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## PREFACE

This abstract book includes all the abstracts of the papers presented at the *3<sup>rd</sup> Annual International Symposium on Agricultural Research, 15-18 July, 2010*, sponsored by the Environment and Agriculture Research Unit of the Athens Institute for Education and Research (AT.IN.E.R.). In total there were 61 papers and 64 presenters, coming from 23 different countries (Australia, Brazil, Canada, Czech Republic, Egypt, France, Georgia, Germany, Iran, Iraq, Israel, Italy, Jordan, Latvia, Mexico, Poland, South Africa, Taiwan, Thailand, The Netherlands, Turkey, UK and USA). The conference was organized into 17 sessions that included areas such as Issues and Policy, Crops, Microbiology and Entomology, Insects, Bacteria and Behavior, Animal Studies, Waste Management and Biomass, Soils e.t.c. As it is the publication policy of the Institute, the papers presented in this conference will be considered for publication in one of the books of ATINER.

The Institute was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world could meet in Athens and exchange ideas on their research and consider the future developments of their fields of study. Our mission is to make ATHENS a place where academics and researchers from all over the world meet to discuss the developments of their discipline and present their work. To serve this purpose, conferences are organized along the lines of well established and well defined scientific disciplines. In addition, interdisciplinary conferences are also organized because they serve the mission statement of the Institute. Since 1995, ATINER has organized close to 150 annual international conferences and has published over 100 books. Academically, the Institute is organized into four research divisions and

nineteen research units. Each research unit organizes at least one annual conference and undertakes various small and large research projects.

I would like to thank all the participants, the members of the organizing and academic committee and most importantly the administration staff of ATINER for putting this conference together.

Gregory T. Papanikos  
Director



## **Detection of Adulteration and Identification of Cat's, Dog's, Donkey's and Horse's Meat Using Species-Specific PCR and PCR-RFLP Techniques**

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PCR and PCR-RFLP methods for identification of cat's, dog's, donkey's and horse's meat were developed. DNA from a very small amount of muscles (0.05 g) was extracted to amplify species-specific DNA sequences in cat, dog and horse, in addition to mitochondrial DNA segment (*cytochrome-b* gene) in both donkey and horse. PCR product size of the species-specific region was 672-, 808- and 221-bp in cat, dog and horse, respectively. Using the same horse-specific primer, the same PCR amplification size (221-bp) in donkey was obtained. For discrimination between donkey's and horse's meat, the mitochondrial DNA segment (*cytochrome-b* gene) was amplified. Restriction analysis of PCR-RFLP of the mitochondrial *cytochrome-b* segment (359- bp) showed difference between donkey's and horse's meat. Where, restriction enzyme *AluI* yielded three fragments in horse's meat; 189-, 96- and 74-bp, whereas no fragments were obtained in donkey's meat. The use of these species-specific primers allowed a direct and rapid identification and detection of adulteration of cat's, dog's, donkey's and horse's meat even after homogenizing.

## **Histopathological Study of *Calotropis Procera* on Male Albino Rat**

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**Ghallab A.M.A.**

Professor, South Valey University, Egypt

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**Shehata A.**

Professor, Assiut University, Egypt

A total number of 201 male albino rats were used for toxicological investigation. One hundred thirty six (136) rats were used for determination of LD<sub>50</sub> of *CP* crude latex. Sixty five (65) rats were exposed to one tenth LD<sub>50</sub> of *CP* crude latex day by day for 12 weeks (long-term toxicity). Clinical signs, post-mortem lesions, and histopathological examination were made.

The oral mean lethal dose (LD<sub>50</sub>) of *CP* crude latex in male albino rats was 4232.9 mg/kg, which indicates that *CP* crude latex is moderately toxic and can be used as a therapeutic agent with certain precautions.

The histopathological examination of the stomach revealed severe necrosis of the mucosal epithelium. Interstitial hemorrhage and oedema were evident in the heart in acute phase, as a result of *CP* crude latex effect on vascular permeability. Moreover saccular aneurysm in the large blood vessels in the atrium of heart was reported. The kidney was the most affected organ with a variety of changes in both acute and long-term exposure. The testicular tissue showed absence of spermatogenic cell layers and testicular atrophy. These acute changes will be compared with the long term toxicity. In conclusion, *calotropis procera* crude latex is moderately toxic; in large doses has hazardous local and remote toxic effects in different body organs.

# **Effect of Zinc Fertilizer Applications on Yield, Leaf Chlorophyll Concentration, Grain Zinc, Nitrogen, and Phosphorus Contents of Some Registered Chickpeas Varieties**

**Aysen Akay**

Associate Professor, Selcuk University, Turkey

Chickpea (*Cicer arietinum L.*) is an important pulse crop due to its protein content and wide adaptability as a food grain. Besides being an important source of human and animal food, chickpea also plays an important role in the maintenance of soil fertility, particularly in the dry areas. In Turkey, chickpea rotates with cereals. Chickpea varieties differ in their response to nutrient element uptake under water stress.

In this study, the effect of zinc fertilizer applications on different chickpeas varieties and the most suitable zinc application dose were investigated under the field conditions in May-September of 2003 and 2004. Experiments were conducted in split plot design in Konya-Turkey. Three types of chickpeas Canitez-87, ILC-482 and Gokce were employed under watery conditions. Zinc was applied to the soil at four doses 0-0.5-1.0-1.5 kg Zn da<sup>-1</sup> before sowing. During the experiment leaf samples were regularly collected every week to determine the chlorophyll content of fresh leaf tissue three weeks after planting. The changes in the content of total chlorophyll were followed. Chickpea samples of each varieties were harvested mainly taking into account maturation periods. Leaf chlorophyll concentration, grain phytic acid, zinc, nitrogen and phosphorus contents were determined in chickpea varieties.

According to correlation test results, there were significant ( $P>0.05$ ) differences among described criteria. Particularly, significant correlations between phosphorus content in grain and grain yield; phytic acid and grain yield; phytic acid and grain Zn content were outstanding; and correlation between phytic acid and total chlorophyll content of leaves collected in different periods was also important in both years.

## **Response of *Thymus Vulgaris* L. to Plant Population Density**

**Ezz Al-Dein Al-Ramamneh**

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*Thymus vulgaris* L., also known as common thyme, is native to the Mediterranean region. The dried herb and extracts of thyme plants has shown high economical value due to its flavoring agents and various medicinal properties. For this reason, thyme is commercially cultivated nowadays in many countries. It has been known that agronomical factors have a great effect on the growth and herbage biomass of thyme plants. Therefore, a study has been conducted in 2007 in the research farm of Shoubak University College in the southern part of Jordan. The experiment was a split plot in randomized complete block design with four replicates. Thyme was cultivated in rows 1.70 m apart with intra-row spacing of 15, 30 or 45 cm. Plants were harvested in the vegetative, beginning of blooming, full blooming and fruit set stages. In order to study the effects of planting space and harvesting time, plant height, canopy diameter, fresh and dry weight of shoots, number of long and short shoots, number of leaves produced by each of long and short shoots, specific leaf area and root depth were measured. Apart from the experiment in 2007, measurements were taken on the 15<sup>th</sup> of November in 2008 irrespective of harvesting stage and treated as an independent experiment. Harvesting time significantly ( $P < 0.01$ ) affected all components of plant growth in 2007. On the contrary, the effects of planting space were not significant for all the parameters measured in 2007. With the exception of fresh and dry weight of roots, fresh and dry weight of short shoots, number of short shoots and number of leaves produced on short shoots, spacing significantly affected plant growth in 2008 experiment. The maximum yield of fresh and dry weight of thyme shoots in 2007 experiment was obtained in 15 cm planting space and at the fruit set stage. Likewise, the highest dry weight of shoots, herbage fresh and dry weight in 2008 experiment resulted by 15 cm intra-row spacing. Plants grown in closer spacing resulted in significantly taller plants due to possible competition for sunlight. These plants also exhibited higher shoot:root ratio compared to plants in wider spacing. Plants, therefore, grown using 15 cm intra-row spacing had a better use of light and accumulated more biomass. The decrease in specific leaf area between vegetative and full bloom stage in 2007 experiment indicated that leaves became thicker as an adaptive mechanism to the surrounding environment.

# **The Determination of the Alteration of Vineyard Tekirdağ and Evaluation of Topographically Appropriate Vineyard Areas in Tekirdağ - Şarköy District by Geographic Information Systems (GIS)**

**Selcuk Albut**

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The evaluation of the alteration in vineyards of Tekirdağ in recent decade and determination of the eligible vineyards according to topographic and climatic requirements of Şarköy district was aimed at this Project. Satellite images of Landsat 7 TM taken in 2000 and ASTER and Quickbird in 2008 were used and the coordinates of existing vineyards was assessed using Crescent A100 DGPS. Vineyard area was arranged in 2000 as 22 676,5 da and in 2008 as 24 863,35 da. Topographic character of Şarköy was defined through analyse of 2 ASTER satellite images taken in 2008 and numeric maps of the region scaling 1/25000 was also used. These images were transferred to computer with ERDAS Imagine Professional 9.1 program and numeric analyses were obtained using ArcGIS software. Thus economically valuable new varieties could be added. The slope rates were evaluated due to size, and these values were respectively between %0-%5 136,51 km<sup>2</sup> and larger than %30 309,29 km<sup>2</sup>. According to aspect analysis it was seen that directions sided through south, southeast, southwest covered %34 of the total area.

# **Evaluating the Likelihood of the Adoption of the Welfare Quality Assessment System for Farm Livestock**

**Lusine Aramyan**

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**Paul Ingenbleek**

Wageningen University, The Netherlands

**Ge Backus**

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**Kees de Roest**

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**Richard Tranter**

Wageningen University, The Netherlands

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Over the past four years a large number of scientists from over 40 institutes from more than 16 countries worked on the Welfare Quality® project which aims to accommodate societal concerns and market demands to improve animal welfare by developing reliable on-farm monitoring systems, product information systems, and practical species-specific strategies. The WQ system is probably the most scientifically underpinned Animal Welfare Assessment system in the world. It puts natural behaviour of animal more centrally (as compared to space and system measures). Currently this system has been developed and is ready to be adopted. Therefore, the main objective of this study is to examine the question “what is the likelihood that organizations that offer and set standards to farmers will adopt the WQ system?”. Literature study revealed that the decisions of retailers/processors in combination with Standards formulating organizations (SFOs) drive the adoption of the WQ system by farmers, thus empirical studies focus on retailers/processors and SFOs.

