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10th June 2014

11.00 am- 12.40 pm

Salon Orchid,

Galadari Hotel,

Colombo

Climate Change, Farmer Perception & Agriculture

Session Chair: Prof. D.K.N.G. Pushpakumara

1	Climate smart management options for improving the soil fertility and farm productivity in the middle hills of Nepal	*B.K. Bishwakarma, A. Shrestha, and R. Allen*
2	Alleviation of temperature stress by the exogenous application of gibberellic acid and changes in acid phosphatase activity on mung bean (Vigna radiata L.) seedlings	*Simeen Mansoor, Farzana Nasir Naqvi*
3	Farmers' innovation capacity for climate-smart forest and agricultural practices in Bangladesh	*M. Asaduzzaman Sarker , A. H. Chowdhury*
4	Comparison of C storage in three promising fast growing tree plantations under an Agroforestry system in sub-humid tropics of Chhattisgarh, India	*Swamy, SL and Khare, CP*
5	Farmers' perception and adaptation to climate change: Case study of vulnerable areas in Polonnaruwa district	*W.A.C.K.Chandrasiri*

[01]

CLIMATE SMART MANAGEMENT OPTIONS FOR IMPROVING THE SOIL FERTILITY AND FARM PRODUCTIVITY IN THE MIDDLE HILLS OF NEPAL

[1]B.K. Bishwakarma, [2]A. Shrestha, and [3]R. Allen

Sustainable Soil Management Programme (SSMP), HELVETAS Swiss Intercooperation Nepal

ABSTRACT

Increasing food demand and climate change pose a major challenge to the sustainability of food production systems and safeguarding environmental health. Nepal's economy is primarily reliant on agriculture which is highly sensitive to climate variability. Key concerns in the mid-hills of Nepal include declining soil fertility and soil degradation, changing temperature and precipitation patterns, and pest and disease outbreaks all of which are affecting productivity, prices, incomes, and ultimately livelihoods. This paper describes some simple, farmer-friendly climate smart management options, and analyses their importance, effectiveness and impacts on improving soil fertility and farm productivity. Simple and widely adopted sustainable soil management and agronomic practices, which are based on efficient use of local resources, include improvements in the preparation and management of farmyard manure and compost, systematic collection of cattle urine and its use as a base for botanical pesticides and liquid fertilizer, integrating legumes and fodder crops into the cropping system, small-scale collection of rain and run-off water, and improved water use efficiency. These practices have resulted in a statistically significant increase in soil organic matter levels, and have improved soil fertility and structure, workability, and moisture characteristics. Additional benefits include enhanced soil carbon storage, and improved crop resilience to changes in weather patterns. Adoption of these practices has contributed to increased productivity, enhanced income, improved food security, and a beneficial impact on the workload of women.

Keywords: climate change, food security, farmyard manure, soil fertility, soil organic matter

ALLEVIATION OF TEMPERATURE STRESS BY THE EXOGENOUS APPLICATION OF GIBBERELLIC ACID AND CHANGES IN ACID PHOSPHATASE ACTIVITY ON MUNG BEAN (*VIGNA RADIATA* L.) SEEDLINGS

[1]Simeen Mansoor, [2]Farzana Nasir Naqvi

Department of Genetics, University of Karachi, 75270. Pakistan

ABSTRACT

Plants are exposed to various abiotic stresses throughout their life. Many of these stresses may have detrimental effects on growth. High temperature is one of the major abiotic stress that can reduce yield of number of agricultural crops. At the same time plants have developed some defense mechanism to cope the negative impact of stress. It is here important to understand plant responses to environmental stresses and exploiting the ways to reduce their impact, one of such method is the exogenous application of phytohormone like gibberellic acid (GA3) during stress. In present study we examined the effect of pretreatment of mild temperature (40°C, 1h) and 100 µM GA3 on the acquisition of thermotolerance and acid phosphatase (AP) activity on seedlings of four mung bean genotypes (NM 19-19; Nm 20-21; NM 121-123 and NCM 89). Acid phosphatase activity was reduced under lethal temperature stress (50°C, 2h), which was improved when seedlings were exposed to 40°C for 1h prior to 50°C for 2h. Similarly 100 µM GA3 also exhibited promoting effect on growth and AP activity in seedlings treated with temperature as well as optimum temperature (30°C)

Key words; mung bean, vigna radiata, acid phosphatase, gibberellic acid, temperature stress

FARMERS' INNOVATION CAPACITY FOR CLIMATE-SMART FOREST AND AGRICULTURAL PRACTICES IN BANGLADESH

[1]M. Asaduzzaman Sarker , [2]A. H. Chowdhury

[1]Bangladesh Agricultural University (BAU), [2]University of Guelph, Canada

ABSTRACT

Bangladesh is a small and populated country in South-Asia. Seventy-seven percent of its population lives in rural areas, majority are dependent on natural resources for livelihood (BBS, 2011). Due to ever- growing population forest land has been decreasing at 2% annually. This is one of the significant factors responsible for climatic change events like recurrent natural calamities and degradation of natural resources. The study was conducted in Madhupur forest area, which has greatly been exhausted due to conversion of forest into human settlement, agricultural production and peripheral industrialization. Tribal 'Garo' people lives inside this forest and meeting up their livelihoods from forest resources. Although, this forest has been considered as one of the rich biosphere regions, this is now under threat of unsustainable and environment-antagonistic agricultural practices. Thus, a pilot project was taken in the area by BAU to minimize carbon emission through introduction of low emission agricultural practices (vermi-compost and botanical pesticide) in crop production and to increase women's participation in social forestry program. The findings showed that beneficiaries of the project are now greatly aware on consequences of climate change. Around 75% of the beneficiaries are now using own made vermi-compost and botanical pesticide in agricultural production, while 42% of them are using improved cooker which has significantly reduced amount of fire wood for cooking. So, it can be concluded that through improving farmers' innovation capacity it is possible to reduce consequences of climate change. However, to let it happen integrated initiative is needed from concerned agencies.

Keywords: innovation capacity, climate-smart practices, forestry and agriculture

COMPARISON OF C STORAGE IN THREE PROMISING FAST GROWING TREE PLANTATIONS UNDER AN AGROFORESTRY SYSTEM IN SUB-HUMID TROPICS OF CHHATTISGARH, INDIA

[1]Swamy, SL and [2]Khare, CP

[1]Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, Chhattisgarh, India 495009.

[2]Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India 492006.

