN THE GENUS *TENOTHRIPS* (THYSANOPTERA : THIRIPIDAE) IN TURKEY

İnci Sahin¹, Cengiz İkten², İrfan Tunc², Levent Unlu¹, Kambiz Minaei³

¹ *Selcuk University, Turkey*

² *Akdeniz University, Turkey*

³ *Shiraz University, Iran*

incisahin@selcuk.edu.tr

The need for expertise on systematics and faunistics of insects including Thysanoptera led to an increasing interest in their molecular identification in recent years. Molecular techniques were proven to be useful not only for basic systematic research e.g., solving problems on species complexes but also to address urgent plant protection and quarantine problems where expertise is essential for rapid and accurate species identification. DNA barcoding based on nucleotide sequencing analysis of the mitochondrial *cytochrome oxidase I (COI)* gene has become a popular technique for species identification and discrimination. The *mtCOI* sequence was shown to provide sufficient variation to be used within the genus *Tenothrips*. This study aimed to construct a molecular identification key for 3 *Tenothrips* species including *Tenothrips frici* (Uzel), *Tenothrips anatolicus* (Priesner) and *Tenothrips discolor* (Karny). Individuals were collected from Konya, Karaman and Mersin provinces of Turkey between 2015 and 2017. Here, we present *mtCOI* and *ITS* sequencing data for *T. anatolicus* and *T. discolor* for the first time. Molecular data indicate that different species in the genus *Tenothrips* are located in distinct groups in phylogenetic tree. Overall results show that molecular keys can be a useful on *Tenothrips* identification for pest management and plant quarantine purposes.

Keywords : *Tenothrips* sp., DNA barcoding, molecular identification, Turkey

(28560) IRRIGATION SCHEDULING OF COOL AND WARM SEASON TURFGRASSES IRRIGATED WITH SPRINKLER METHOD

A.H. Orta, B. Türk

Tekirdağ Namık Kemal University, Agricultural Faculty, Biosystem Engineering Department, Land and Water source Division, Tekirdağ-TURKEY

The aim of this study is to determine the irrigation scheduling of cool-season (CS) and warm-season (WS) turfgrass species under sprinkler irrigation method. Field experiments were conducted in the experimental fields of Silivri municipality in Gümüşyaka village located between boundaries of Tekirdağ and İstanbul city-TURKEY(41°03'N; 28°00'E; 46 m a.s.l.), during the summer of the 2018. In the study, three different irrigation strategies were applied on cool season and warm season turfgrass species. Experimental design was split-plots in randomized blocks design with three replications. In the experimental area, Bermudagrass (*Cynodon* spp.) was used as a warm season turf type and a four-part mixture (30% *Lolium perenne*, 25% *Festuca rubra rubra*, 35% *Festuca arundinacea* and 10% *Poa pratensis*) was used as cool season turf type. Irrigation scheduling was planned according to changes of available soil moisture level in root zone. Soil moisture was monitored via PR2 Probe and HH2 Soil Moisture Meter, which are Time Domain Reflectometry (TDR) based. Soil moisture values of 0-30 cm soil depth were used to determine the amount of irrigation water, and that of 0-60 cm soil depth were used for measuring of actual evapotranspiration. Irrigation water was applied when approximately (I30)30%, (I50)50%, and (I70)70% of readily available water at effective root zone of 30 cm until the soil moisture content reached field capacity. At the end of the study, for cool season turfgrass types; the total amount of irrigation water applied in different irrigation strategies varied between 523.5 mm – 275.3 mm, seasonal evapotranspiration values varied between 754.8 mm – 521.9 mm, and daily evapotranspiration values varied between 5.2 mm/day – 3.7 mm/day. As for warm season turfgrass types; same values varied between 423.8 mm – 186.2 mm; 590.1 mm – 521.5 mm; and 4.1 mm/day – 3.6 mm/day, respectively. The results indicated that colour, quality, fresh yield, dry matter yield, irrigation water use efficiency, water use efficiency, vegetation height and mowing were significantly different in terms of irrigation strategies for both species. When factors such as amount of irrigation water applied, cutting frequency and quality under the region's conditions are evaluated together; it is suggested to start irrigation when (CS I50) 50% of the available water in effective root zone is consumed in cool season turfgrass and when (WS I70) 70% is consumed in warm season turfgrass. At this irrigation timing, crop water stress index values before irrigation were determined as 0,52 and 0,65 for CS I50 and WS I70, respectively. When suggested irrigation strategies are compared, it can be said that warm season turfgrass demands 63% less irrigation water and consumes 28% less water than cool season turfgrass. Besides, the most suitable reference evapotranspiration estimation method under the experimental condition is Penman-FAO modification (P-FAO) and Penman-Monteith (P-M) method for cool season and warm-season turfgrass species, respectively, and crop coefficient (kc) curves are prepared for both turfgrass species.