This research consists of two main studies. In Study 1, interviews were carried out with international retailers and processors involved in processing and/or selling pig meat, chicken meat and/or hen eggs in different EU countries. The main objective of this study was to find out the perceptions towards acceptability and adoption possibilities of the WQ system by retailers and processors. In Study 2, a conjoint analysis was designed to evaluate the perceived adoption likelihood of the WQ system by different SFOs in three sectors (pigs, laying hens and broilers) in several EU countries

The overall results show that the presence of a legitimate third party organization that supports the implementation process of the WQ assessment system has a stronger influence on the decision whether or not to adopt the WQ scheme than societal pressure, the absence of additional costs, and freedom with respect to the formulation of norms. A third party organization also increases the probability on adoption for those SFOs that are still uncertain whether they will adopt the system. The findings

also shine a different light on the discussion with regards to costs of animal welfare measurement. Concerns with regard to measurement costs may at least partially be explained by a lack of overall clarity on the costs and benefits of the system.

# **The Evaluation of Oxidative Stress in Lambs with Border Disease**

**Oznur Aslan**

Assistant Professor, Erciyes University, Turkey

**Ayse Gencay**

Assistant Professor, Erciyes University, Turkey

This study was performed to evaluate the plasma malondialdehyde (MDA) level, and erythrocyte glutathione peroxidase (GSH-Px), catalase (CAT) and superoxide dismutase (SOD) activities in lambs with Border Disease.

In this study, 60 lambs, aged between 2,5-3months were used. Following virological and clinical examinations, Group 1 (20 animals) served as noninfective controls and Group 2 (40 animals) served as infected with border disease. The samples of the blood and faeces, from the lambs were examined by reverse transcriptase-polymerase chain reaction (RT-PCR) test using pan-pestivirus primers. At the end of the test, the disease was detected as border disease by amplification of a specific DNA.

Blood samples from the lambs were collected for determination of plasma MDA level, and erythrocyte GSH-Px, CAT and SOD activities. Plasma MDA level was significantly higher in the lambs with border disease compared to controls ( $p<0.05$ ). However, the erythrocyte SOD, CAT and GSH-Px activities in the lambs with border disease was significantly lower ( $p<0.05$ ) than that of the controls.

In conclusion, the determination of increasing in plasma MDA levels and decreasing in erythrocytes CAT, SOD and GSH-Px activities in the infected lambs suggested that border disease caused to oxidative stress. This indicated that the equilibrium between oxidants and antioxidants impaired in favour of oxidants in the lambs with border disease.



# **Ecophysiological and Growth Traits Explain the Success of Two Invasive Woody Species in the Semi-Arid Grasslands of Nebraska, USA**

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**Bihmidine Saadia**

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Changes in climate, land management, atmospheric nitrogen deposition, and fire regime have contributed to woody species expansion into grasslands and savannas worldwide. In the USA, *Pinus ponderosa* and *Juniperus virginiana* are expanding into semiarid warm-season C<sub>4</sub> grasslands in the Great Plains. Ecophysiological responses of these woody invasive species to water availability - a key factor limiting growth and productivity, and a principle determinant of vegetation type including the relative abundance of grasses and woody species in semiarid grasslands - are presented to provide insights into woody species success in this region. Field and controlled studies were conducted and factors including gas exchange, stomatal limitation to photosynthesis, water potential, C/H/O/N isotopes, maximum photochemical efficiency of PSII, carboxylation velocity, rate of electron transport, and growth traits were followed. Results showed that the studied species followed different strategies to succeed in semiarid grasslands. *Pinus ponderosa* behaved like a drought-avoidant species with strong stomatal control and deep root system, while *J. virginiana* was more of a drought-tolerant species, maintaining physiological activity at lower soil water content. Both species followed resistance strategies that rendered them well suited for survival provided that (i) sufficient soil water exists in early spring for these C<sub>3</sub> species, (ii) deep (>1.5 m) soil water persists during drought periods, and (iii) fire suppression continues to be a dominant policy. Both species can continue to invade and displace dominant grasses. Expansion of C<sub>3</sub> woody vegetation into C<sub>4</sub> grass dominated regions has important ecological and economical implications. The shift from grass to tree species is likely to change plant productivity, standing-plant biomass, and the relative allocation and storage of carbon in above- and belowground components and may contribute to a decline of ground water recharge and change in regional hydrology. Differences between the studied species and the ecological implications and responses to climate change will be discussed.

# **The Influence of Microbial Succession on Insect Communities of Swine Carcasses: Implications for Potential Pathogen Dispersal From Large Animal Feeding Operations**

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**Andrew Lewis**

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**Jeffery K. Tomberlin**

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**Tawni Crippen**

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**Helene N. LeBlanc**

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Blow flies (Diptera: Calliphoridae) develop on decomposing organic material, which is habitat for bacterial pathogens, and a serious threat to livestock, poultry, and human communities. Many studies demonstrate that flies transmit human pathogens. Livestock and poultry production are large, worldwide industries, and at concentrated animal feeding operations (CAFOs) mortality rates can be high, resulting in numerous decomposing carcasses. Blow flies can arrive and have extensive contact with the resource within a few minutes after death, increasing the likelihood of pathogen transfer. Scientists lack a thorough understanding of the biological processes influencing microbial presence and persistence, and the potential vectoring capacity within blow fly populations.

In this study we monitored microbial and insect community assembly among six replicate swine carcasses placed in forested terrain over four seasons. We hypothesized that microbial successional dynamics (community structure rate and sequence of change) were important for initial species-specific blow fly oviposition and colonization. We hypothesize that insect species richness correlates with specific microbial community composition during decompositional succession, possibly in response to microbial volatile odor production. Lastly, we predicted that microbial community multivariate ordination scores would predict insect species richness and arrival sequence of blow flies. Preliminary data from one season indicated that average insect species richness at the fresh stage of decomposition ranged from 1-2, but increased to up to four during the active decay stage and then decreased during the dry stage. We also found substantial change over time in microbial structural and functional diversity on the carcasses and in the soil beneath, compared to little change in the corresponding control soil communities. This indicates that microbial communities could be important to blow fly attraction and oviposition, by creating conditions necessary for intra- and inter-specific competition and potential pathogen transfer to adult blow flies.

## **Relationship among Leaf Greenness Nitrogen Content and Yield of Waxy Corn Applied with Various Nitrogen Rates**

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Application of optimum nitrogen fertilizer is important to be considered to reduce production costs and conserve soil properties and environments. The objectives were to determine the optimum nitrogen fertilizer rate to apply to waxy corn plants for reducing nitrogen fertilizer uses resulted in decreased production costs on condition that total yield was not significantly decreased. Field experiment was conducted using a split plot in randomized completely block design with three waxy corn varieties (NSW, BW and TBK) and five nitrogen fertilizer rates (0, 75, 150, 225 and 300 kg/ha) and replicated four times. The result was found that all recorded characteristics, excepting chlorophyll b and leaf greenness at 25 days after sowing (V10), showed significant differences under various nitrogen fertilizer rates. Total yield was mostly succeeded at 300 kg/ha of nitrogen, however did not significantly differ from 225 kg/ha. Leaf greenness and chlorophyll content at silking stage of all waxy corn varieties applied with nitrogen at 150, 225 and 300 kg/ha were not different. Leaf nitrogen content at silking stage was quite varied based on waxy corn genotypes. Leaf greenness critical point of waxy corns was 45.7 and 50.3 spad unit at 25 days after sowing (V10) and silking stage (R1) respectively. At this critical point, total yield was decreased by 10%. This value can be used for farmer's decisions whether to add nitrogen fertilizer or not to their corn plants for maintaining yield potential. From this result, it can be concluded that there was a relationship among yield, leaf greenness, chlorophyll content and nitrogen content and nitrogen response pattern tended to be quadratic models.

# **Physiological and Morphological Responses of Waxy Corn Seedlings after Chitosan Application under Hypoxia**

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Chitosan acts as an elicitor in many plant species. It not only activates the immune system of plants, but also increases the yields. The objectives of this study were to investigate the effect of chitosan on physiological and morphological responses of waxy corn seedling genotype, tolerant and susceptible, under hypoxia. Pot experiments were conducted using a split plot in completely randomized design with four replications. Main plots were tolerant and susceptible genotypes of waxy corn: Big White852 and Neaw Roiet. Sub plots were three treatment conditions: normal irrigation without chitosan application (I-NC), chitosan application before hypoxia (C-H) and hypoxia without chitosan application (H-NC). The results were found that slight genotypic effect was observed for aerenchyma development under various treatment conditions. However, a number of new roots, aerenchyma development were affected by various treatment conditions. C-H had positive effects on a number of new roots and aerenchyma development and also tended to maintain leaf greenness and chlorophyll content but did not affect soluble sugar accumulation and nitrate reductase activity (NR activity) in corn leaves.

# **Physiological Consequences of Water Stress Imposed at Different Phenological Stages of Plant Growth**

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Evaluations have been done on the bases of the results obtained from the 3-years filed study carried out in order to determine the effect of different irrigation regimes and water stress imposed at different growth stages on water use, growth and leaf yield of flue-cured tobacco plant (*Nicotiana tabacum* L.). The field trials were conducted on a silty loam Entisol soil, poor in organic matter and reach in potassium on the fields of former Rural Services Atatürk Research Institute in Kırklareli. A randomised complete block design with three replications was applied and K-326 Virginia tobacco cultivar was used in the experiment. Three known stages of the plant, Vegetative (V), Yield formation (F) and Ripening (R), were considered and a total of 14 (including rain fed) irrigation treatments were applied. All the experimental treatments were irrigated at the same time as (VFR) irrigated at each growth stage with the amount of water required to fill the 0-90 cm soil depth to field capacity and three levels of water amount reductions (0, 40 and 60 %) were done at each development stage. Single irrigation was applied during the second part of vegetative stage, while subsequent water applications were done at 50 and 70 % depletion level during the yield formation and ripening stages, respectively. Observations on plant development were carried out on five labelled plants for each plot starting prior the first irrigation application, repeated at weekly intervals and ceased prior to first priming date. In addition at 15-days intervals, three plants, from rows 2 and 8 of the 9 row plot, were cut at ground level, leaves were separated from the stalk, and their shapes traced and area measured using a planimeter. All plant parts were cut into pieces, oven dried at 70 °C to a constant weight. The sum of dry weight of leaves and other parts was assumed to be the total dry matter (TDM) of the plant. Results of the 3-years study showed irrigation water applications or water stress imposed at Vegetative growth (V) and Yield formation (F) stages are influential mainly on plant growth, leaf formation (number and size) and on the physiologically based parameters as Net Assimilation Rate (NAR), Leaf Area Index (LAI), Absolute Growth Rate (AGR) and Relative Growth Rate (RGR).