ABSTRACT

The anthropogenic activities are alarmingly increasing the concentrations of CO_2 in the atmosphere leading to the climate change. The global changes in temperature and erratic rainfall are altering the structure and functioning of the terrestrial ecosystems. Agriculture ecosystem especially tropical agricultureis most vulnerable to climate changeposing a serious threat on food, nutritional securityand livelihoods of poor farming communities. Agroforestry technologiesindeed offerviable opportunity to mitigating the atmospheric accumulation of$CO_2$and other Greenhouse gases, and potential for transforming to resilient farming systems and further help smallholder farmers of many tropical countries like India for adapting to climate change. However, the magnitude of C sequestration inmany agroforestry systemsis still unknown, which primarily depends on thechoice of tree species and managerialpractices. The present study corresponds to a part of the long term project on Gmelinaarborea, Populusdeltoidesand Ceibapentandra based agroforestry systems evaluatedfor C storage potentials in sub-humid tropics Chhattisgarh, India. At 5 years age, total C storage in G. arborea stands ranged from 4.6 to 9.8 Mg ha^{-1},P. deltoidesfrom 10.7 to 18.3Mg $ha^{-1}$and C. pentandrafrom 5.6 to 9.9 Mg ha^{-1}. Soil organic C significantly enhanced under agroforestry system. Soil organic C inG. arboreastands increased from 9.1to 21.5%, P. deltoides from 7.1% to 17.9%,and C. pentandra from 18.5 to 29.2% under different treatments. Soybean and wheat were found to be suitable crops for intercropping in agroforestry systems. The paper discusses the management implications for sustainable tree-crop production and improving C sequestration under agroforestry systems for mitigating the climate change.

Key words: Biomass, Carbon sequestration, Climate change, Greenhouse gases, Mitigation, Yield losses

FARMERS' PERCEPTION AND ADAPTATION TO CLIMATE CHANGE: CASE STUDY OF VULNERABLE AREAS IN POLONNARUWA DISTRICT

W.A.C.K.Chandrasiri

Socio Economics and Planning Centre, Department of Agriculture, Peradeniya

ABSTRACT

Changing climate made regular incidences of floods and drought. It confused farmers and policy makers on policy making for achieving country's food security. This study examines climate change on aspects of its severity to farm income, farmer awareness, adaption options and its determinants and barriers to adaption. A primary survey was conducted with a sample of 115 farmers in most vulnerable three Divisional Secretariats (DS) namely Thamankaduwa, Madirigiriya and Dimbulagala in Polonnaruwa District during April – May in year 2013. Logistic regression model was used to analyze data. The findings are 99% of the farmers affected to floods and 63% affected to both drought and flood conditions. Farmers earn 80% of their income from agriculture and loose 39% of income due to drought from each of 8 seasons and 76% of income due to floods in each of 4 season's intervals. Climate change aspects were fairly aware to farmers and the level of adaption was poor. Adoption to climate change was attempted by 13 percent of farmers in ways of cultivating short duration crops and coinciding cultivation according to rainfall. The farmers with young age, educated, proper connection with extension officers, familiar with climate change, satisfied with the irrigation water availability adopt their cultivation to climate change. Further 15% of farmers believe that managing cultivation is impossible according to changing climate. Therefore focused extension programmes, research on suitable technologies, and programmes to attract educated young farmers to climate smart agriculture is highly emphasized.

Key words: climate change, farmers, agriculture, logistic regression model

Technical Session 02

10th June 2014

02.15 Pm- 03.55 pm

Salon Orchid,

Galadari Hotel,

Colombo

Agriculture Education, Marketing & Data Management

Session Chair: Prof. D.K.N.G. Pushpakumara

1	Predisposition factors of students' choice in agriculture, fisheries, and natural resources (AFNR) courses (Luzon Area)	*Romeo C. Clemente, Romeo R. Quilang*
2	Modeling the causal effect of world cocoa price on production of cocoa in Ghana	*Sampson Ankrah, K.A. Nyantakyi and E. Dadey*
3	Analyzing consumers' perception and attitude toward organic food products in United Arab Emirates	*Safdar Muhammad*
4	Digitization of field data collection	*Deepali Kamatkar*
5	A remote sensing-based SVAT modeling platform to simulate ecohydrological processes of pristine and managed ecosystems	*Govind, Ajit*

PREDISPOSITION FACTORS OF STUDENTS' CHOICE IN AGRICULTURE, FISHERIES, AND NATURAL RESOURCES (AFNR) COURSES

(LUZON AREA)

[1]Romeo C. Clemente, [2]Romeo R. Quilang

[1]DA-Agricultural Training Institute

Quezon City, Manila, Philippines

[2]Cagayan State University

Tuguegarao City, Philippines

ABSTRACT

This study is an inquiry into the motivational, personality, and extrinsic factors affecting students' predisposition in their career choice for agriculture, fisheries and natural resources (AFNR) courses. It features recent conditions of public and private Higher Education Institutions (as NUCAFs, PIAs and PIFs identified by NAFES-CHED and DA) of Luzon, Philippines vis-à-vis problems and reasons of continuous decline in the subscription of Filipino students for AFNR courses. Subsumed in the findings for Luzon area (i.e., most enrollees and their parents are marginalized; most mothers who are mere housekeepers heavily influence children's disposition; most AFNR parents and enrollees' siblings who are now AFNR professionals poorly influence them to take the same course; scholarship grants or free tuition fee as a way out to finish college education; personal ideal expectation of students for the government to provide local employment; common social motive to participate in addressing problems on food security; economic motive to shorter waiting time for employment; SUCs feel obliged to expand curriculum offering to non-AFNR courses to survive institutional fiscal constraints; dearth of educationally qualified faculty and administrators; campaign for the AFNR curriculum programs as effective strategy to improve enrolment rate; low passing rate in AFNR board examinations due to low participation rate, expensive requirements of review, generic contents of examination, and deficiency on the quality and quantity of facilities/equipment and library holdings in most AFNR State Colleges/Universities) served as framework of reference for the formulation of proposed education policy reforms/measures and advocacy interventions designed to spur interest in (AFNR) courses.

Keywords: Students' predisposition, motivational/personality/extrinsic factors, career choice

MODELING THE CAUSAL EFFECT OF WORLD COCOA PRICE ON PRODUCTION OF COCOA IN GHANA

[1]Sampson Ankrah, [2]K.A. Nyantakyi and [3]E. Dadey

[1,2]PhD Students, Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka

[3]SSNIT, Research Department, Accra, Ghana

ABSTRACT

In this paper, models are developed to explain and forecast the effect of world cocoa price on production of cocoa in Ghana by using regression model with time series errors. It was investigated whether the world cocoa price can assist in forecasting or influence the future behavior of the cocoa production in Ghana. Annual data from 1961 to 2010 were used in fitting the model while 2011 and 2012 were used as out-of-sample data. Based on the behavior of several model adequacy techniques the regression model with ARIMA(2,2,0) errors was fitted as the 'best' model to cocoa production variable. The mean absolute percentage error (MAPE) as a forecast accuracy measure was used to validate the model. Thus, the MAPE of the production regression model with ARIMA errors was 7.97%. However, the 'best' ARIMA model fitted to the production variable indicated an MAPE of 16% for the production variable. This indicates that, the production variable has better forecast accuracy measure, when it was modeled together with world price using regression with ARIMA errors. Hence, regression model with ARIMA errors is a better statistical technique in forecasting production of cocoa in Ghana than the ARIMA method.