Keywords: Landspace irrigation, turfgrass species, CWSI, irrigation method, irrigation timing

The study is summarized from MSc thesis.

(28031) COMBINED EFFECT OF THE SAMBUCUS NIGRA LECTIN (SNA) AND THE ALKYLATING COMPOUND MNNG ON MGMT GENE EXPRESSION AND VIABILITY OF HUMAN CELLS IN VITRO

Olha Akulenko¹, Valentyna Lylo², Karpova Iryna², Liubov Lukash², Galyna Ostrovska¹

¹ Kyiv National Taras Shevchenko University, Ukraine

² Institute of Molecular Biology and Genetics, NAS, Ukraine

o.a.stolyar@gmail.com

O6-methylguanine-DNA methyltransferase (MGMT) is a repair enzyme, which deletes alkyl groups from O6-position of guanine of DNA in one step. High activity of MGMT protects normal human cells from harmful influence of alkylating compounds. However, on the other hand, this leads to a powerful resistance of cancer cells to chemotherapy with alkylating agents. *MGMT* gene expression can be regulated on both genetic (mutations) and epigenetic (promoter methylation) levels. It can also be modulated by transcriptional and different exo- and endogenous factors. The alkylating agent MNNG (N-methyl-N'-nitro-N-nitrosoguanidine) is one of the specific MGMT inducers, which methylates DNA just in the O6-position of guanine. Lectins are carbohydrate binding proteins. They, including elderberry lectin - SNA, are shown to be a new tool in diagnostics and therapy of cancer (Silva M.L.S., et al, 2014). In our previous works (Karpova I.S., et al, 2015, Lylo V.V. et al, 2015), the modulating effect of *S. nigra* lectins on MGMT gene expression in mammalian cell cultures was shown. The aim of our research was to investigate the possible combined action of the MNNG and the lectin of *S. nigra* (SNA) on the *MGMT* expression and human cells viability *in vitro*. In our work we used a MGMT-expressing human cell line Hep-2 (larynx cancer). Cytotoxicity of agents was studied by MTT-assay (the method of determining the metabolic activity of cells). Cells were treated both with SNA (20 µg/ml) and MNNG (0.02/0.1/0.5 µg/ml) separately and in various combinations. Moreover, the SNA was applied both before and after treatment with the MNNG. The presence of the MGMT protein was detected by Western Blot analysis. All studied agents were shown to cause reduction of the viable cell number. The most cytotoxic effect was observed as a result of treatment with MNNG (0.02/0.1 µg/ml) and SNA (20 µg/ml). Both of compounds also demonstrated a cytotoxic effect, moreover the effect of SNA being more pronounced. It is interesting to note that increasing MNNG dose up to 0,5 µg/ml in combination with SNA, which was used first, did not led to growth of the cytotoxic effect. Without pretreatment of cells with SNA, the highest dose of MNNG together with SNA caused the most toxic effect. It allows us to assume a certain protective effect of SNA in these conditions. Western Blot analysis showed that SNA and MNNG in concentrations used caused an increase of the MGMT protein amount. The most significant effect was observed at 0.1 µg/ml of the MNNG. Combined application of the SNA and the alkylating compound MNNG also caused the MGMT induction. MGMT amount decrease was observed only in one variant – with the pre-treatment of cells with MNNG (0,5µg/ml) followed by SNA. It should be noted that SNA and MNNG individual effect was more pronounced then their combined action. The effect of SNA and MNNG separately and in their combination on the *MGMT* gene expression was shown. This effect depended on the order of treatment with compounds and their dose. Optimal conditions under which SNA demonstrated some protective effect against MNNG action were found. We suggest that both substances might have the same target – the repair enzyme MGMT.