# **Developing New Fuel Factors for Construction Project Costs: A Case Study of Transportation Projects, Oregon, United States**

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Price volatility of construction materials and supplies in agricultural development projects, such as asphalt, fuel, cement and steel can result in significant problems for contractors in preparing realistic bids and for the agencies sponsoring the projects themselves. The bidder/construction company cannot in many cases obtain firm price quotes from material suppliers for the duration of the project. This can lead to price speculation and inflated bid prices by the contractor to protect against possible price increases.

Escalation of global fuel prices increases the uncertainty of the bidding process. These higher fuel prices are magnified when combined with the other concrete, asphalt and demand factors currently affecting the construction industry. This paper looks at transportation projects as a case study of such development needs.

The industry and state/federal Departments of Transportation in the United States have, since 1974, handled this problem by allowing specific price adjustments of selected commodities in highway contracting, thus decreasing the risk to the contractor from the price fluctuations over the life of a contract. The application of fuel usage factors is generally accepted as a way to obtain bids that more closely reflect actual costs for any given project, but this end can be achieved if and only if the fuel factors accurately reflect the fuel consumption.

However, the states have relied on factors that were published over 30 years ago. In the state of Oregon, the location of this pilot study, these factors have not changed, despite obvious changes in the purchasing power of construction dollars, construction techniques, industry innovations and fuel types being used for the many varying tasks in construction. As stated by the Oregon Department of Transportation (ODOT) in September 2007, "Thus, it is very unlikely that those fuel usage factors are accurate or effective in removing the risk of fuel price fluctuations to the grantor or construction firm."

The major source of error is the effects of inflation on construction costs over three decades since the usage factor for structures and miscellaneous construction were established in gallons per \$1,000 of construction, and the dollar amounts were established in 1980 and have never been revisited.

This paper presents the results of the study that undertook analysis of the effects of inflation in relevant areas of construction costs for highway structures such as bridges;

presents a compilation of information from national survey of other states on how they have addressed the effects of inflation in fuel factors, particularly as they apply to the construction of structures; updated the fuel factors for structures to reflect current conditions in the various types of structures, design, construction methods, construction materials, and processes utilized; and, finally, developed a revised table of fuel usage factors for ODOT structures, including a recommended method for periodic updating of these factors. The fuel factors were found to be off by a minimum of 300%, causing just this state to overpay millions of dollars. The new indices developed from the study will eliminate this inefficient allocation of transportation construction dollars.

# **The Expenses of Producing for the Innovative Composition of Broiler Meat Production**

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Innovative composition of broilerchicken meat, in comparison with commercial mass production, contains higher levels of omega-6 and omega-3 fatty acids and carotenoids complex which positively influence human health and prevent risk factors that cause different diseases. The aim of investigations was to evaluate a possibility to obtain of innovative composition broilerchicken meat, and to evaluate the expenses of production in bioeconomic aspects by using feed that contains as increased amount of  $\omega$ -6 and  $\omega$ -3 fatty acids level. Feeding trial was carried with cross ROSS 308 broilerchicken in the age from 1 to 42 days (n=300). It was concluded that the best combination in broilerchicken feed for producing innovative composition meat is 1% flax seed oil, 2% rapeseed oil and 2% soyabean oil. By using the mentioned oil composition obtained in broilerchicken meat contained the amount of  $\omega$ -6 fatty acids 19.5%,  $\omega$ -3 fatty acids 8.8% of total lipids; it is for 7.0% and 5.6% higher in comparison with commercial mass productions. Poultry organism metabolic processes are essential factors that determine the carry over levels of fatty acids and carotenoids in meat, and it is impossible to evaluate and calculate these physiological processes in organisms exactly economically.

In trial the expenses of feed consumption per 1000 broilerchicken breeding were higher than commercial feed, but higher productivity broilerchicken by obtained higher total income from sales of 1000 broilerchicken breeding.



# **Belowground Biodiversity in Contaminated Agricultural Soils: Impact of New Energy Crops**

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Soils of contaminated agrosystems represent potential arable land surfaces for the production of non-alimentary crops such as bio-energetic ones, providing that such cropping systems do not lead to increase risks for the environment. Impacts of changing land management on soil properties have been widely studied over the last decades, but such impacts in terms of soil biodiversity remain little understood for the case of contaminated agricultural soils. The aim of this study is to monitor changes in biodiversity belowground, potentially occurring following introduction of new energy crop systems on contaminated agricultural land areas.

The study area located in the suburb of Paris (France) is multi-contaminated by trace elements and organic substances. Within this area, cropping system recently switched from alimentary to energy ones with introduction of either switch grass (*Panicum virgatum*), *Miscanthus x giganteus*, or poplar trees (*Populus sp.*). Four different treatments were selected: “classical cereals rotation” (wheat, maize, sorghum) as control, “miscanthus”, “switch grass”, and “poplar”. The last treatment is an afforestation scheme on short time rotation cycle. Abundance, biomass, species richness, and several community parameters were determined for several groups of soil organisms. Besides biotic parameters, several abiotic parameters were measured in order to explain variances in our dataset.

In general, abundance and species richness of soil fauna were very low in the control treatment as typically observed in contaminated agricultural soils. Introduction of energy crops led to dramatically increase abundance, biomass and species richness of most soil faunal groups. Consequently values of diversity parameters follow this trend being highest in “miscanthus” and “switch grass” treatments. Energy crops seem to favour soil organisms compared to classical crop rotation system. However, there is an urgent need to study the consequences of such stimulation of soil biota on fluxes of traces elements. Promoting biological activity belowground might result in modifying bioavailability of contaminants through activation of soil organic matter for example.

**Movement of Bacteria through the Gastrointestinal Tract of the  
Lesser Mealworm, *Alphitobius diaperinus* (Coleoptera:  
Tenebrionidae), into the Environment**

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**Longyu Zheng**

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**Cynthia Sheffield**

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**Jeff Tomberlin**

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**Teaching Locally, Engaging Globally:  
Enhancing the Undergraduate Curriculum**

**Kim Dooley**

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# **Flowering and First Yield of Sour Cherry Cultivars Grown by Using Woodchip mulch and Drip Irrigation**

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The peculiarities of cultivars as well as use of mulch or irrigation influences the flowering and yielding of fruit plants as it is stated in several researches. The trial was carried out at the Latvia State Institute of Fruit Growing to determine the effect of soil moisture adjustment on the yielding of different sour cherry cultivars. Sour cherries were grown using woodchip mulch and drip irrigation or without both of them – in control variant. The first yielding of cultivars ‘Bulatnikovskaya’, ‘Desertnaya Morozovoi’, ‘Latvijas Zemais’, ‘Orlica’, ‘Shokoladnica’, ‘Tamaris’ and ‘Zentenes’ was investigated. Flowering and fruit set were evaluated in order to characterize the formation of yield. In general the use of drip irrigation and woodchip mulch did not influence flowering and fruit set significantly. Yield was not influenced by using drip irrigation but the use of woodchip mulch decreased yield. Differences of flowering, fruit set and yield depending of cultivar were significant. Cultivars ‘Tamaris’ and ‘Bulatnikovskaya’ had the highest flower density index and fruit set. Cultivar ‘Bulatnikovskaya’ had the highest yield.

## **Potential of Agricultural Residues in the Production of Adsorbents for Phenylalanine Adsorption. 1: Defective Coffee Beans**

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Phenylketonuria (PKU) is a disease associated with a metabolism disorder in which the oxidation of Phenylalanine (Phe) is impaired due to the deficiency of the hydroxylase Phe enzyme. PKU nutritional therapy is based on diets based on protein hydrolysates, where Phe contents are reduced to acceptable levels usually by adsorption with activated carbons. The high production costs make the production of the Phe-depleted hydrolysates almost cost-prohibitive in developing countries, and the use of low-cost adsorbents could drastically change this scenario. Thus, in the present study, defective coffee beans press cake, a residue from biodiesel production based on coffee oil, was evaluated as raw material in the production of an adsorbent for phenylalanine removal from aqueous solutions. Batch adsorption studies were conducted at 25°C and the effects of particle size, adsorbent dosage, contact time, initial pH and initial concentration of phenylalanine were investigated. Preliminary adsorption tests pointed towards the need for chemical activation in order to increase adsorption capacity. Such tests also demonstrated that nitrogen flow during activation had a negative effect on adsorption capacity due to loss of surface chemical groups. Phenylalanine adsorption was favored by a reduction in adsorbent particle size. The effect of initial solution pH was evaluated in the range of 2 to 10, indicating that low pH's hinder adsorption due to electrostatic repulsion. Adsorption equilibrium was attained after 6 h for all the evaluated phenylalanine concentrations. Langmuir, Freundlich, Tempkin, Dubinin-Redushkevich (D-R) and Henderson models were tested for equilibrium description, with Langmuir providing the best fit. The results obtained in this study showed that defective coffee beans press cake can be viewed as a potential candidate for the production of low cost adsorbents for phenylalanine removal from protein hydrolysates, thus contributing for the implementation of sustainable development in both the coffee and biodiesel production chains.

## **Systematic Consortium: System Vision Applied to the Small and Average Farms of Cuneo's District**

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The focus of our research is the province of Cuneo and its agricultural economy and production. Cuneo is located in the North West part of Italy and it represents for extension one of the most important provinces in the Italian scene.

In particular our interest is on small and medium farms that, for their nature, represent the real fulcrum of Cuneo's economy. Analyzing the current situation of food-producing, it's evident how productive processes are linear and based overall on quantity and not quality.

In this way the territory has lost the link with its history, local values and know-how to pursue the globalization ideal and receipts.

It happens that in a province like Cuneo, South American cereal are grown and imported to feed English breed of swine, that are going to be one of the most popular Italian products: Parma's raw ham! The real problem is that some cultivations have replaced the native ones, and some others, as cereals, are insufficient to provide for territory needs; so products coming from small farms are devalued, because they are sold by large retailers without any indication about their provenance and peculiarity. Moreover all weaving factories have natural outputs, considered as wastes. Applying the systemic approach to the Cuneo's district we connected the different weaving factories, breeding and agriculture ones, creating a kind of consortium, in which they share knowledge, potential, products and overall outputs to pursue goals in common and to create new opportunity, dividing cost and pay-off. This is called Systemic Consortium.

So the real challenge is changing the way we think about sustainability, only with dialogue and collaboration between the local weaving factory, it's possible to create a correct and fair development: a network in which output becomes input, wastes are resources and the processes are in balance with territory and ecosystem.