Key Words: ARIMA, Regression with ARIMA Errors and MAPE.

[08]

ANALYZING CONSUMERS' PERCEPTION AND ATTITUDE TOWARD ORGANIC FOOD PRODUCTS IN UNITED ARAB EMIRATES

Safdar Muhammad

Department of Agribusiness, College of Food and Agriculture,

United Arab Emirates University, UAE

ABSTRACT

The global demand for organic food products is increasing rapidly in recent years. The consumers are willing to pay higher prices (price premium) for certified organic food products. Growing demand, high price premium, uniform standards, and increased production of organic food products indicate an opportunity for the farmers seeking high value alternative enterprises. The objective of this paper is to gain knowledge about consumers' perception and their attitudes toward organic food in UAE. The results showed that a few number of UAE consumers have heard a little of organic food. UAE consumers who know organic food consider organically-grown products as very healthy, fresh and chemical free. According to the research results, an important task for the producers will be to increase consumers' knowledge and awareness of organic food and promoting organic certification that will differentiate organic food with other in the marketplace.

Keywords: Organic food, consumer perception and attitudes, organic certification, organic premiums

[09]

DIGITIZATION OF FIELD DATA COLLECTION

Deepali Kamatkar

SEED Management Services Pvt. Ltd.

ABSTRACT

"Survey Data ++ "is an innovative software product specially designed for researchers, economists, data analysts to configure and deploy surveys on electronic devices such as tablets, smart phones or even laptops, thus enabling a complete paperless solution. It is an IT solution for ***knowledge gathering****, a proven technology based solution to address the need of field data collection by providing accurate, authentic, and adequate statistical data in a desired time frame. This techniques involves the use of electronic media like tablet to collect , store , manipulate and transmit data relating to interviews conducted between interviewer and the respondent(s).*

This product is applicable to any types of interviewing: CAPI, TAPI, CATI etc. The data collected from this technique is clean and analysis ready and avoids all the errors of manual data entry.

[10]

A REMOTE SENSING-BASED SVAT MODELING PLATFORM TO SIMULATE ECOHYDROLOGICAL PROCESSES OF PRISTINE AND MANAGED ECOSYSTEMS

Govind, Ajit

Laboratory of Interactions in the Soil-Plant-Atmosphere [UMR 1391 ISPA]

National Institute of Agricultural Research [INRA], France.

ABSTRACT

Terrestrial ecosystems exhibit large spatio-temporal variability in the manner in which mass and energy are cycled across the soil-plant-atmospheric continuum. This can be attributed to their large spatial n/r temporal variability in biophysical, edaphic, and hydroclimatic characteristics. Natural disturbance and man-induced management factors render additional effects. In order to better understand these ecohydrological complexities on the important biogeochemical cycles, a process-based modeling approach that can utilize remotely sensed information is postulated to better predict (1) forest or crop productivities and (2) geophysical mechanisms under changing climate and management conditions. In this spirit, I present the STEPS modeling framework and its ability to simulate the carbon, water and nitrogen cycles in diverse ecosystems. Initial part of the presentation will focus on the theoretical aspects of this model. Further we will discuss its application in a pristine boreal forest landscape in Eastern Canada and in a managed forest-crop landscape in SW France.

Keywords: Landscape variability, Soil-Plant-Atmospheric Continuum, Forest and Crop Productivity, Biogeochemical Cycling, Process-based Modeling, Remote Sensing

Technical Session 03

10th June 2014

04.30 pm- 05.50 pm

Salon Orchid,

Galadari Hotel,

Colombo

Horticulture & Food Production Systems

Session Chair: Prof. S.L. Swamy

1	Gaussian mixture model based non-destructive watermelon ripeness classification by acoustic analysis	*Rajeev Rajan, Reshma S, Shilpa Purushothaman*
2	Prospects of non-destructive fruit maturity and quality grading by acoustic and image analysis	*Rajeev Rajan, Reshma S., Shilpa Purushothaman*
3	Techniques for increasing the biological efficiency of paddy straw mushroom (Volvariella Volvacea) in eastern India	*M. K. Biswas and Mrinmoy Layak*
4	Estimation of carbon dioxide flux changes at pear orchard with eddy covariance method in Korea	*EunJung Choi, Jongsik Lee, Hyuncheol Jeong, Sanguk Suh and Kyuho So*

[11]

GAUSSIAN MIXTURE MODEL BASED NON-DESTRUCTIVE WATERMELON RIPENESS CLASSIFICATION BY ACOUSTIC ANALYSIS

[1]Rajeev Rajan, [2]Reshma S, [3]Shilpa Purushothaman,

Government Engineering College, Wayanad, Kerala, India.

ABSTRACT

A major issue in the post harvest phase of fruit production sector is the systematic determination of maturity level of fruits such as ripeness of watermelon. Maturity assessment plays an important role in sorting stage in packing houses before exporting to the destination. This paper proposes a Gaussian Mixture Model based method for automated non-destructive classification of watermelon ripeness by acoustic sound analysis. Acoustic samples are collected from ripe and unripe watermelons in a studio environment by thumping on the surface of watermelons. Sound samples are first processed to remove silence region by fixing an energy threshold. Pre-processed sound signals are segmented into equal length frames sized 200 ms. and Mel-Frequency Cepstral Coefficients with its first order derivatives are extracted from each frame.26 dimensional feature vector obtained in the feature extraction task is fed to the classification phase. The entire audio samples are classified into training set with 50% of total file and testing set with remaining 50%.Gaussian Mixture Model based classifier is trained with features extracted from the training set. Two models correspond to ripe and unripe are build during the training phase. During testing phase files are tested for the maturity level based on likelihood estimation in GMM. Our results show that the proposed method was able to discriminate between ripe and unripe watermelons with 88.00% accuracy, with feature vector of 26 dimensions only. Important merit of this method is that performance of the classifier is not much depend on the parameters, as that is not the case of other classifiers.

Key words: Maturity, Gaussian Mixture Model, MFCC,

[12]

PROSPECTS OF NON-DESTRUCTIVE FRUIT MATURITY AND QUALITY GRADING BY ACOUSTIC AND IMAGE ANALYSIS

[1]Rajeev Rajan, [2]Reshma S.,[3] Shilpa Purushothaman

Government Engineering College, Wayanad, Kerala, India.