Keywords: Repair, MGMT, Sambucus nigra lectin, MNNG, cells viability

REMOVAL OF METHYLENE BLUE DYE BY ADSORPTION ON AN ALGERIAN MONTMORILLONITE CLAY

Belal Saliha¹, Mokhtari Fatiha¹, Benaissa Kheira², Lambert Stephanie³

¹*Laboratoire des Eco-Matériaux et Nanostructurés, Faculté de Chimie, Département de Génie des Matériaux, Université des Sciences et de la Technologie d'Oran Mohamed Boudiaf, El-M'naouar, Oran, Algeria*

²*University Centre of Tamanghasset, BP 10034 Serssouf, 11000 Tamanrasset, Algeria*

³*Laboratoire de Laboratory of Chemical Engineering, Faculty of Applied Sciences, Applied Chemistry Department, University of Liège, Belgium*

saliha.belal@univ-usto.dz

The capacity of an Algerian montmorillonite clay to remove methylene blue was investigated. This research paper is articulated on the physicochemical characterization of natural clay sampled from the region of Maghnia city (Western of Algeria). Several techniques were used such as X-ray diffraction, infrared spectroscopy, and electronic scan microscopical board, in addition to the determination of some physicochemical properties as CEC and PZC. Kinetic experiments were carried out to study the effect of contact time, stirring speed initial dye concentration and adsorbent mass on the adsorption processes. This enabled us to establish a series of data with these different properties of our materials: AMN, AMN Intercalated, AMN Ca^{2+} saturated and Intercalated. The obtained adsorption isotherm indicates high affinity between the adsorbent and the adsorbate. The use of the studied Algerian montmorillonite clay may have great potential for the removal of methylene blue dye.

Keywords: Algerian montmorillonite, AMN, methylene blue, cationic dye, Ca^{2+} , adsorption, X-ray diffraction, FTIR, MEB, CEC, PZC.

(27481) INFLUENCE OF SOWING DATES ON GRAIN YIELD AND SOME CLUSTER PROPERTIES OF QUINOA (*CHENOPODIUM QUINOA* WILLD.) UNDER HARRAN PLAIN CONDITIONS

Abdullah Öktem¹, Ömer Faruk Birden¹

¹ *University of Harran, Turkey*

Aoktem@Harran.Edu.Tr

Quinoa (*Chenopodium quinoa* Willd.) is grown for its tiny edible seeds. Its seeds are high in protein and fibre. The seeds are also high in fibre and oil and are a good source of iron, magnesium, phosphorus, potassium, calcium, zinc, copper, vitamin E, and a number of antioxidants. The plants are also frost-resistant, salt-tolerant, and can be grown in poor soils. Quinoa can be used in any number of sweet or savoury dishes and is commonly boiled like rice or ground as a flour to fortify baked goods. In recently, quinoa growing and consumption are increasing day by day in the world. This study was aimed to determine different sowing dates on the grain yield and some cluster and kernel properties of Quinoa under Harran Plain Conditions. Research was conducted according to randomized complete blocks design with three replicates in Harran plain conditions in 2016, Sanliurfa, Turkey. Q-52 Quinoa (*Chenopodium quinoa* Willd.) variety was used as plant material. In the study 9 different sowing dates were used such as 15 February, 1 March, 15 March, 1 April, 15 April, 1 May, 15 May, 1 June and 15 June. As a result of the research; statistically significant differences were seen between sowing dates at tested characteristics ($P \leq 0.01$). Cluster number of plant ranged from 10.3 to 16.0 numbers, branches number of main clusters from 18.0 to 32.3 numbers and main cluster length from 31.6 to 46.2 cm. Thousand kernel weights were between 2.325 g. and 2.426 g, hectolitre weight between 69.17 and 69.83 kg/hl and grain yield 168.0 kg/da and 226.8 kg/da. It was seen that tested characteristics generally increased from 15 February to 1 April sowing dates, but after 1 April sowing dates decreased. The highest grain yield was obtained from 1 April sowing date with 226.8 kg/da whereas the lowest grain yield was seen at June 15 sowing date with 168.8 kg/da.

Keywords: Quinoa, Sowing dates, grain yield, Harran Plain

28540) MORPHOLOGICAL CHARACTERIZATION OF NETTLE LINES COLLECTED IN THE BLACK SEA REGION

Hatice Bilgin ¹, Rıza Paşlı ¹, Ali Kemal Ayan ², Selim Aytaç ¹, Mustafa Acar ³

¹ *Ondokuzmayıs University, Samsun, Turkey*

² *High School of Professional of Bafra, Samsun, Turkey*

³ *Black Sea Agricultural Research Institute, Samsun, Turkey*

akayan@omu.edu.tr

Stinging nettle (*Urtica dioica*), which is widely distributed in the world, is used as food, fiber, dye, medicine and cosmetics. Nettle has a history of thousands of years as a fiber plant. Although nettle work in Europe started in the first half of the 20th century, the methods of processing nettle fiber and the possibilities of using the obtained fiber in the textile industry have been concentrated in Germany, Austria and Finland since the mid-1990s. Stinging nettle is widespread in our country and especially in Black Sea region. The aim of this study was to determine the fiber properties of nettle genotypes collected from different provinces in the Black Sea region. Morphological characteristics of nettle genotypes collected from 15 different provinces in the Black Sea region such as plant height, stem thickness, etc. were investigated. The highest average plant height was found in the genotype collected from Ordu province with 131.4 cm and the lowest plant height was found in the genotype collected from Artvin province with 83.4 cm.