# **Growth of Ecological Agriculture in Poland**

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Paper presents the current state of ecological agriculture in Poland on the background of transformation of Polish agriculture during the past 20 years. The transformation of Polish agriculture, which has started in the early 1990's, was connected with the abandoning of forced, centralized distribution system and the acceptance of market economy. Process met with difficulties particularly evident in agriculture. Polish agriculture sector employs many workers, and, because of that fact, it should develop in both traditional and modern ways. It should continue employing many people (ecofarming requires a lot of manual labour), and it should use also more high-technology.

Ecofarming has become a significant element in Polish farming and could play a part in the development of multifunctional rural economies in the future. Poland has favourable conditions for the development of ecological agriculture and ecotourism. In 2008 organic production in Poland was carried out by 14 896 of organic farms, including 8 685 holdings with the certificate and 6 211 farms in the switch period. The total area of ecologically cultivated land in 2008 in Poland (including farms with the certificate and in the period of conversion) was 287 528 ha. At the end of 2008 were registered 15 206 organic producers, including 14 896 of ecological farms and 236 of processing plants. Compared to 2004, when Poland became a member of the European Union, it is an increase of 11 446 producers. This very strong growth is the result of the comprise of Polish agriculture by Common Agriculture Policy, which supports the development of ecological agriculture. This support applies to additional payment to soils grown ecologically.

Ecofarming has been developing as the result of economic and political changes in Poland. It was in the beginning a spontaneous tendency, and it was different from traditional passiveness and inertia, which, traditionally, was associated with Polish agriculture. Currently many farmers decide to ran farm on ecological way because of economic aspects. They may obtain additional payment, develop eco-tourism and pursuit of small-scale processing. Ecological farming can be an opportunity for the future of many Polish farms.

# **Physiological Responses of Eight Wheat Cultivars Under Salinity Stress**

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The effects of NaCl salinity was studied in eight wheat cvs, Shirazi, Toss, Roshan, Hirman, Bolani, Falat, Kavir and Star, grown under control (nutrient solution) or salt stress (nutrient solution containing 100, 200 and 300 mM NaCl) conditions. The results revealed that salt stress caused a significant decreases in the growth parameters such as root and shoot dry weight. Toss and Falat cultivars had the highest decreasing these parameters. The negative effect of salinity on plant was due increasing Na<sup>+</sup> and decreasing K<sup>+</sup> content in the leaves. Among the cultivars, Bolani and Toss had the highest Na<sup>+</sup> and lowest K<sup>+</sup> content. In leaves of salt-stressed plants, ascorbate peroxidase (APX), catalase (CAT) activity increased and guaiacol peroxidase (GPX) decreased with salinity. The increase in enzyme activities was more pronounced in the salt-tolerant Roshan cultivar than others cultivars. Changes in proline and soluble carbohydrate content in wheat cultivars had been correlated with their capacity to tolerate and adapt to salinity conditions. In this study, by increasing salinity levels from 0 to 300 mM NaCl Toss and Star cultivars had the highest soluble carbohydrate and proline content. The results suggest that cv. Roshan, exhibits a better protection mechanism against salinity as indicated by higher biomass and antioxidant enzymes activity.



# **How Can we Explicitly Integrate the Diversity of Farmers' Decisions into Studies of Rural Land-Use Change?**

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A large body of research has concentrated on the analysis of complex human-environment interactions, with particular emphasis on the investigation of land-use/cover change (LUCC). Nevertheless, the mechanisms that underlie land transformation are still poorly understood. A possible explanation is related to the disciplinary isolation that characterised research until recently, which had resulted in the conceptualised separation of nature and society. The majority of LUCC studies have focused on the detailed description of processes that take place between and within ecosystems, while human dimension has been either neglected or theorised in an oversimplified way. A typical paradigm is that of farmers who have been traditionally conceptualised as a homogeneous group of 'profit maximisers', despite the diversity of land-use patterns that implies a variation in their decisions. This paper presents a novel approach to the analysis of rural LUCC that integrates social research with computer science. A new type of models, the agent-based models (ABMs), allow modellers to simulate a range of 'irrational' behaviours, link human and natural systems and carry out multi-disciplinary assessments of environmental change impacts, as driven by local forces and responses of adaptive agents. The explicit representation of the human behaviour in the ABM is supported by a multi-phase social survey which employs both quantitative and qualitative methods. Data collection was conducted in the Canton of Aargau, Switzerland. Analysis revealed a range of motivations and other factors that determine farmers' decisions and a number of typologies describing farmers' behavioural profiles, attitudes and implementation strategies. The divergence of the findings from the mainstream micro-economic view suggest the great need for the adoption of holistic approaches for getting an insight into human behaviour and its complex interactions with the environment.

# **Insecticidal Action of Chitin-binding Lectin (MChbL) from European Mistletoe (*Viscum album* L.) Against Lepidoptera Pests**

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*Apamea sordens* Hufn. and *Agrotis segetum* Schiff. are the most devastating polyphagous Lepidoptera pests of Noctuidae family causing substantial crop losses throughout the world. Due to the environmental concerns of pesticide use and limited list of effective alternatives it is therefore urgent to develop novel biopesticides from natural sources that have low mammalian and environmental toxicity for crops. In this regard, plant agglutinins (lectins) as natural plant defence agents, have been implicated as antibiosis factors against insects are promising candidates for biological pesticides.

In the present work the insecticidal activity of mistletoe (*Viscum album*) chitin-binding lectin (MChbL) against *A. sordens* and *A. segetum* larvae was investigated. MChbL exhibited proteinase inhibitory and chitinase activities and affected larval development and survival at different growth stages. MChbL produced 40% mortality of second and third instar larvae in both experimental groups when incorporated into a artificial diet at a level of 0.001% (w/w). The antinutritional effects of lectins were much evident at the early stages of larval development. MChbL was not digested by larval midgut preparations and no inhibition of sugar-binding activity of lectin was observed. MChbL affected larval gut proteolytic enzymes. FITC-labeled casein fluorescence polarization showed 60% decrease of total protease activity of the midgut preparations when incubated with MChbL at a concentration of 0.25 $\mu$ g/ $\mu$ l. MChbL showed no inhibition towards bovin trypsin, indicating the possible digestibility of MChbL by mammalian gut enzymes.

The results obtained demonstrate that mistletoe lectins have obvious anti-nutritive effects on *A. sordens* and *A. segetum* larvae. Apparently, proteinase inhibitory activity and perceptible resistance to proteolytic degradation by the insect digestive enzymes are basic prerequisites for MChbL to exert their deleterious effects on insects. Possible implication of mistletoe chitin-binding lectins as potential entomotoxic biopesticides for the control of polyphagous herbivore Lepidoptera pests is discussed.

# **Alternative Underlings for Weather Derivatives: An Analysis of the Benefits of Water Capacity-based Weather Derivatives for Farms in East Germany**

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Crop farmers in Germany's federal state of Brandenburg have one of the highest volatilities of family-farm-income in Europe. The main reason is that levels of rainfall in Brandenburg are low, and the predominant sandy soils there retain water poorly. Although climatic circumstances create high production risks in Brandenburg, crop farming is the main line of agricultural production.

Many crop farmers in Germany employ price hedging, e. g. in the form of forward contracts. But there are only very few instruments requested to compensate yield risk. So the question arises why crop farmers do not use more different kinds of weather risk management instruments. In many countries crop farmers take out multi-peril crop insurance and weather derivatives. In Germany crop farmers do not demand insurance contracts besides these insurances against catastrophic yield risk, like for example hail.

In this paper we evaluate which kind of management strategy would be optimal for crop farmers in the county of Märkisch-Oderland (in the East of the federal state of Brandenburg) and provide hints to insurers on how to design an effective instrument for this specific region.

To quantify the benefits of specific risk management instruments we built a whole-farm-risk-programming-approach, using empirical data from the German ministry for agriculture. To determine the level of risk aversion, we derive the risk aversion by looking at the already accepted standard deviation of the last years. We then look for an additional benefit gained from different risk management instruments. This is accomplished using a program which combines a stochastic simulation with genetic algorithm.

The first calculation quantifies the farmers' accepted risk aversion is and how much they are willing to pay for risk reduction by using diversification and weather derivatives. We are able to evaluate the benefits using weather derivatives as possible risk management instrument.

# **Investigating the Policies of Research and Propagation of a New Technology to Farm Mechanization, a case study on Laser Land Leveling (LLL) system in Iran**

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Agricultural mechanization is one of the key aspects of cultivation which a broad researches devoted to it's improvement. Deliver of new technology confronted with obstacles such as resistance of farmer to change, adoption to culture and nature of that country. Some well defined and conducted study will clear the realability and guarantee the achievement of new technology. Laser land leveling (LLL) system with high potentiality in water saving, increasing crop yield and enhancing mechanization activity is one of the recently fed machineries in agriculture sector of many Asian countries. This study composed of investigating the researches patterns and efforts for entrance and propagation of laser land leveling technology in the farm mechanization regime of Iran. The project began in the 2003 and the process include the study for selecting , source finding of some proper equipments and field test in about 300 hectare of pilot farm in Farse province of Iran. Outcome of the 4 year researches approve the profitability of LLL technologies and formal dedicate of certification for business activity on laser land leveling. Results of researches and governmental driving force caused rapid promotion of this technology, so that LLL is the largest today mechanized project of Agricultural ministry of Iran. In spite of this useful income, analysis of field data and user questionnaire reveal some side effect coerces to farmer due to incompatibility of imported equipments to real farming demand. As a conclusion a proper research proposal can be recommended for addition of a new machine to agricultural mechanization.

## **Sugar Beet – Past, Present and the Future**

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Sugar is produced from sugar cane and sugar beet. For centuries, Europeans were dependent on sugar from colonies in the West Indies. The Napoleonic Wars led to the development of the sugar beet crop in France which resulted in Europe being the largest producer of sugar beet. Currently, about 25% of world sugar is produced from sugar beet. Successful sugar beet production started in the United States (US) around 1838 and development of the industry was similar in Europe. In the early history of sugar beet production, manual labor was in high demand for land preparation, thinning multiple germ seeds, weed control, harvesting, topping and loading roots for transporting to processing plants. The discovery and development of mono-germ seeds in the mid 60s, the availability of agricultural chemicals, and the development of machinery and equipment significantly reduced the man-hours required for beet production. In the US, expensive and unavailable labor initiated the development and modification of machinery and equipment for sugar beet production. More recently, herbicide resistant sugar beet have been developed, approved and widely used commercially in the United States. However, this transgenic technology has not been approved for commercial use in Europe. Research showed the need for specific nutrient requirements, and breeders developed cultivars that were resistant to nematodes, and diseases such as Rhizomania caused by the beet necrotic yellow vein virus, Cercospora leaf spot caused by *Cercospora beticola*, and Aphanomyces root rot caused by *Aphanomyces cochliformis*. Sucrose yield from sugar beet has increased from about 3 t/ha in the 1930s to about 9 t/ha currently. In France, United Kingdom and Germany, the sugar beet is also used to produce ethanol. How can we modify the sugar beet to produce sugar and other products for 7 to 8 billion people in the near future?