ABSTRACT

During the past decades, the inspection of quality and maturity of fruits and vegetables is highly demanded in fruit production industry. A number of promising technologies exist for non-destructive assessment of fruit maturity and quality based on ripeness and maturity indices. Traditional non-destructive methods for assessing fruit maturity and quality are based on aroma, colour, composition, defects, firmness and shape. Manual sorting by visual inspection is labour intensive, time consuming and suffers from the problem of inconsistency and inaccuracy due to person dependant perception. Fruit production industry is looking for newer automated non-destructive quality checking methods to avoid the problems of the traditional approach. Automated non-destructive classification consists of many techniques such as vibration response spectrum, impedance matching method, acoustic analysis and image based techniques. Machine vision and acoustic methods gain popularity nowadays due to the reliability, accuracy and easiness in the implementation. This paper critically analysis the existing machine vision and acoustic based methods in the non-destructive classification of maturity level and discusses the prospects for further improvement in the performance. Machine learning based methods consists of two phases, feature extraction phase and classification phase. Features widely used are MFCC, Spectral flatness, Spectrogram, RGB colour and R/IR Histogram. Classifiers usually used are based on Multilayer perceptron, Support Vector Machine and Gaussian Mixture Model. This paper focuses on each phase of the entire system, described in the literature and suggests alterations that can be incorporated to improve the overall performance.

Keywords: non-destructive classification, Machine learning, acoustic, maturity

TECHNIQUES FOR INCREASING THE BIOLOGICAL EFFICIENCY OF PADDY STRAW MUSHROOM (*VOLVARIELLA VOLVACEA)* IN EASTERN INDIA

[1]M. K. Biswas and [2]Mrinmoy Layak

[1,2] *Department of Plant Protection, P.S.B., Visva-Bharati, Sriniketan,W.B.,731236, India*

ABSTRACT

Mushrooms are popular for their delicacy and flavoured food value. Among the various mushrooms cultivated in India, paddy straw mushroom (Volvariella spp.) holds a good promise and its cultivation have been introduced as a cottage industry. It has several advantages like requirement of the tropical or sub-tropical climate, fast growth rate, easy cultivation technology and good acceptability at consumers' level. Various methods were employed to enhance the Biological Efficiency of Volvariella volvacea. Cage method of cultivation proved its superiority among all the methods tested and gave highest Biological Efficiency (12.10 %) followed by bed method and spiral method of cultivation. Mixing of banana pseudostem and paddy straw in the ratio of 1:1 increased the yield (14.90% B.E) which was 34.23 % higher than paddy straw. Hand threshed straw of local indigenous variety showed maximum yield and Biological Efficiency (14.15%) in comparison to cattle and tractor threshed high yielding rice variety. A range of 10.36 % to 30.57 % increase in Biological Efficiency was obtained with different supplements. Maximum yield (16.45 % B.E.) was recorded from 2 % red gram supplemented substrate followed by 2% rice bran (14.15 % B.E). The above findings will provide valuable information to the cultivators and help them for generating extra income through paddy straw mushroom cultivation.

Key words: Volvariella volvacea, Biological Efficiency, Paddy straw, Supplementation

[14]

ESTIMATION OF CARBON DIOXIDE FLUX CHANGES AT PEAR ORCHARD WITH EDDY COVARIANCE METHOD IN KOREA

[1]EunJung Choi, [2]Jongsik Lee, [3]Hyuncheol Jeong, [4]Sanguk Suh and [5]Kyuho So

National Academy of Agricultural Science

ABSTRACT

Concern over global warming impact on climate change has increased interest in mitigation of greenhouse gases (GHGs). There are many studies conducted for reducing carbon dioxide (CO_2) emission which is main constituent of GHGs. Most annual crops those are cultivated in short period give little contribution to carbon accumulation. However, fruit tree can be a role as an important CO_2 sink source in agriculture as fruit tree photosynthesizes over 15 years in general. In this study, we carried out to estimate of changes of carbon balance with eddy covariance method in pear orchard at Naju, Republic of Korea in 2013. In order to compare to carbon balance, we measured various factors such as temperature, precipitation, and soil temperature, etc. As the results, net ecosystem CO_2 exchange (NEE) was 8.8 t $C \cdot ha^{-1} \cdot yr^{-1}$ in 2013. However, the NEE would be reduced when it was excepting value of branches, leave, and fruits. Furthermore, long-term monitoring is needed for accurate measuring the NEE in orchard ecosystem.

Keywords: carbon dioxide (CO2), NEE, pear, sink

Technical Session 04

11th June 2014

10.00 am- 11.00 am

Salon Orchid,

Galadari Hotel,

Colombo

Animal Production, Health & Hygiene

Session Chair: Prof. Terence J. Centner

1	Compensating farmers for damages from neighbor's pesticide spray drift	*Terence J. Centner*
2	Immuno suppressive effect of bendiocarb application in the rabbits	*Danko, J., Massanyi, P., Stawarz, R., Vdoviakova, K., Maloveska, M., Kresakova, L.*
3	Bendiocarb induced male reproductive alterations in rabbits	*Massanyi. P,[1]Krockova. J, Petrovova. E, Danko. J, Lukac. N., Stawarz. R, Formicki. G.*
4	Effect of nickel on male reproduction	*Lukac. N., Massanyi. P., Krockova, J., Toman R., Danko. J., Stawarz. R., Formicki.G.*

COMPENSATING FARMERS FOR DAMAGES FROM NEIGHBOR'S PESTICIDE SPRAY DRIFT

Terence J. Centner

The University of Georgia

ABSTRACT

Pesticides are widely used all over the world for food production. If they are not used carefully, pesticide drift may invade nontarget properties causing damages. In most cases, common law causes of action can be used to seek redress for damages from pesticide drift. However, established tort law often means a farmer faces difficult burdens of proof. While evidence of pesticide drift on a nontarget property seems to establish a claim for an unlawful trespass, some courts are declining to recognize trespass actions for spray drift. Alternatively, farmers may claim that damages from a neighbor's spray drift were the result of negligence. However, the injured producer will need to establish a breach of a duty of care. This may be difficult if the applicator has records showing that all pesticides were applied according to acceptable spray practices. This paper analyzes the jurisprudence of pesticide spray drift damages to discern the viability of causes of actions and to inquire whether governmental recovery options are outdated. It examines how governments are reconciling competing interests of farmers with neighbors who spray pesticides. Application of the polluter pays principle suggests that the law might hold pesticide applicators accountable for damages their actions cause to nearby property owners.

Keywords: pesticide drift; trespass; nuisance; negligence; liability

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IMMUNO SUPPRESSIVE EFFECT OF BENDIOCARB APPLICATION IN THE RABBITS

[1]Danko, J., [2]Massanyi, P., [3]Stawarz, R., [4]Vdoviakova, K., [5]Maloveska, M., [6]Kresakova, L.