Keywords: Stinging nettle, Morphological characteristics, Black sea

**(28541) DEPRESSION DETERMINED IN CONFECTIONARY
SUNFLOWER PLANTS IN PROGRESSIVE SELFING-GENERATIONS**

Selim Aytac¹, ıgdem Yięen², Derya Aksoy¹

¹ *Ondokuzmayis University, Samsun, Turkey*

² *Black Sea Agricultural Research Institute, Samsun, Turkey*

selim@omu.edu.tr

Sunflower (*Helianthus annuus L.*) is cultivated in many countries of the world due to its high adaptability and is being used for various purposes. It is primarily produced for sunflower, confectionery, ornamental plant, fodder, and other purposes for agriculture in order to obtain oil. As a confectionery production and consumption have an economy that can not be underestimated. In this respect, there is a need to develop varieties of confectionery sunflower. Approximately for 11 years, 36 lines have been selected by single plant selection and have the ability to be combined with each other. In the study, promising lines in the four year of the self-fertilization phase were used. In each line, 10 plants were isolated before flowering and prevented from taking pollen from the outside. Results of the study were shared in 2018. Characteristics discussed: self-fertilization rate, plant height, disc shape, full achene, empty achene, achene length and achene width. Significant changes were observed in the plant height and table size in the lines due to depression of the self-fertilization. In addition, deformations were detected in the shape of disc. An increase in the rate of full achene in the subsequent selfing generations has been observed as a positive development in some lines.

Keywords: Sunflower, selfing, breeding, confectionery, selection.

(28542) MORPHOLOGICAL CHARACTERISTICS OF TURKEY HEMP

Selim Aytac¹, Merve Gün¹, Ali Kemal Ayan², Şahane Funda Arslanoğlu¹, Şahin Gizlenci³

¹ *Ondokuzmayıs University, Samsun, Turkey*

² *High School of Professional of Bafra, Samsun, Turkey*

³ *Black Sea Agricultural Research Institute Samsun, Turkey*

selim@omu.edu.tr

Hemp is a plant cultivated since ancient times made in Turkey. The hemp produced in Turkey; rope, tether, carpet warp yarn, waterproofing of metal pipes at the joints, paper production and in some regions was used for knitting local clothing (Foretiko and Rize Bezi). After 1960, cultivation areas started to decrease. In particular, this decrease, which was caused by the cheaper synthetic products and the replacement of synthetic products with natural products, continued until 2013. the formation of consumer consciousness, and begin to turn to natural products in Turkey after 2013, hemp cultivation areas have started to rise again. Although not a registered varieties of hemp genotypes in Turkey is rich. Breeding studies for variety registration started in 2014 in Turkey. In this subcription, the data determined within the scope of breeding studies will be shared. In this study, 43 local lines and 3 varieties (USO-31, Santhica-27 and Ferimon-12) which were registered in Europe were used. The data are from 2018 year. According to the results obtained; Plant height; ranged from 59.90 to 296.60 cm, 1000 seed weight ranged from 11.68 to 22.48 grams, female plants flowering time ranged from 45 to 118 days, male plants flowering time ranged from 37 to 101 days and 1000-grain weight ranged from 11.68 to 22.48 grams. As a result; Turkey hemp genotypes are different from each other morphologically.