# **Competitiveness of Dairy Sector in Creating Value Added**

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Latvian dairy sector is fragmented that results in higher costs associated with milk collection. As these costs are unproductive costs that do not add value to the product, they reduce the price of raw milk that can be received by the farmers that directly affects the value added and incomes received by the farmers, weakening the competitive position of farms in ensuring adequate compensation for labour force and preventing from investing in farm efficiency.

The paper analyses the dairy sector structure and looks at the current organization of raw milk collection in Latvia. It also studies the weaknesses and strengths of the milk collection systems in Latvia, as well as explores the possibilities of improving organization of milk collection to decrease milk collection costs, citing also experience from other countries.

The study is based on statistical data and the information obtained from industry expert interviews.

The study finds that one of the main possibilities of improving raw milk collection lies in cooperation of farmers as well as cooperation of processing enterprises.

**Bacterial Symbionts on House Fly Eggs, *Musca Domestica* (Diptera: Muscidae), Act As Ovipositional Cues, Anti-Fungal Agents, and Larval Food and are vertically Transmitted by House Fly**

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House fly larvae, *Musca domestica* (Diptera: Muscidae), face several challenges during their development to adult flies. They must: (1) condition their nutritional resources while minimizing intraspecific competition; (2) avoid competitive fungi and inhibit their growth; and (3) obtain bacteria as food supplements. Gravid female house flies address these challenges in three ways: (1) they gain the resource-conditioning benefits of aggregated oviposition, while avoiding cannibalism of younger larvae by older ones, by depositing and responding to the bacterium *Klebsiella oxytoca*, which proliferates over time on the surface of deposited eggs and inhibits further oviposition when a threshold bacterial density is reached; (2) they avoid competition with harmful fungi by recognizing fungus-derived semiochemicals and by rejecting fungus-infested resources as oviposition sites. Together with their eggs, they also deposit bacteria which, as a group, suppress the growth of fungal competitors through resource nutrient depletion and/or the release of antifungal chemicals; and (3) they ensure sufficient nutrition for larvae by depositing bacteria that increase larval survival in resources lacking appropriate bacterial food. The key bacterial symbiont *K. oxytoca* is transmitted vertically from one generation of house flies to the next. Applying plasmid EGFP (Enhanced Green Fluorescent Protein)-transformed *K. oxytoca* to the surface of house fly eggs, we have demonstrated that such bacteria are retained in the ensuing larval, pupal and adult stages.

# **Olfactory Stimuli Response from Blow Flies to Volatiles Released from Decomposing Vertebrate Carcasses**

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Decomposition is a natural process and allows nutrients to be re-absorbed and recycled. The process of decomposition is initiated by bacterial activity and enzymatic digestion, a process called autolysis or self-digestion; however, vertebrate decomposition by bacterial action alone can be a very slow process. This bacterial action, however, almost immediately attracts carrion insects to the decomposing carcass, where the larval stages of these insects significantly increase the rate of decomposition. In the field of forensic entomology, it is the principal goal to establish the point at which the body was initially inhabited by carrion insects in order to calculate a post mortem interval. Therefore, research was undertaken to explore the succession of insects on a decomposing body and to identify the semiochemicals responsible in initially attracting blowflies to the body. Combined gas chromatography (GC) and electroantennogram (EAG) experiments isolated volatile chemicals recovered from the decomposing pigs which elicited a receptor response from *Calliphora vomitoria* (Diptera: Calliphoridae). Dose response experiments demonstrated that two specific compounds elicited the greatest receptor responses. A positive correlation was found between the concentration of these compounds and the number of flies on the pig carcass. The chemical composition and concentration of the compounds associated with decay, in particular the EAG-active compounds, varied between the different stages of decomposition. These findings and more will be discussed.



# **The Effect of Farm Subsidies on Research Delivery to Producers: A Comparison of the United States and Argentina**

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The United States subsidizes agriculture, while Argentina does not. While both countries have areas of land that are fertile for the production of corn, soybean and wheat; the structure and function of farms and supportive research are different. The United States has an Extension system within each state that conducts delivers applied research information to producers. Some states have better systems than others. Producers pay indirectly for the Extension service through taxes. In some states, they may pay additional fees for publications or special projects. Argentina has a federal extension system but fewer people and less contact with producers. Some producers in Argentina have developed their own structure for conducting research and delivering information. These producers organize in small groups, share technical and sometimes economic information, and coordinate research projects. There are strengths and weaknesses in both countries. The Extension system in the United States is losing funding, but is more stable than the Extension system in Argentina. The small groups in Argentina are much more flexible and focused on local issues for producers.

# **Influence of Harvesting and Genotype on the Dynamics of Minerals and Protein Contents in Brassica Oleracea Cultivated in South Africa**

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**Mohammed S.**

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Hunger, malnutrition, diseases and poverty are currently the main challenges facing Sub-Saharan Africa. The major causes of malnutrition have been found to be vitamin and mineral element deficiencies, especially micronutrients; a phenomenon usually described as hidden hunger. The malnourished populations live in rural communities with access to land for the cultivation of different varieties of vegetables. These vegetables have been found to be highly nutritious and previous indigenous knowledge indicates that most of them have medicinal properties. Research in the utilization and domestication of these vegetables has been neglected mainly due to over reliance on exotic species which are not readily available to resource poor individuals. Brassica oleracea var acephala is native to coastal southern and western Europe with very high mineral and protein contents; a precondition for its importance in African diet where poverty is still a dominant part of life of the majority. Six genotypes of the species were randomly selected for mineral and protein analyses during the winter planting season of 2009. Experiment was laid out in randomized complete block design and analyzed in a factorial arrangement using SAS analytical method. The results of the experiment revealed tremendous variability in mineral contents as affected by genotypes and harvesting period. Total protein appears to have more relevance with harvesting period than difference in genotype. If genotypes and harvesting period must be considered among lines tested in the experiment, the overall results of the study indicate a possible trade-off; of certain minerals for the other. The implication of this study on the alleviation of hidden hunger among marginal input communities in South Africa is discussed.

# **Farmed Deer (*Cervus Elaphus*) Meat Microbiological Pollution**

**Solveiga Liepina**

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## **Food Habits of Goats on Rangelands with Different Cover of *Atriplex Canescens***

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Esophageally fistulated goats were used on a microphyll desert scrub with 14.6% or 46.2% aerial cover of *Atriplex canescens* (Pursh) Nutt.) (induced by removal of shrubs, except *A. canescens* and livestock grazing exclusion for 10 years) in northeastern Mexico, to determine seasonal forage species selected by goats. Shrub removal strongly affected goats feeding habits; goats grazing the cleared site consumed 4.5 times ( $P < 0.01$ ) the amount of *A. canescens* than goats on the untreated pasture during all seasons. Shrubs were used heavily in all season by goats in both pastures, with higher ( $P < 0.01$ ) percentages (75.5 - 82.8) in the diets of goats grazing the untreated pasture, compared to goats grazing the *Atriplex*-dominated area (62.5 - 68.5) with no differences between seasons. Goats in the cleared pasture were better grass users than goats grazing the control area, ingesting more ( $P < 0.01$ ) perennial graminoids in summer (15.0%) and spring (18.3%) than goats on the untreated pasture (6.0% to 7.0%). Forbs were a variable but important component of diets, particularly in the cleared pasture, where goats consumed more ( $P < 0.01$ ) forbs than goats in the untreated pasture with no differences between sampling seasons. In both pastures, preference indices were highest for *Sphaeralcea angustifolia* and lowest for *Stipa eminens*; *A. canescens* was used in proportion to *its* occurrence within the study area in both sites. It was concluded that the successful expansion of *A. canescens* strongly affected goats feeding strategy, with a substantial increase in the use of this fodder shrub, forbs and grasses in all seasons. This data reaffirm that goats were opportunistic grazers, which did not limit their selection to the abundant high-quality browse available, but diversified their diet including important proportions of grasses and forbs.

# **Allelopathic Potential and Molecular Analysis of some Rice Cultivars (*Oryza sativa* L.) cultivated in Kurdistan Region – Iraq**

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Several experiments were conducted to determine the allelopathic potential variation among six rice cultivars locally cultivated in Kurdistan Region. This was performed to study the effect of aqueous extract of rice cultivars on seed germination, seedling growth, and some physiological and possible genetic malformation of lettuce plant.

Aqueous extracts of different rice cultivars significantly inhibited seed germination, the highest reduction was noticed in the cultivar shash-mah (80%). Seedling growth was found to be more sensitive to the water soluble extracts than seed germination, the inhibition was (92%). the aqueous extracts of all rice cultivars significantly reduced chlorophyll a,b, total chlorophyll content, ion uptake such as nitrogen, phosphorus, calcium, Magnesium, potassium, and sodium of lettuce leaves, the reduction in chlorophyll and ion uptake appeared to be paralleled to the reduction in growth of lettuce plant. Generally, shash-mah cultivar showed the highest allelopathic potential among other rice cultivars used.

To investigate any possible genetic malformation, genomic DNA of lettuce as the model plant was isolated and quantified. After optimization of RAPD reactions conditions, ten different decamer primers of arbitrary sequences were used to scan for DNA polymorphisms. Results of repeated experiments revealed no genetic changes had occurred within primers annealing sites, thus, most probably, it may be suggested that allelochemicals released did not have any genotoxic effects on lettuce plant.

# **Evaluation of Drought Tolerance in Bread Wheat Genotypes using Quantitative Drought Resistance Indices**

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Drought is a wide-spread problem seriously influencing wheat production and quality. Effective selection criteria are necessary for development of resistant cultivars. To evaluate drought tolerance of 27 bread wheat genotypes, two field experiments based on randomized completely block design with two replications were carried out in two conditions (rain-fed and irrigated) in 2008-2009. Combined analysis of variance showed that drought stress reduced grain yield significantly. Correlation analysis between drought resistance indices and grain yield in both conditions revealed that stress tolerance index (STI), mean productivity (MP) and geometric mean productivity (GMP) were the best indices for identifying high yielding genotypes in both conditions. Based on the drought resistance indices, genotypes No. 1, 9, 12, 14, 18 and 20 were relatively identified as drought tolerant genotypes.