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ABSTRACT

Immune system of animals reacts to various exogenous stimuli by the changes of the immune system reactivity. A decrease of the immune system reactivity after the influence of the exogenous factor results into the immunosuppression, i.e. permanent or temporary immune dysfunction leading to the increased susceptibility of organisms to pathogenic agents. Pesticides belong to the substances that can cause significant modulation of the immune mechanisms both in man and animals. The immune system reacts more sensitive than other systems to the chemicals even in very low concentrations. Therefore the haematological and immunological parameters in rabbits was evaluated by application of the carbamate insecticide (bendiocarb; in the dose 5 mg/kg of the body weight). Total leukocyte cell count and differential cell count were determined during the period of three months of bendiocarb application and compared with those in healthy animals. The immunotoxic effect was evaluated by the test of ingestion ability of phagocytes (phagocytic activity and index of phagocytic activity) and proliferation activity of lymphocytes after mitogen stimulation. Our results confirm in vivo suppressive effect of long-term bendiocarb application on the functional status of lymphocytes and phagocytes in the rabbits. The significant decrease of total leukocytes, lymphocytosis and neutropaenia were found after bendiocarbamate application. The functional activities of phagocytes (expressed as phagocytic activity) and lymphocytes (proliferative activity) were significantly suppressed in rabbits treated with bendiocarb compared with those in control groups and values before the experiment.

This study was supported by project VEGA No. 1/0111/13 from the Slovak Ministry of Education.

Keywords: bendiocarb, immune system, rabbit, toxicity

BENDIOCARB INDUCED MALE REPRODUCTIVE ALTERATIONS IN RABBITS

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ABSTRACT

Exogenous contaminants with different effects on living organisms include also agrochemicals. These chemicals are used in agriculture with a wide range of products for plant nutrition, crop and animal protection. Such substances are also pesticides and one of them is bendiocarb mainly used as a protection against mosquitoes, flies, axes, ants, fleas, cockroaches, ticks and other pests in homes, industrial plants, food warehouses etc. In this study male rabbits (n=9) were used and bendiocarb (Bayer, Germany) tablets were administered daily to rabbits at a dose of 5 mg/kg of body weight for 13 days and later the doses were limited to 48-hour intervals. The killing of the experimental animals was carried out painlessly by ether anesthesia at the 3rd day (Collection 1 – C1) and the 60th day (Collection 2 – C2) after the last dose of bendiocarb. For microscopic analysis samples were taken from the rabbit testes. For spermatozoa analysis in vitro the semen samples were diluted with saline solution and bendiocarb in various concentrations (B1 – 0.268 mg/mL, B2 – 0.214 mg/mL, B3 – 0.161 mg/mL, B4 – 0.107 mg/mL and B5 – 0.054 mg/mL). Each of thus prepared samples was evaluated using a CASA system.

In the control animals each seminiferous tubule formed a central lumen lined by an actively replicating germinal epithelium with a population of supporting Sertoli cells. In experimental groups a decrease in comparison with the control group was detected but the differences were not significant. The lowest volume in germinal epithelium was in the group from the C1. An increase in the relative volume of the lumen was registered in both experimental groups in comparison with the control group, but the highest volume in lumen was also in the group from C1. Qualitative analysis detected a dilatation of blood vessels in the interstitium, basal membrane undulation and various empty spaces in the germinal epithelium. Spermatozoa motility analysis at Time 0 detected a slight increase in comparison with the control group. However, after 30 min of incubation the motility was decreased, and the highest motility was observed in the control group. The lowest spermatozoa motility was detected in group B1 with the highest bendiocarb administration at Time 180. The motility time– and dose–dependently decreased. The progressive motility showed similar decreasing tendency. Our findings clearly suggest a negative effect of bendiocarb on the testicular structure and function as well as negative effect on spermatozoa motility parameters.

This study was supported by project VEGA No. 1/0532/11 from the Slovak Ministry of Education. The research leading to these results has received funding from the European Community under project no 26220220180: Building Research Centre "AgroBioTech".

Keywords: bendiocarb, reproduction, testis, spermatozoa, rabbit, toxicity

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EFFECT OF NICKEL ON MALE REPRODUCTION

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ABSTRACT

Distribution of nickel as a risk factor of environment, in testis and its effects on the testicular structure in experimental animals and animal's spermatozoa were studied. In this study are presented effect of i.p. administration of Ni to the testicular structure, concentration of nickel in semen different animal species and effect of in vitro spermatozoa incubation with nickel to the spermatozoa motility and membrane changes. Our findings clearly suggest a negative effect of nickel on the structure as well as on the function of seminiferous epithelium. In experimental groups with nickel a significant ($p<.001$) decrease of germinal epithelium in comparison with control group was observed. The analysis of nickel showed that the concentration of this element in stallion semen was 0.20 $mg.kg^{-1}$, in bull 0.12 mg. kg^{-1}, in ram 0.31 $mg.kg^{-1}$, in boar 0.06 $mg.kg^{-1}$ and in fox 0.36 $mg.kg^{-1}$.Concentrations from 125 µM Ni/ml in various time periods of culture act stimulating on spermatozoa motility after 30 minutes ($p<0.001$), but later inhibitory. After a culture of spermatozoa in addition of 125 µM Ni/ml and 240 minutes a typical Annexin–V fluorescence reaction was detected. Fluorescence was detected in mitochondrial segment of bovine spermatozoa. In spermatozoa exposed to higher nickel concentration the Annexin–V positive reaction was detected also on the spermatozoa head membrane. Nickel in very low concentrations (7.8 µM Ni/ml) stimulates the bovine spermatozoa motility but in higher concentrations (>250 µM Ni/ml) cause decrease of spermatozoa motility in vitro.

This study wassupported by project VEGA No. 1/0857/14fromthe Slovak Ministry of Education. and Thisworkwas co-funded by European Community under project no 26220220180: Building Research Centre "AgroBioTech".

Keywords: nickel, spermatozoa, testis, semen,

Technical Session 05

11th June 2014

11.00 am- 12.20 pm

Salon Orchid,

Galadari Hotel,

Colombo

Agronomy/ Precision Agriculture

Session Chair: Dr. Rajeev Bhat

1	Impact of Azospirillum Brasilense inoculation on cucumber seedlings fertilized with fish effluent	*Jonathan S. Mangmang, Rosalind Deaker and Gordon Rogers*
2	Precision nutrient management through use of LCC and nutrient expert in hybrid maize under laterite soil of India	*M. Banerjee, Debtanu Maiti, Sudarshan Dutta, Gopal Sing Bhuiya, G.C Malik*
3	Greenhouse propagation and management of Gliricidia sepium in arid areas of Kuwait	*Hani Al-Zalzaleh, G. D'cruz*
4	Biofilmed biofertilizers reduce chemical fertilizer use in strawberry (Fragaria X Ananassa)	*I. D. Singhalage, P. C. Wijepala, K. R. S. C. B. Kahawandala, H. M. S. P. Madawala, G. Seneviratne*