Keywords: Hemp, morphological, breeding, register

PARTICIPANT LIST

#	Name	E – mail	Country
1	Ermelinda Gjeta	ermelindagjeta@live.com	Albania
2	Jerina Kolutari	j.kolutari@gmail.com	Albania
3	Ahmed Boukeloua	ahmedcte@yahoo.fr	Algeria
4	Aichour Ridha	ridha_aichour@yahoo.ca	Algeria
5	Azi Mouna	azimouna1982@gmail.com	Algeria
6	Azi Mouna	azimouna@gmail.com	Algeria
7	Bachra Khettal	bachra_khettal@yahoo.fr	Algeria
8	Badis Abdelmalek	badisabdelmalek@yahoo.fr	Algeria
9	Baya Khouloud G. Nabila	kholood_alg@yahoo.com	Algeria
10	Belal Benaissa	benaisa.nawel1987@gmail.com	Algeria
11	Belal Saliha	saliha.belal@univ-usto.dz	Algeria
12	Benkenana Naima	benkenana@yahoo.co.nz	Algeria
13	Bouatrous Yamina	bouatrousyamina@yahoo.fr	Algeria
14	Chebouti-Meziou Nadjiba	chnadjiba@yahoo.fr	Algeria
15	Diaf Mustapha	diafmustapha@gmail.com	Algeria
16	Labdelli Amina	aminalabdelli@yahoo.fr	Algeria
17	Mahi Zineb	z.mahiman@gmail.com	Algeria
18	Miloud Hafsi	hafsimiloud@gmail.com	Algeria
19	Ouardia Ouldali Ouldali	ouuldali@yahoo.fr	Algeria
20	Sihem Ait Atmane	sihemaitatmane@yahoo.com	Algeria
21	Tabet Derraz Souhila	sous.tabet95@gmail.com	Algeria
22	Tebboune Leyla	w.djohra@gmail.com	Algeria
23	Aygun Aliyeva	aygunphd@gmail.com	Azerbaijan
24	Cingiz Aliyev	metanetpenahova20@gmail.com	Azerbaijan
25	M. Abul Kalam Azad	makazad.pdbbina@gmail.com	Bangladesh
26	Lena Ramanishka	lenaramanishko@mail.ru	Belarus
27	Aminath F. Yacoubou	afy@anadolu.edu.tr	Benin
28	Krsto Mijanović	krsto.mijanovic@unmo.ba	Bosnia & Herzegovina
29	Marlise Dos Santos	marliseas@hotmail.com	Brazil
30	Anyo Mitkov	anyomitkov@abv.bg	Bulgaria
31	Daniela Valkova	valkova_d@abv.bg	Bulgaria
32	Mariyan Yanev	marlanski@abv.bg	Bulgaria
33	Nesho Neshev	n_neshev85@abv.bg	Bulgaria
34	Nina Nenova	nina_n13@abv.bg	Bulgaria
35	Tonyo Tonev	tonytonev@abv.bg	Bulgaria
36	Drabo M. Soungalo	mousyoung@gmail.com	Burkina Faso
37	Abdeljalil Metioui	metioui.abdeljalil@uqam.ca	Canada
38	Zeeshan Ahmad	zeeshanagronomist@yahoo.com	China
39	Niangaly Djeneba	dniangaly@yahoo.fr	Cote D'ivoire
40	Khaked Elgendy	elgendykh64@gmail.com	Egypt
41	Birhanu Gameda Gato	birhanubio@hotmail.com	Ethiopia
42	Shri Mohan Jain	jain.mohan70@gmail.com	Finland