## **Use of Ground-Based Remote Sensing to Detect Biotic and Abiotic Stress of Maize Plants and to Estimate Biofuel Potential**

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In Texas and elsewhere, there is a growing need for precision ag applications for early-detection of emerging stressors and their potential impact on yield. Hyperspectral imaging data were acquired from individual maize leaves, and the main objective was to develop a classification system to detect drought stress levels and spider mite infestation levels across maize hybrids and vertical position of maize leaves. A second objective was to estimate biofuel potential (heating value) of growing maize plants. Stepwise discriminant analysis was used to identify the five spectral bands (440, 462, 652, 706, and 784 nm) that contributed most to the classification of three levels of drought stress (moderate, subtle, and none) across hybrids, leaf position, and spider mite infestation. Standard variogram parameters (“nugget”, “sill”, and “range”) from selected spectral bands were examined as indicators of spider mite and/or drought stress. Several variogram parameters showed significant effects of drought stress and spider mite density without simultaneous effects of maize hybrid and/or vertical leaf position. We showed that heating values (biofuel potential) of individual maize plants could be accurately predicted based on variogram parameters derived from leaf reflectance data. Importantly, we only acquired reflectance data from about 12 cm<sup>2</sup> of each maize leaf – even higher predictive accuracy could likely be obtained if reflectance data were acquired from more leaves and/or larger portions of each leaf. Thus, the analysis presented here outlines how a well-established analytical approach (variogram analysis) can be used successfully in analysis of reflectance-based studies to: 1) detect both abiotic and biotic stress, and 2) to predict qualitative traits of growing maize plants with critical importance to both dairy and biofuel industries.

# **Effects of Gradual Water Deficit Stress on Phenological and Morphological Traits in Chickpea (*Cicer arietinum* L.)**

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Water deficit stress is an important constraint of chickpea yield in arid and semi-arid regions. This study was carried out in 2007 and 2008, to investigate responses of three chickpea cultivars (Hashem and Arman from kabuli and Pirooz from desi type) under well watering ( $I_1$ : 70mm evaporation from class A pan), gradual water deficit ( $I_2$  and  $I_3$ : 70...90...110...130 and 70...100...130mm evaporation, respectively) and severe water stress ( $I_4$ : 130mm evaporation). Result showed that days to flowering and plant height were decreased, as water limitation increased. This reduction was significant under gradual water stress ( $I_2$  and  $I_3$ ) and severe water deficit ( $I_4$ ), compared with control ( $I_1$ ). There were no significant differences in grain filling period and grain yield among  $I_1$ ,  $I_2$  and  $I_3$  irrigation treatments. In contrast, no significant differences in days to physiologic maturity and number of sub branches were recorded among irrigation treatments. Interactions of year  $\times$  cultivar for days to physiologic maturity, grain filling period and grain yield ( $P < 0.01$ ) and for days to flowering and plant height ( $P < 0.05$ ) were significant. The superiority of Arman in producing comparatively greater grain yield could be attributed to higher grain filling period of this cultivar in both years.



**Preliminary Studies on Aspects of Insect Pest and Natural Enemies  
Associated with Cowpea (*Vigna Unguiculata*) (L.) walp) in a  
Subtropical Agro-Ecosystem, South Africa**

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Insect pests and their potential natural enemies were monitored on cowpea during the 2008 / 2009 cropping season in the Transkei area of South Africa. A total of 5953 insects belonging to 21 species, in 12 families and 5 orders (Coleoptera, Hemiptera, Orthoptera, Homoptera and Lepidoptera) were counted from 18 observations on cowpea from seedling to maturity. Aphids, lepidopteran larvae, blister beetles and pod-sucking bugs were designated as “major” pests of cowpea in this study area on account of their high levels of population infestations, persistence and overall damage inflicted on the crop. Natural enemies recorded during the study were ladybird beetles, ants, wasps, assassin bugs and spiders. Insect pest activity was much concentrated between eight and thirteen weeks after sowing (WAS) corresponding to flower budding and pod formation stages of cowpea phenology respectively. Results from this study have significant implications for the integrated control of the insect pest complex of cowpea in sub-tropical agro-ecosystems.

## **Potential of Agricultural Residues as Biosorbents for Wastewater Treatment. 1 - Raphanus Sativus Press Cake**

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Over 95% of the world's current biodiesel production is derived from edible oils and continuous and large-scale biodiesel production without proper planning may eventually cause problems, including depletion of food supply. A solution to these problems would be the use of non-edible oils, employing seeds such as *Jatropha curcas* and *Raphanus sativus*. However, the process of biodiesel production with these seeds generates an extensive amount of solid residues (pressed seed cakes), which present environmental problems in terms of their adequate disposal, given their limited applications as animal feed or silage. Some studies have shown that seed press cakes can be employed as biosorbents for removal of pollutants such as heavy metals and dyes. Thus, the objective of the present study was to evaluate the potential of *Raphanus sativus L.* press cake as a biosorbent. Adsorption studies were conducted with methylene blue. Adsorption kinetics was determined by fitting pseudo first and second-order kinetic models to the experimental data, with the second-order model providing the best description. The equilibrium data were fitted to Langmuir, Freundlich and Tempkin adsorption models, with Langmuir providing the best fit. Maximum adsorption capacity was 29 mg L<sup>-1</sup>. The results obtained in the present study indicated that this type of waste material is a suitable candidate for direct use as an adsorbent for removal of cationic dyes, thus, contributing for the implementation of sustainable development in the biodiesel production chain.

# **Oil Content, Fatty Acid Composition and Correlations of Peanut Genotypes Differing In Maturity and Growth Habit**

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Eight peanut genotypes (*Arachis hypogaea* L.) belonging to Virginia, Spanish and Valencia, and two spontaneous crosses were compared for oil content and fatty acid composition. Significant differences were observed in oil content of peanut genotypes. Oil content varied from 47.52 to 54.79 %. Oil content of genotypes in Virginia group were generally higher than the other two groups. Valencia genotype had the lowest oil content. Oil content decreased with early maturity. Research on peanut genotypes showed a high degree of genetic variability in fatty acid composition. The two major oil fatty acids, oleic and linoleic ranged between 35.28-52.18% and 26.76-42.12 %, respectively. Oleic acid decreased with early maturity while early maturing genotypes had higher levels of oil linoleic acid. The ratio of oleic to linoleic acid (O/L) in Virginia was higher than Spanish and Valencia. Oleic acid concentration was negatively correlated with level of linoleic acid. Spontaneous crosses had significant differences from the three peanut groups for oil content, fatty acid concentrations, seed and fruit properties.

# **Deer Farming Development in Latvia**

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Deer farming is relatively new and intensely growing sector in world. It has developed during the last thirty years in the world, but this period is less than twice in the Latvia. There is a sufficient amount of unused land in Latvia - unused agricultural land and forest area, which could be developed for deer farming, thereby promoting employment in rural areas and environmental and landscape improvement. The study has analyzed the situation and development trends in the deer farming sector in Latvia.

The main laws governing of the industry and the most important coordinating and supervisory authorities of the sector were identified by the study. It is found the importance of the branch organization "Latvian Wild Animal Breeders Association" established in 2000. The study identified four periods in the development of deer farming sector.

Number of deer farms has increased by 2.3 times since the year 2004 in Latvia. Their number amounts to 70 farms and there are breded more than 7000 deer. Common areas or paddocks fenced area of deer farms were 8873 ha at the end of 2009<sup>th</sup>. Growth of deer farms' are determined the breeding animals increasing during the test period.

Average density of animals at the end of 2009<sup>th</sup> per farm was 0.8 animals per 1 ha fenced area; this corresponds to extensive deer farming requirements in Latvia. With intensive farming approach to deer farming industry, it is possible to increase the number of deer by at least 7 times in currently existing paddocks' area, which could be the basis for development of the industry in the future.

# **Problems and Possibilities of Raw Milk Collection**

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Latvian dairy sector is fragmented that results in higher costs associated with milk collection. As these costs are unproductive costs that do not add value to the product, they reduce the price of raw milk that can be received by the farmers that directly affects the value added and incomes received by the farmers, weakening the competitive position of farms in ensuring adequate compensation for labour force and preventing from investing in farm efficiency.

The paper analyses the dairy sector structure and looks at the current organization of raw milk collection in Latvia. It also studies the weaknesses and strengths of the milk collection systems in Latvia, as well as explores the possibilities of improving organization of milk collection to decrease milk collection costs, citing also experience from other countries.

The study is based on statistical data and the information obtained from industry expert interviews.

The study finds that one of the main possibilities of improving raw milk collection lies in cooperation of farmers as well as cooperation of processing enterprises.

## **Investigating Different Concentrations of Crude Oil on Growth Parameters of Tall Fescue and Alfalfa in the Calcareous Soil**

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The ability of hydrocarbon contaminants to cause variable toxicity in soils, depend on their types and concentrations. On the other hand, different kinds of plants differently response to various concentrations of contaminants because of the diversity of physiological and morphological characteristics. In this study the effect of different levels of light crude oil was investigated on emergence, persistence and plant biomass (fresh and dry weight) of tall fescue (*Festuca arundinacea*) and alfalfa (*Medicago sativa* L.) as a Completely Randomized factorial Design (CRD) with three replicates. Crude oil and uncontaminated soil sample (0-30cm) was provided from Sarkan-Makoo site in Lorestan province, Iran. The above plant groups were planted in 800g soil pots in CRD with 6 contamination level (0, 1, 3, 5, 7 and 10 percent crude oil (w/w)) in three replicate, and grown under greenhouse conditions for 4 months. Results indicated plant biomass (dry and fresh weight) was significantly ( $p < 0.05$ ) different in contaminated and uncontaminated soils for both plants. Plant leaves showed symptoms of toxicity due to contamination treatments and the symptoms increased with the enhanced crude oil concentrations for both plants. Plant growth parameters reduced in contaminated soil with different percent of crude oil. There was not significantly difference ( $p < 0.05$ ) in emergence percentage (EP) between uncontaminated soil and soil contaminated with one percent for both plants, but EP was significantly different between over one percent- contaminated and uncontaminated soil. The highest EP was observed in uncontaminated soil for tall fescue and alfalfa by 75.6% and 75%, respectively while the lowest was 25.6% and 15% in soil contaminated with 10 percent crude oil. Alfalfa showed low resistance to toxicity of petroleum hydrocarbons comparison with tall fescue so that after 30 days of planting, seedlings of alfalfa died in soil contaminated with 10 percent crude oil whereas fescue plants could survive in spite of growth parameters reduced.