IMPACT OF *AZOSPIRILLUM BRASILENSE* INOCULATION ON CUCUMBER SEEDLINGS FERTILIZED WITH FISH EFFLUENT

[1]Jonathan S. Mangmang, [2]Rosalind Deaker and [3]Gordon Rogers

Faculty of Agriculture and Environment, The University of Sydney, NSW, Australia 2015

ABSTRACT

There has been a growing emphasis put in place to reducing application of agro-chemical inputs and recycling of organic waste to alleviate problems associated with nutrient discharge and pollution to the environment. Along with this reasoning, the beneficial microbes particularly plant growth promoting rhizobacteria (PGPR) are also increasingly exploited to reduce the commonly used inputs in conventional agriculture. In this study, 3 strains of Azospirillumbrasilense (i.e. Sp7, Sp7-S and Sp245) were evaluated for their impacts on the growth of cucumber seedlings grown with fish effluent as source of nutrients. Vegetable seeds were inoculated with these strains before sowing and transplanting into seedling trays,and grown at greenhouse condition with natural light. The results show that despite of the existing indigenous microflora and low level of nutrients in the fish effluent, the A. brasilense strains survived at populations ranging from 5 – 6 log colony forming unit (CFU gFW^{-1}) of roots and altered most of the important agronomic traits that led to growth enhancement. In particular, all the strains enhanced the leaf area, root length, plant biomass, total phosphorus (P) and endogenous plant IAA contents and peroxidase activity. Azospirillum inoculation also showed no adverse impact on the bacterial communities of the fish effluent which indicates that this PGPR can be incorporated well into system that utilized fish effluent as nutrient source (e.g. aquaponics). Thus, the results suggest that A. brasilense can be a valuable agent to help maximize the usefulness of fish effluent or wastewater from fresh water aquaculture to further support plant growth.

Keywords: Azospirillumbrasilense, fish effluent, seedling growth, sustainability, cucumber

PRECISION NUTRIENT MANAGEMENT THROUGH USE OF LCC AND NUTRIENT EXPERT IN HYBRID MAIZE UNDER LATERITE SOIL OF INDIA

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ABSTRACT

Nutrient management has played a crucial role in achieving self sufficiency in food grain production. Energy crisis resulted in high price index of chemical fertilizers. Coupled with their limited production, fertilizer cost, soil health, sustainability and pollution have gave rise to interest in precision nutrient management tools. Field experiment was conducted to study the effect of variety and nutrient management on the growth and productivity of maize under lateritic belt of West Bengal during kharif season of 2013 at the farmers' field located in Birbhum district of West Bengal, on sandy loam lateritic soil having low fertility status and acidic reaction (pH5.6). The experiment consisted of the five levels of fertilizer i.e, F1= control, F2= state recommendation (150:75:75),F3= nutrient expert (120:34:51),F4=farmers practices (80:40:40),and F5= Basal application of 50:75:75 with split N application on basis of LCC, and two level of varieties viz.,V1= Rajkumar,V2= Sona, thus making ten treatment combinations, which were replicated thrice and was laid out in randomized block design(RBD). The "Nutrient Expert" is a Decision support tool developed by IPNI (International Plant Nutrition Institute) & CIMMYT. The values for growth parameter like plant height, length and girth of cob, number of cob per plant, harvest index were observed. It was the found that the growth parameter as well as yield component and yield were significantly affected by different level of fertilizer and different varieties. The result indicated that different schedules of fertilizer expressed significant effect on plant height, cob girth and length, grain per cob, grain weight per cob, test weight, Maize grain yield and stover yield at harvest. It was found that the application of split N on the basis of LCC gave highest yield and yield parameter values. The application of nutrient on the basis of recommendation obtained from the decision support system like "Nutrient expert" also proved satisfactory. The gross return, net return and Benefit: cost ratio indicated that the application of nutrients on basis of nutrient expert recommendation proved economically more remunerative.

Key words: Hybrid maize, LCC, Nutrient management, Nutrient Expert, Yield, economics

GREENHOUSE PROPAGATION AND MANAGEMENT OF *GLIRICIDIA SEPIUM* IN ARID AREAS OF KUWAIT

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Biodiversity of Terrestrial Ecosystems, Environment and Life Sciences Research Center, Kuwait Institute for Scientific Research, Kuwait

ABSTRACT

Gliricidia sepium (Jacq). features prominently as a forest tree species in the tropical and sub-tropic regions of the world. Limited multi-location testing has been undertaken on Gliricidia in the arid climates. Consequently, information on the suitability of the various provenances (accessions) of this species for greenery purposes is very limited, reducing the efficiency of its multipurpose usage. Hence, an evaluation trial of these exotic plants under the prevailing climatic conditions of Kuwait was carried out to investigate their use in landscape projects. As part of the study, green house propagation and management of seedlings was conducted to determine the germination and establishment ability of different provenances. The study was conducted in a controlled greenhouse, at a farm in Wafra. From the Echocommunity club, 23 provenances of Gliricidia sepium and stem cuttings from quality nurseries were collected. The seeds were soaked overnight in pure water at room temperature and were planted in germination trays using coco-peat as the medium. These plants were later transplanted into containers of 10- cm diameter filled with a potting medium consisting of coco-peat, agriculture soil, perlite, and organic manure in a 2:1:1:1 (v/v) proportion. The propagated seedlings were kept in the shade house for hardening. Results showed that among different provenances, a high percentage of germination (98 %) was noticed in the Retalhuleu and a low percentage in Chumption (0%). The establishment for G. sepium was nearly 100% in germinated seedlings of all provenances. Individual trees and provenances differ tremendously in the stem cuttings from which they can germinate. Cuttings of about 1 m long and 3to 4.5 cm in diameter showed good propagation percentage. A greater initial stake height and diameter at breast height resulted in greater crown development. But when the temperature drops below 15^{o}C, shedding of leaves was noticed irrespective of all trees and provenances. It was hypothesized that coppicing of newly grown branches before the onset of winter would decrease the large-scale loss of established seedlings. This method of propagation is very simple avoiding the costly misting practices and hormonal treatments for root induction and could have wide application throughout the arid regions.

Key words: Evaluation, landscaping, provenances, seedlings, cuttings, potting medium.