43	Cherrad Semcheddine	shemsad@hotmail.com	France
44	Kakha Nadiradze	knadirad@gmail.com	Georgia
45	Ralf Hofestadt	ralf.hofestaedt@uni-bielefeld.de	Germany
46	Ioannis Tokatlidis	itokatl@agro.duth.gr	Greece
47	Mahendra Singh Pal	drmspal1@gmail.com	India
48	Bagas Zaki Muhammad	bagaszakim@gmail.com	Indonesia
49	Zaki Muhammad Bagas	bagaszakim@gmail.com	Indonesia
50	Abdulbasit Aljanabi	abd_lbasit@yahoo.com	Iraq
51	Maha Hasan	dr_maha2008@yahoo.com	Iraq
52	Thikra Hasan	thikra_appleid@yahoo.com	Iraq
53	Fabio Catalano	fabio.catalano@ipsp.cnr.it	Italy
54	Nicola Sasanelli	nicola.sasanelli@ipsp.cnr.it	Italy
55	Trifone D'addabbo	trifone.daddabbo@ipsp.cnr.it	Italy
56	Malika Shamekova	shamekov@gmail.com	Kazakhstan
57	Myung-Chul Lee	mcleekor@korea.kr	Korea Republic
58	Vija Strazdina	vija.strazdina@arei.lv	Latvia
59	Igor Iljovski	iljovski2@yahoo.com	Macedonia
60	Ile Canev	icanev@gmail.com	Macedonia
61	Romina Kabranova	rkabranova@yahoo.co.uk	Macedonia
62	Zoran Dimov	dimov632002@yahoo.co.uk	Macedonia
63	Abdelghani Nabloussi	abdelghani.nabloussi@gmail.com	Morocco
64	Abderrazzak Bendidi	abendidi1@yahoo.fr	Morocco
65	Hafid Ibriz	ibrizhafid@yahoo.fr	Morocco
66	Mohamed Fechtali	fechtali.mohamed@gmail.com	Morocco
67	Benson Apuyor	fitzapuyor@yahoo.com	Nigeria
68	Chigozirim Onwusiribe	ndubuisichigo@gmail.com	Nigeria
69	Dickson Junior Nwosu	dicksonnwosu@gmail.com	Nigeria
70	Emmanuel Okoronkwo	emmanuelokoronkwo0@gmail.com	Nigeria
71	Iwoh Ekerette	okoronkwoemma@rocketmail.com	Nigeria
72	Jude Mbanasor	judembanasor@gmail.com	Nigeria
73	Mayowa Olubiyi	mayoraph@yahoo.com	Nigeria
74	Michael Adedotun Oke	maof2020@gmail.com	Nigeria
75	Sunday Aladele	saladele6083@gmail.com	Nigeria
76	Vincent Eze	mekus2020@gmail.com	Nigeria
77	Ahmad Shoeb Tahir Mr	astahir@gmail.com	Pakistan
78	Ali Liaqat	phlaid@liaqatcorp.com	Pakistan
79	Ali Nawaz	alinawazgcu@yahoo.com	Pakistan
80	Asghar Ali	asgharali_phb@pakhibred.com	Pakistan
81	Ejaz Waraich	uaf_ewarraich@yahoo.com	Pakistan
82	Fayyaz Ahmad Mr	fayyazro@yahoo.com	Pakistan
83	Fozia Abasi	abasifozia@gmail.com	Pakistan
84	Hafeez Ahmad Sadaqat	drhafeezsadaqat@yahoo.com	Pakistan
85	Hamid Mukhtar	hamidwaseer@yahoo.com	Pakistan
86	Hina Saleem Saleem	hinah3099@gmail.com	Pakistan
87	Humera Razzaq	humerarazzaq@gmail.com	Pakistan

88	Ikram Haq	dr.ikramulhaq@gcu.edu.pk	Pakistan
89	Jam Nazeer Ahmad	jamnazireeahmd@yahoo.com	Pakistan
90	Kanita Shah	alinawazgcu@gmail.com	Pakistan
91	Mahmood Ul Hassan	mhj407jb@yahoo.com	Pakistan
92	Mubasher Ahmad Malik	ahmadmubasher49@gmail.com	Pakistan
93	Muhammad Bilal	bilaladams@gmail.com	Pakistan
94	Muhammad H. N. Tahir	hammad.nadeem@mnsuam.edu.pk	Pakistan
95	Muhammad Saeed Rauf	saeedbreeder@yahoo.com	Pakistan
96	Nasir Ali Tauqir	tauqir041@hotmail.com	Pakistan
97	Rashid Ahmad	uaf_rashid@yahoo.com	Pakistan
98	Samina Jam Nazeer Ahmad	saminatmalik@yahoo.com	Pakistan
99	Sanam Bashir Khan	seenasweet89@hotmail.com	Pakistan
100	Uzma Ayaz Khan	uzma_ayaz89@hotmail.com	Pakistan
101	Zahoor Ahmad	zahoorbhp@yhao.com	Pakistan
102	Zahra Mubeen	mubeenzahra77@gmail.com	Pakistan
	Danuta Kurasiak-	danuta.kurasiak-	
103	Popowska	popowska@up.poznan.pl	Poland
104	Kinga Stuper-Szablewska	kinga.stuper@up.poznan.pl	Poland
105	Tomasz Wolak	twolak@steqtech.com	Poland
106	Enascuta Cristina	cristina.enascuta@gmail.com	Romania
107	Epure Doru-Gabriel	doru.epure@probstdorfer.ro	Romania
108	Gidea Mihai	gideam@yahoo.com	Romania
109	Niculescu Mihaela	mihaelaniculescu59@yahoo.com	Romania
110	Oprescu Elena-Emilia	oprescuemilia@gmail.com	Romania
111	Nina Konkova	ninakonkova.1@mail.ru	Russian Federation
112	Victor Deineka	deineka@bsu.edu.ru	Russian Federation
113	Elena Hájeková	elena.hajekova@stuba.sk	Slovakia
114	Katarína Matúšková	katarina.matuskova@nppc.sk	Slovakia
115	Ľudmila Joríková	ludmila.jorikova@vurup.sk	Slovakia
116	Peter Hozlar	peter.hozlar@nppc.sk	Slovakia
117	Petra Ondrejčíková	ondrejickova@enviengroup.eu	Slovakia
118	Lucia Gãmez-Limia	lugomez@uvigo.es	Spain
119	Manuel Falcon	m.falconmartin@strube-research.net	Spain
120	Miriam R. González	miriamrodrizg@gmail.com	Spain
121	Mohammad H. Alanbari	alanbari@universidadeuropea.es	Spain
122	Sidonia Martinez Suárez	sidonia@uvigo.es	Spain
123	Prabhakaran Mahalingam	aenpraba@gmail.com	Sri Lanka
124	A. A. Adam Mohammed	amirchem22@gmail.com	Sudan
125	Aisha Modawi	aiosha25@gmail.com	Sudan
126	Awatif Siribel	siribelawatif@yahoo.com	Sudan
127	Babiker M. Osman	amiradam2@gmail.com	Sudan
128	Elfadl Elmogtaba	elmogtaba@yahoo.com	Sudan
129	Ismail Hussein	sunnopri@gmail.com	Sudan
130	Louai A. Mohammed	aburetaj22@gmail.com	Sudan