## **Vegetative Propagation of *Gerbera jamesonii* via Tissue Culture Technique (Callus Induction)**

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A set of experiments were conducted to find out the most appropriate plant growth regulator supplements used for callus initiation, propagation and plant regeneration from leaf disc of *Gerbera jamesonii*. The optimal surface sterilization of adult leaf explants (90%) was attained by using Ethanol (70%) for 1 minute and commercial bleach (NaOCl 1.0%) for (5) minutes and (HgCl<sub>2</sub> 0.1%) for (5) minutes. The highest rate of callus formation was obtained by culturing of adult leaf explants excised from greenhouse plants on MS medium supplemented with 1.0 mg/l-1 BA + 0.5 mg/l-1 NAA which produced higher value (13.72 mg.) of callus. On the other hand, the use of Kinetin and NAA gave different results on callus formation, the maximum (7.2 mg) of callus was recorded in the case of combination between these two plant growth regulators on MS medium supplemented with (2.0 mg/l-1 Kinetin + 0.0 mg/l-1 NAA). Whereas, the highest root length of adult leaf explants (2.5 cm) was recorded in MS medium supplemented with 0.1 mg/l-1 NAA and lowest range was recorded in MS medium free of growth regulators and also from another different concentrations of plant growth regulators like ( 0.5mg/l-1 NAA, 0.5, 1.0 and 2.0 mg/l-1 BA, 0.5 +0.5 mg/l-1 BA and NAA, 1.0 + 0.1, 1.0 +.03, 1.0+.05mg/l-1 BA and NAA, 2.0+0.1, 2.0+0.3, 2.0+0.5 mg/l-1 BA +NAA), also lower root number was recorded in the same medium, and the highest root number was 6 root/explants in MS medium supplemented with 0.5 mg/l-1 BA + 0.1 mg/l-1 NAA. In contrast, the highest root length (2.0 cm) was found after culturing of adult leaf explants on MS medium supplemented with 0.6 mg/l-1 NAA while the lowest root length and number/explants (0 root/explant) were recorded in MS medium supplemented with different growth regulators (2.0 mg/l-1 Kinetin+ 0.2, 0.4, 0.6 mg/l-1 NAA, 3.0 mg/l-1 Kinetin + 0.2, 0.4 mg/l-1 NAA), whereas the highest root number (5 root/explant) was recorded in MS medium containing 3.0 mg/l-1 kinetin + 0.6 mg/l-1 NAA. The in vitro procedures reported in this study were rapid, efficient and reproducible. Thus, they can be suggested to be used for large scale micropropagation for further genetic manipulation studies for this important ornamental plant and other similar plants.

**Evaluation of Different Sources of Nitrogen Combined with zine  
Application on the Rice Yield and Fertilizer Nitrogen Efficiency**

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## **Leptospirosis in Sheep at Sohag Governorate, Egypt: Epidemiological and Pathological Study**

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Leptospirosis is an important largely hidden, complex, neglected and intriguing spirochetel infection of animals and humans caused by serovars of leptospirae. Our goal is to investigate the incidences of sheep leptospirosis in Sohag governorate, Egypt. A total number of 176 female and male sheep aged between 6 months to over 3 years were used for this study. 123 animals were clinically suffering from urinary tract diseases. The signs were mentioned by the veterinarians, owners or meat inspectors responsible in the respective abattoir. The rest were selected as clinically healthy group. Animals were selected from slaughter houses in Sohag governorate. After routine pathological examination, thirty four (11 male and 23 female) sheep showed focal interstitial nephritis as well as hepatic lesions and jaundice, These cases were subjected to additional pathological, bacteriological and serological examination. Five male and seven female animals proved to be affected with leptospirae by using specific silver impregnation stain for kidney and liver samples. Twenty four animals (8 male and 16 female) were serologically positive for leptospire antibodies using slide agglutination test. The bacteriological examination revealed presence of mixed infections in some cases.

## **Evaluation of Dried Tomato Seeds as Feedstuff in the Diets of Growing Rabbits**

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This study was conducted to investigate the growth performance, digestibility, carcass traits and blood biochemical parameters of rabbits fed on different levels of dried tomato pomace, DTP (10, 20 and 30%). Twenty four of New Zealand White rabbits of averaged 945g body weight (6 weeks of age) were divided into four groups, of six each. The first group was fed a basal diet (0% DTP) and considered as control, while the other three groups were fed the basal diet after substituting part of the diet with DTP at 10, 20 and 30% respectively. There were significant ( $P<0.05$ ) differences between different experimental groups in live body weight and weight gains and feed intake. There were no significant differences in the digestion coefficients of the dry matter, crude protein and nitrogen free extract, while there were significant differences ( $P<0.05$ ) in the ether extract and crude fibre between different experimental groups and the diet contained 20% DTP recorded the highest values compared to other treated groups. There were significant ( $P<0.05$ ) differences between different experimental groups in dressing percentages, while no significant differences in weight percentages of liver, kidneys, heart and lungs. There was no significant difference in the total protein, while there were significant ( $P<0.05$ ) difference in the albumin, globulin and urea between different experimental groups. It could be concluded that dried tomato pomace (DTP) can be utilized efficiently and safely in the diets of rabbits up to level of 20% without any adverse effect on the performance, digestion coefficient of nutrients and carcass traits in addition to economical value and alleviate the pollution results in from these wastes.

# Early Transcripts Related to Male Development in Chicken Embryos

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Early transcripts related to male development in chicken embryos and their expression profiles were examined in this study. A total of 89 and 127 candidate male development transcripts that represented 83 known and 119 unknown non-redundant sequences, respectively, were characterized in an embryonic day 3 (E3; Hamburger and Hamilton Stage 20: HH20) male-subtract-female complementary DNA library. Of 35 selected transcripts, quantitative reverse transcription-polymerase chain reaction validated that the expression levels of 25 transcripts were higher in male E3 whole embryos than in females ( $P < 0.05$ ). Twelve of these transcripts mapped to the Z chromosome. At 72 wk of age, 20 and four transcripts were expressed at higher levels in the testes and brains of male than in the ovaries and brains of female chickens ( $P < 0.05$ ), respectively. Whole mount and frozen cross-section in situ hybridization, as well as Western blotting analysis further corroborated that *riboflavin kinase (RFK)*, *WD repeat domain 36 (WDR36)* and *EY505808* transcripts; RFK and WDR36 protein products were predominantly expressed in E7 male gonads. Treatment with an aromatase inhibitor formestane at E4 affected the expression levels at E7 of the *coatamer protein complex (subunit beta 1)*, *solute carrier family 35 member F1*, *LOC427316* and *EY50512* transcripts across both sexes ( $P < 0.05$ ), similar to what is observed for the *doublesex and mab-3 related transcription factor 1* gene. The interaction effects of sex by formestane treatment were observed in 15 candidate male development transcripts ( $P < 0.05$ ). Taken together, we identified a panel of potentially candidate male development transcripts during early chicken embryogenesis; some might be regulated by sex hormones.

# **Grain Storage Management**

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Suitable utilization of agricultural products and storage until marketing are also important as well as increasing of agricultural production. Aim of storage is to preserve properties of products and their freshness. If suitable storage conditions aren't supplied, according to product variety, quality and quantity losses increase. Decreasing these losses is possible with providing suitable storage conditions and storage management. In this paper, information concerning with storage conditions of agricultural products and storage management to safe storage were given.

# **Interaction of Cereal and Root Starches With Maca (*Lepidium Meyenii*) and its Effect on their Physico-Chemical Properties**

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Maca (*Lepidium meyenii*) is a South American plant which has long been used as a food for its nutritional value and medicinal properties. There are several studies highlighting its nutritional importance, however, there is limited information on characterising maca as an ingredient. The aim of this study is to evaluate maca and starch interactions in order to facilitate the use of it as a functional ingredient in a range of applications used in the food industry.

This study used four different starches (potato, corn, tapioca and wheat) as controls, with maca added at three different concentrations (3, 5 and 10% w/w). The effect of addition on the physical properties of the starches was then determined. The Water Absorption Index (WAI) in maca and the starches, with and without maca addition, heated at different temperatures (50, 60, 70, 80 and 90 °C) was also measured. The pasting profiles of starches and starch-maca mixtures, and compression tests were used to evaluate the effect of maca on gel formation and strength.

Adding maca had a significant ( $P < 0.05$ ) effect by decreasing the WAI of starches at temperatures close to the starch pasting temperature. The viscosity of the starches decreased significantly ( $P < 0.05$ ) when maca was added, including peak, breakdown, and final viscosity, as well as consistency. Adding maca at 10% (w/w) also significantly decreased the strength of the potato, corn and wheat starch gels.

Interaction of maca with a number of commonly used starches showed that there were no detrimental effects on the starches' physical properties at low levels of addition. Therefore, the incorporation of an established functional food, such as maca, as a food ingredient is possible and will facilitate a number of potential food applications. Such foods would benefit from the proven properties of maca without compromising the texture of the final product.

## **Effects of Brittle 1 and Waxy 1 Gene Dosage in Endosperm on Seed Quality of Their Corn**

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The objectives of this study were to investigate effects of Brittle 1 and Waxy 1 gene dosage in endosperm on seed quality of Their Corn . This experiment was conducted using completely randomized design (CRD) with 9 gene dosages and replicated 4 times. All 9 gene dosages were *bt1bt1bt1wx1wx1wx1*, *bt1bt1bt1Wx1wx1wx1*, *bt1bt1bt1Wx1Wx1wx1*, *bt1bt1bt1Wx1Wx1Wx1*, *Bt1bt1bt1wx1wx1wx1*, *Bt1bt1bt1Wx1Wx1wx1*, *Bt1Bt1bt1wx1wx1wx1*, *Bt1Bt1bt1Wx1wx1wx1* and *Bt1Bt1Bt1wx1wx1wx1*. The results were revealed that the endosperm of Their Corn expressed by *bt1bt1bt1wx1wx1wx1* gene showed the smallest seed size and weight and also had poor germination percentage and speed of germination but amylopectin contents were the highest (97.36%). In regard to the endosperm expressed by 3 recessive genes (*wx1*), the contents of amylopectin were quite high (92.01-97.36) whereas those of the endosperm expressed by 1-3 dosages of dominant gene (*Wx1*) were remarkably decreased from 86.47 to 87.94 %. Interaction between *wx1* and *bt1* gene in the endosperm expressed by 3 recessive genes (*wx1*) was the genetic background . Amylopectin contents were decreased from 97.36 to 93.13, 95.90 and 92.00 when gene dosage of *bt1* (*recessive*) was changed into *Bt1* (*dominant*) from 0 gene to 1, 2 and 3 genes respectively. It was indicated that interaction between *wx1* and *bt1* gene influenced amylopectin contents in endosperm of Their Corn.