BIOFILMED BIOFERTILIZERS REDUCE CHEMICAL FERTILIZER USE IN STRAWBERRY (*FRAGARIA X ANANASSA*)

I. D. Singhalage[1, 3, 4*], P. C. Wijepala[1], K. R. S. C. B. Kahawandala[5], H. M. S. P. Madawala[2], G. Seneviratne [1]

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ABSTRACT

Heavy chemical fertilizer application is a common practice in Strawberry. This study was carried out to evaluate the effects of microbes originated from the Strawberry rhizosphere; a fungal strain (F), a bacterial strain (B), three simple fungal-bacterial biofilms (BF1–BF3) and one higher order fungal-bacterial biofilm (HO), on the growth of Strawberry. Treatments were cultures alone and cultures coupled with 25,50, and 75% of chemical fertilizers (CFs). Reference treatments were 0,25,50,75 and 100% CFs. Treatments with three replicates were arranged according to completely randomized design in a glasshouse. Plants were maintained for six months. The time of flowering, number of flowers, fruit set and the final harvest were recorded. Data were analyzed using General Linear Model in Minitab (version 16). Early flowering was shown by BF2, BF3 and HO coupled with 50, 75 and 25% of CFs, respectively. Except HO coupled with 50 and 75% of CFs, all the other treatments produced mature fruits at sixth month of plant development. Flowers per bunch were significant ($p<0.05$) in BF1 coupled with 50% CFs. Significant fruit set was detected in 75% CFs treatment. The number of fruits was significantly highest ($p<0.05$) in B with 25% of CFs but produced smaller fruits. BF2 coupled with 50% CFs produced large-sized fruits with significantly higher ($p<0.05$) average fruit weight (18.58g) than the rest of the treatments. The findings of this study clearly indicate the efficacy of fungal-bacterial biofilms and their potential use as biofertilizers in Strawberry to reduce the usage of chemical fertilizers while maintaining a higher fruit production.

Key words: biofertilizer, fungal-bacterial biofilm, chemical fertilizer, Strawberry

Technical Session 06

11th June 2014

01.30 pm- 02.50 pm

Salon Orchid,

Galadari Hotel,

Colombo

Crop & Environment Management

Session Chair: Dr. Maiti Debtanu

1	Compensating farmers for damages from neighbor's pesticide spray drift	*Terence J. Centner*
2	Biochemical characterization of quality proteins and effects of fertilizers on total protein content in Pakistani bread wheat accessions	*Sarwat Afshan*
3	Induction of androgenesis in pearl millet	*Panchangam Sameera Sastry*
4	Molecular and pathogenic diversity of the causal agents of onion leaf twister disease in Batticaloa district Sri Lanka	*Vengadaramana A. and D. M. De Costa*

COMPENSATING FARMERS FOR DAMAGES FROM NEIGHBOR'S PESTICIDE SPRAY DRIFT

Terence J. Centner

The University of Georgia

ABSTRACT

Pesticides are widely used all over the world for food production. If they are not used carefully, pesticide drift may invade nontarget properties causing damages. In most cases, common law causes of action can be used to seek redress for damages from pesticide drift. However, established tort law often means a farmer faces difficult burdens of proof. While evidence of pesticide drift on a nontarget property seems to establish a claim for an unlawful trespass, some courts are declining to recognize trespass actions for spray drift. Alternatively, farmers may claim that damages from a neighbor's spray drift were the result of negligence. However, the injured producer will need to establish a breach of a duty of care. This may be difficult if the applicator has records showing that all pesticides were applied according to acceptable spray practices. This paper analyzes the jurisprudence of pesticide spray drift damages to discern the viability of causes of actions and to inquire whether governmental recovery options are outdated. It examines how governments are reconciling competing interests of farmers with neighbors who spray pesticides. Application of the polluter pays principle suggests that the law might hold pesticide applicators accountable for damages their actions cause to nearby property owners.

Keywords: pesticide drift; trespass; nuisance; negligence; liability

BIOCHEMICAL CHARACTERIZATION OF QUALITY PROTEINS AND EFFECTS OF FERTILIZERS ON TOTAL PROTEIN CONTENT IN PAKISTANI BREAD WHEAT ACCESSIONS

Sarwat Afshan

Department of Genetics, University of Karachi

ABSTRACT

Wheat landraces are an important source of genetic diversity that could be valuable for making crop improvement. Current study was under taken to determine the protein quality and also the effect of fertilizers i.e. urea and NPK (Nitrogen Phosphorus Potassium) were observed on the levels of total protein in 10 wheat accessions. HMW-Glutenin subunits profiling of wheat genotypes was done through SDS-PAGE; polymorphism was revealed at HMW-GS encoding loci; Glu-A1, Glu-B1 and Glu-D1. The Glu-1 score ranged from 6-10 with an average of 8, indicating that the Pakistani wheat studied possesses strong gluten strength. To understand the effects of fertilizers on total protein content the experiment was conducted in a factorial arrangement based completely randomized design with three replicates. After 15 days of germination, treatment of urea (67.2 kg ha-1 and 134.4 kg ha-1) and NPK (67.2 kg ha-1 and 134.4 kg ha-1) was applied to the plantlets for 12 days; whereas controls were kept under normal condition. High level of total protein content was found in control samples. The total protein content of each accession was further increased when applied with urea and NPK. But the response of NPK uptake gave more increase in quantity of total protein content as compared to urea. It was also evident from the results that the lower dose of NPK gave good results as compared to the higher dose of the same. Landraces with good bread-making quality and high total protein content could be beneficial and valuable in developing new varieties.

Keywords: bread wheat, HMW-Glutenin subunits, NPK, protein content, SDS-PAGE, urea

[25]

INDUCTION OF ANDROGENESIS IN PEARL MILLET

Panchangam Sameera Sastry

JNTU/ ICRISAT

ABSTRACT

Breeding efforts in Pearl millet (Pennisetum glaucum (L.) R. Br.), one of the most widely cultivated drought- and high-temperature tolerant C4 cereals, are aimed at maximum exploitation of hybrid vigour for both grain and forage yields. Until now, very limited work is carried out on in vitro production of haploids in pearl millet while it is being employed as the pollinator which will be further eliminated, resulting in haploids of the recipient species, e.g. Wheat, oat. Anther culture experiments were carried out with seven genotypes 841-P3, 843-22B, ICMB 93333, ICMB 89111, XL-51, 4201 and 86-M34 tested on 12 different culture media. Androgenic embryos were induced in the frequency of 13.7, 9.51 and 7.58 % from 841-P3, ICMB 93333 and XL-51 cultivars. Inclusion of 4% maltose as additional carbon source resulted in higher number of multicellular microspores among the responsive genotypes. These experiments form a promising basis to further develop double haploid protocol in pearl mille breeding for the arid and semi-arid regions.