131	Nada Hamza	nada.hamza@gmail.com	Sudan
132	Yasmin Aburgal	aburigalyasmin@gmail.com	Sudan
133	Mahaba Ghannam	mahaba.2022@gmai.com	Syrian Arab Republic
134	Thada Amsungnoen	t.d.thada@gmail.com	Thailand
135	Krouma Abdelmajid	abdelmajid.krouma@gmail.com	Tunisia
136	Abdulhabip Ozel	hozel@harran.edu.tr	Turkey
137	Abdulhalim Orta	horta@nku.edu.tr	Turkey
138	Ahmet Cat	ahmetcat@akdeniz.edu.tr	Turkey
139	Ahmet Korhan Sahar	ahmetkorhan.sahar@tarimorman.gov.tr	Turkey
140	Ahmet Yilmaz	ahyil42@hotmail.com	Turkey
141	Ali Kahraman	kahramanali@selcuk.edu.tr	Turkey
142	Ali Kemal Ayan	akayan@omu.edu.tr	Turkey
143	Aydın Güllü	aydingullu@trakya.edu.tr	Turkey
144	Aygun Dayan	adayan@cu.edu.tr	Turkey
145	Aziz Tekin	tekin@ankara.edu.tr	Turkey
146	Begum Kaya	begumkaya22@gmail.com	Turkey
147	Bengu Ozturk	benguozturk@gmail.com	Turkey
148	Bihter Onat	bzaimoglu@cu.edu.tr	Turkey
149	Bulent Cengiz	bulent.cengiz@tarimorman.gov.tr	Turkey
150	Bulent Uzun	bulentuzun@akdeniz.edu.tr	Turkey
151	Cemal Kasnak	ckasnak@gmail.com	Turkey
152	Elif Taban	eliffataban@gmail.com	Turkey
153	Emrah Akpınar	emrah.akpinar00@gmail.com	Turkey
154	Erdal Arik	erdal@tnhturizm.com	Turkey
155	Fulya Dilek Gokalp	fulyadilek@trakya.edu.tr	Turkey
156	Gokhan Sadi	sadi@kmu.edu.tr	Turkey
157	Hakan Yavas	hakan.yavas@tarim.gov.tr	Turkey
158	Halil Bakal	hbakal@cu.edu.tr	Turkey
159	Halis Arioglu	harioglu@cu.edu.tr	Turkey
160	Hamit Ayanoglu	hamitayanoglu@tsuab.org.tr	Turkey
161	Hasan Vural	hvural@uludag.edu.tr	Turkey
162	Hayati Arda	harda@trakya.edu.tr	Turkey
163	Hicret Asli Yalcin	hicret.yalcin@jic.ac.uk	Turkey
164	Irfan Ozturk	irfanozturk62@hotmail.com	Turkey
165	Kemal Özçelik	kemal@tnhturizm.com	Turkey
166	Leyla Gulluoglu	gulluoglu@cu.edu.tr	Turkey
167	Mehmet Cavit Sezer	mehmetcavit.sezer@tarimorman.gov.tr	Turkey
168	Mehmet Karakus	mehmet.karakus@tarimorman.gov.tr	Turkey
169	Meltem Posta	meltem-posta@hotmail.com	Turkey
170	Metin Yurdagul	metin.yurdagul@mumsad.org.tr	Turkey
171	Mitat Aydoğdu	maydogdu75@hotmail.com	Turkey
172	Muhammad Aasim	mshazim@gmail.com	Turkey
173	Mursel Catal	mcatal@akdeniz.edu.tr	Turkey
174	Mustafa Onder	monder@selcuk.edu.tr	Turkey
175	Muzaffer Isik	muzafferisik@bisab.org.tr	Turkey