## **N9-Substituted Purine Derivatives in Plant Biotechnology**

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Purine based derivatives called cytokinins belong to a class of plant growth regulators that play important role in many aspects of plant growth and development.<sup>1</sup> Cytokinins are used in micropropagation techniques for a very long time although their use in biotechnology is connected with some unwanted side effects, such as apical and main root shortening. We prepared and characterized a number of N<sup>6</sup>-furfurylaminopurine (kinetin), N<sup>6</sup>-isopentenylaminopurine and N<sup>6</sup>-benzyladenine derivatives substituted in N<sup>9</sup> atom of the purine moiety that maintain cytokinin effect without the above mentioned side effects. We studied their stability in solution, toxicity and biological activity in a number of bioassays such as tobacco callus bioassay, wheat senescence bioassay and *Amaranthus* bioassay as well as *in vitro* receptor bioassay in order to evaluate the biologic effects of newly prepared substances.<sup>2,3</sup> Selected substances were also used *in vivo* on *Arabidopsis thaliana* and *Zea mays* seedlings. N<sup>9</sup> substituted derivatives of kinetin and substituted N<sup>6</sup>-benzylaminopurine are highly active and beneficial for plant growth and could be used in crop biotechnology in the future.

**Just how Filthy are Maggots? Microbes Associated  
with the Blow Fly *Lucilia Sericata* (Diptera: Calliphoridae)**

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# **Comparative Study on the Effect of Different Phosphatic Fertilizers on Growth and Yield of Maize Plants Grown Under Saline Conditio**

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Pot experiment was carried out during the summer season in the green house of National Research Centre , Dokki, Giza Egypt . This work aimed to study the effect of three rates of chemical fertilizer (zero,16 and 32 kg P<sub>2</sub>O<sub>5</sub>/fad) and two types of bio-fertilizer (Phosphorine and vesicular arbuscular mycorrhiza) on growth and yield of maize plants. Chemical fertilization increased growth and yield parameters especially under high level. Inclusion of bio-fertilizers with either phosphorine or vesicular arbuscular mycorrhiza greatly increased various growth parameters (i.e. leaves and tillers number, dry weight of leaves, stem and ears) as well as yield components (leaves and tillers number , weight of straw and ears, grain yield , protein and oil contents of the grains. Dual application with chemical and bio-fertilizers, had more favorable effect on the majority of studied parameters than single use. . The highest dry matter accumulation in shoot system and ears and the highest yield and yield components recorded by maize plants fertilized with 16 m<sup>3</sup>/fad and inoculated with vesicular arbuscular mycorrhiza.

## **Potential Role of Microbes Regulating Attraction and Colonization of Rendered Animals by Blow Flies (Diptera: Calliphoridae)**

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Animal carcasses represent nutrient rich resources for organisms ranging from microbes to vertebrate scavengers. Microbes were initially thought of only as nutrient recyclers. However, some researchers have suspected that microbes were competitors with other consumers including insects for these resources. Microbes may alter food resources and produce toxins that affect the “appeal” of the resources, and themselves, to other consumers. Microbes colonizing fish carrion in tidal estuaries will compete with other consumers for these resources. These microbes release noxious chemicals that deterred consumption of the fish remains by higher level consumers, such as crustaceans.

Blow flies (Diptera: Calliphoridae) and microbes occurring on rendered animals have evolved in some instances a mutualistic relationship. Microbes consumed by immature blow flies feeding on a resource, survive larval molting and pupation, and are present in emergent adult insects which serve as a dispersal mechanism. The microbes release volatiles that attract blow flies to resources and resulting progeny disperse microbes to new habitats. However, consumption by the wrong saprophage results in microbial mortality. We hypothesize that while one bacterial species survives digestion and pupation with one fly species, it will not with another fly species. Therefore, bacterial proliferation and dispersal is mitigated by colonization patterns of fly species. However, such an association could prove detrimental to both species as the volatiles emitted could also attract predators, such as *Chrysomya rufifacies*, a predatory species on the native blow fly *Cochliomyia macellaria*.

We present data from a series of studies illustrating the role microbes play in attracting or repelling blow flies to rendered animals. We also present data indicating that microbes and other materials present on resulting larvae have a non-consumptive effect on the development of interspecific larvae competing for these resources and on the behavior of intra- and inter-specific adults tracking and locating these resources.

# **The Effect of Nitrogen Fertilizer Application on Yield Components and Plant Phosphorus Content of Flax (*Linum Usitatissimum* L.)**

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Flax which is a culture plant, is grown in order to benefit from fiber and fat . Flax production is done approximately 5-6 million hectares in the world .70% of this production is to produce oil and the rest is to produce fiber. In Turkey for growing a wide variety of oil plants has suitable ecology. However, an oilseed and vegetable oil deficit continues many years. Protein content and oil content of flax seed can vary depending on genetic and environmental factors. According to data in 2008, this plant has for seed and fiber production about 670 decare areas in Turkey. Seed production is 40 tones and yield is 60 kg da<sup>-1</sup>.Fiber production 1 ton year<sup>-1</sup> and yield is 1 kg da<sup>-1</sup> in our country in 2008.

This investigation was carried out ecologic conditions at Cumra District in Konya-Turkey; in a period of May 2009-July 2009 .Sarı-85 flax varieties were used. In this study, different doses of nitrogenous fertilizer (5 kg N da<sup>-1</sup>, 7 kg N da<sup>-1</sup> and 10 kg N da<sup>-1</sup>) were given and were given as a fixed dose of phosphorus fertilizer(5 kg P<sub>2</sub>O<sub>5</sub> da<sup>-1</sup>) in sowing for flax. Witnesses' parcels haven't been any made fertilizer application. Experiment under the field conditions were conducted in split plot design in Cumra Country Konya-Turkey. Flax (Sarı-85) was grow under watery conditions.

The effect of nitrogen fertilizer application at the end of study was seen plant height, number of capsules in the plant, thousand grain weight, plant weight and root weight of aboveground parts .Between the phosphorus content of plant's leaves, roots and stem parts and nitrogen fertilizer applications were observed statistically significant changes P<0.05. But between phosphorus content of seed and nitrogen fertilizer applications have not been statistically significant changes. In general, with increasing the amount of applied nitrogen fertilizer increased the phosphorus content of seed.

**The Effect of Deferred Harvesting, Sowing Density and harvest Intensity on Trend of Hard Seed Breakdown of Annual Medic, (*Medicago scutelatta* Var Robinson)**

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To evaluate the effects of deferred harvesting, sowing density and harvest intensity on hard seed and break down trend of annual medic (*Medicago scutelatta* Var Robinson), an experiment was conducted in the agricultural research farm of Tehran University located in Karaj during 2007 growing season. The experimental treatments were arranged in split-split plots based on a complete randomized block design with four replications. Where the commencement of harvesting (continues and deferred) was allocated to the main plot, the sowing densities of 25, 75 and 225 plant  $m^{-2}$  to sub plots and the harvest intensities (Different heights of forage cutting from ground level) of 2, 4 and 8 cm to the split-split plots. Results indicated that present hard seedness follows a decreasing trend with decline in sowing density and an increase in harvest intensity. Present hard seedness was 83.3% in august (During harvest of pods) which was decreased to 52.7% in March.

## **Biofilm Formation of Bacterium *Proteus mirabilis* Isolated from the Salivary Glands of Blow Fly *Lucilia sericata***

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Bacteria seldom live individually but prefer to live in biofilms. These complex communities are formed by the attachment of bacteria to submerged surfaces in aquatic environments and by the production of microbial products including polysaccharides, glycoproteins, and DNA. In medicine, 80% of human bacterial chronic inflammatory and infectious diseases involve biofilms; hence, a detailed understanding of the genetic basis of biofilm formation is necessary to determine effective cures and prevent biofilm infections. Given its interaction with surfaces that include bacterial biofilms, we hypothesized here that the blow fly *Lucilia sericata* can influence biofilm formation. Using *Escherichia coli*, *Pseudomonas aeruginosa*, and *Bacillus subtilis* as reference bacterial strains and using a static biofilm assay on 96-well polystyrene plates, we found the salivary gland extract of maggots did not alter the biofilm formation of all three bacteria. However, the salivary gland extracts contained at least two species that interacted with the reference cultures: *Proteus mirabilis* and *Providencia stuartii*; these strains were identified by API biochemical tests and confirmed by pyrosequencing. *P. mirabilis* increased the biofilm formation of all three bacteria. Initial phenotype tests on *P. mirabilis* showed that it is able to make significant biofilm on polystyrene surfaces at 37°C without any changes in extracellular indole or exopolysaccharide. In addition, this insect-related strain swarms on Congo red plates at low temperatures (room temperature and 30°C) while it does not swarm at 37°C. Therefore we found that *Proteus mirabilis* from the blow fly salivary gland plays a role in biofilm formation at low temperatures.

# **Agricultural Waste Management: Case Study of a Waste Treatment Plant for Animal Manure**

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The problem of agricultural waste management is studied in the agricultural region of the East Galilee that includes 25 villages and four urban centers and neighboring the Sea of Galilee. The annual agricultural activity involves fruit plantations, field crops, dairy cows, poultry, fruit packing houses, and vineyards. The total amount of waste from these agricultural branches is 200,000 tons in the range of service 45 km. Ninety percent of waste is animal manure. The aims of the study are to suggest a method of evaluating agricultural waste management technologies that would relate to economic, logistic and environmental aspects, and to adapt this method to a targeted region.

A comprehensive study of the region was carried out. It includes available technologies, market for the final products (compost, fertilizer, electricity and heat), and detailed questionnaires for technological and management aspects. The suggested method includes the following: process balances (mass, liquid, energy); economic model for collection and transportation of waste, its processing in the plant, and sales of final products. We used a mathematical model (decay equation) for emissions and carbon credits prediction. The results of adapting the method are as follows. The recommended technology is the Anaerobic Digestion. All the waste is disposed in one site; there will be no need for another site in future. The farmers will pay for collection and transportation of waste to the plant; and they are charged low price for compost and fertilizers. The plant produces electricity (converted from biogas), and sells it to the grid. Clean Development Mechanism pays to the plant for carbon credits, due to prevention pollutant emissions to the atmosphere. These economic benefits make the plant a profitable business. Benefits for farmers of the region are waste removal, high grade compost and organic fertilizer substitute for lower price. Environmental benefits for the region are preventing air pollution, Sea of Galilee and underground water contamination.

**Evaluation of Organic and Chemical Fertilization  
on Heavy Metals Concentrations in Soil and Plant**

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