176	Nehir Ozdemir Ozgenturk	nehirozdemir@yahoo.com	Turkey
177	Nesrin Aktepe Tangu	nesrinaktepetangu@tarim.gov.tr	Turkey
178	Nilgun Bayraktar	nbayrak@agri.ankara.edu.tr	Turkey
179	Niyazi Akarken	niyazi.akarken@tarimorman.gov.tr	Turkey
180	Osman Bariş Kilinc	osman@bisab.org.tr	Turkey
181	Pelin Gunc Ergonul	pelin.ergonul@cbu.edu.tr	Turkey
182	Pinar Cubukcu	pcubukcu@hotmail.com	Turkey
183	Rahime Cengiz	rcengiz24@gmail.com	Turkey
184	Recep Palamutoglu	receppalamutoglu@hotmail.com	Turkey
185	Rustem Ustun	rustemustun@akdeniz.edu.tr	Turkey
186	Selim Aytaç	selim@omu.edu.tr	Turkey
187	Serpil Onder	sonder@selcuk.edu.tr	Turkey
188	Sibel Day	day@ankara.edu.tr	Turkey
189	Turkan Mutlu Keceli	turkankecelimutlu@gmail.com	Turkey
190	Umran Akgun Yildirim	umran_akgun@hotmail.com	Turkey
191	Utku Guner	uguner@trakya.edu.tr	Turkey
192	Yalcin Kaya	yalcinkaya22@gmail.com	Turkey
193	Yasemin Vurarak	yasemin.vurarak@tarimorman.gov.tr	Turkey
194	Yasin Ozdemir	gidaciyasin@hotmail.com	Turkey
195	Yasin Ozgen	yozen@ankara.edu.tr	Turkey
196	Yavuz Agi	yavuz.agi@tarimorman.gov.tr	Turkey
197	Yildiray Gencer	y.gencer@metgen.com.tr	Turkey
198	Zeynep Aksoylu Ozbek	zeynepaksoylu@hotmail.com	Turkey
199	Zinnur Gozubuyuk	zgozubuyuk2001@yahoo.com	Turkey
200	Andriy Pushak	apushak@gmail.com	Ukraine
201	Dariia Yefanova	efanova.dasha1998@gmail.com	Ukraine
202	Ihor Yatsiv	igyatsiv@ukr.net	Ukraine
203	Iryna M. Ivashkiv	i.ivach@ukr.net	Ukraine
204	Ivanna Sholonkevych	instapv@i.ua	Ukraine
205	Maryana Kohut	maryana_kohut@i.ua	Ukraine
206	Mykola Mykytyn	tara_ram@ukr.net	Ukraine
207	Nataliia Volkova	natavolki@ukr.net	Ukraine
208	Oleg Sukach	19oleg85@ukr.net	Ukraine
209	Oleksandr Drozd	linumrape@gmail.com	Ukraine
210	Oleksandra Volchovska-Kozak	inst@pu.if.ua	Ukraine
211	Roman Shevchuk	rshevchook@i.ua	Ukraine
212	Stepan Myagkota	smyagkota@gmail.com	Ukraine
213	Svitlana Hrynkevych	lidervit@gmail.com	Ukraine
214	Tetiana Kyrpa-Nesmiian	t-kirpa@ukr.net	Ukraine
215	Viktor Ivaniuk	ivanukv@gmail.com	Ukraine
216	Volodymyr Paslavskiy	paslavskiyv@i.ua	Ukraine
217	Yaroslav Blume	cellbio@cellbio.freenet.viaduk.net	Ukraine
218	Yevhen Kalishyn	kalishyn.yevhen@gmail.com	Ukraine

219	Yevhenii Zaika	za-ika@ukr.net	Ukraine
220	Christopher Ridout	christopher.ridout@jic.ac.uk	United Kingdom
221	Rachel Wells	rachel.wells@jic.ac.uk	United Kingdom
222	Ricardo H. R. Gonzalez	ricardo.ramirez-gonzalez@jic.ac.uk	United Kingdom
223	Bianca Ortega	missybiancas@icloud.com	United States
224	Nurhan Dunford	nurhan.dunford@okstate.edu	United States

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