Keywords: anther culture, pearl millet, double haploids, pro-embryo

MOLECULAR AND PATHOGENIC DIVERSITY OF THE CAUSAL AGENTS OF ONION LEAF TWISTER DISEASE IN BATTICALOA DISTRICT SRI LANKA

[1]Vengadaramana A. and [2]D. M. De Costa

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ABSTRACT

Leaf Twister disease (LTD) is a major disease of onion (Allium cepa L.) cultivated in Sri Lanka. The present study was aimed to determine molecular and pathogenic variations among the causal agents of onion leaf twister disease. The pathogens causing the LTD have been identified as Collectotrichum and Fusarium spp.. Pathogenic variations of the fungal isolates, in terms of pathogenicity and virulence were determined in vivo by inoculation assays using red onion (variety Vethalan). LTD-infected plants were collected from farmer fields of four locations of Batticaloa district, Sri Lanka. Possible causal organism/s of LTD were isolated from three different parts of the infected plants, namely leaves, pseudostem and bulb. Morphologically-different six isolates of Colletotrichum and seven Fusarium isolates were obtained by isolations. Virulence of the Colletotrichum and Fusarium varied significantly among the isolates in terms of rapidity and extent of disease spread. Variety Vethalan was not completely resistant to any isolate of the two fungal genera tested. Genomic DNA of 13 isolates was extracted from each purified isolate using a modified CTAB method. PCR amplification was done with ITS1 and ITS4 primers to amplify the 5.8S-ITS subunit of the Colletotrichum isolates. The ITS2-rDNA subunit of Fusarium isolates was amplified by ITS-Fu1f and ITS-Fu1r primers. As expected 590 bp and 466 bp PCR products were resulted in by all Colletotrichum and Fusarium isolates, respectively. Colletotrichum isolates showed two polymorphic groups based on PCR-RFLP by RsaI, Hae III and Msp I. Fusarium isolates showed no polymorphism based on PCR-RFLP by RsaI, Hae III and Msp I . Findings of the present study revealed that molecular and pathogenic variations exist among different isolates of Colletotrichum and pathogenic variations only exist among Fusarium isolates infecting red onion in Batticaloa district of Sri Lanka.

Key words: PCR-RFLP, Genomic DNA, polymorphism, ITS regions

Technical Session 07

11th June 2014

01.30 pm- 02.50 pm

Salon Orchid,

Galadari Hotel,

Colombo

Food Safety, Food Science & Nutrition

Session Chair: Prof. Terence J. Centner

1	Utilizing edible flowers for producing novel food products – insights on developing an "waste to wealth" concept	*Rajeev Bhat*
2	Risk mitigation methods for removal of pesticide residues in brinjal for food safety	*Cherukuri Sreenivasa Rao, Vemuri Shashi Bhushan, Harinatha Reddy A, Ravindranath Darsi, Aruna M and Ramesh B*
3	Methods for removal of pesticide residues in tomato	*Shashi Bhushan Vemuri*

UTILIZING EDIBLE FLOWERS FOR PRODUCING NOVEL FOOD PRODUCTS – INSIGHTS ON DEVELOPING AN "*WASTE TO WEALTH*" CONCEPT

Rajeev Bhat

Associate Professor, Food Technology Division, School of Industrial Technology,

Universiti Sains Malaysia, Penang 11800,

Malaysia

ABSTRACT

Traditionally, edible flowers of tropical regions have been used for culinary purposes (as flavoring agents, natural colorants, etc) as well as for treating some of the common ailments in humans (as floral tea decoctions). In addition, of late, the potential of a wide range of aromatic flowers has been tapped in cosmetic industries too. Being natural, edible flowers can be considered 'safe' when compared to chemical additives. Having a very short shelf life, majority of the flowers are perceptibly wasted without any further processing or commercial utilization. Presence of a wide range of phytochemicals/ bioactive compounds, including those of essential oils, contributes immensely for the recorded uses of flowers (as antioxidants or antimicrobials). In this paper, results generated on the nutraceutical properties of selected edible flowers of Malaysia and the prospective of exploiting their potential to develop novel bakery based food products will be discussed.

Keywords: edible flowers; nutraceutical value; novel food products

RISK MITIGATION METHODS FOR REMOVAL OF PESTICIDE RESIDUES IN BRINJAL FOR FOOD SAFETY

Cherukuri Sreenivasa Rao*, Vemuri Shashi Bhushan, Harinatha Reddy A, Ravindranath Darsi, Aruna M and Ramesh B

All India Network Project on Pesticide Residues

Acharya N. G. Ranga Agricultural University

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ABSTRACT

The commercial production of highly cultivated and consumed brinjal is highly dependent on regular usage of insecticides to protect the crop from insect pests. The increased consumer awareness and legal issues on food safety, with special reference to insecticide residues in foods, led us to attempt for cheap and effective methods for removal of pesticide residues to address the issues of consumer and food safety, as the farmers are not following the Good Agricultural Practices i.e pre-harvest intervals. The most commonly used pesticides such as profenophos, chlorpyriphos, dimethoate, malathion, phosalone, quinalphos, triazophos and _-cyhalothrin were sprayed at recommended doses at fruit formation stage, samples were collected at 2 hours after treatment to quantify the deposits. The samples were subjected to various household treatments (tap water wash, lemon water wash, dipping in 2% salt water for 15 min, dipping in 2% tamarind water for 10 min, washing with 0.1% sodium bicarbonate solution, washing with 4% acetic acid solution, biowash, cooking), each in three replications, and analysed for residues using validated QuEChERS method and GC-ECD, FPD and GC-MS, so as to estimate the % removal and their effectiveness. Out of all treatments, washing with 2% salt solution for 10 minutes is very effective in removing 45%, 43%, 52%, 50%, 54%, 48% and 76% of Dimethoate, chlorpyriphos, quinalphos, profenophos, phosalone, ⊔-cyhalothrin and malathion, respectively, and cooking removed insecticides in the range 55-80%. Dipping fruits and vegetables in 2% salt solution for 15 minutes is the best household method for removal of pesticide residues, and also the method is effective in reducing the residues below MRL (Maximum Residue Limits).

Key words: Pesticide Residues, Brinjal, Food Safety, Risk Mitigation, 2% salt solution.

METHODS FOR REMOVAL OF PESTICIDE RESIDUES IN TOMATO

Shashi Bhushan Vemuri, Cherukuri Sreenivasa Rao, Ravindranath Darsi, Harinatha Reddy A, Aruna M and Ramesh B

All India Network Project on Pesticide Residues

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ABSTRACT

Tomato is highly cultivated vegetables consumed both as fresh salad and cooked in Andhra Pradesh, attacked by variety of insect pests, of which fruit borer is economically significant. Farmers use variety of pesticides, of which organophosphates and synthetic pyrethroids are predominant. However, farmers are not looking at the safety intervals while harvesting the tomato thus resulting in pesticide residues in tomato at both farm gate and market points. Hence, it is essential to look for cheap and best method which can be adopted easily at home, thus keeping the requirement in mind, a study was planned to evaluate certain methods for removal of pesticide residues from tomato. Tomato fruits (fresh, undamaged, stalks removed) divided into lots, and each lot was dipped in 0.2% insecticide solutions (dimethoate, chlorpyriphos, profenophos, endosulfan) separately for 5 minutes and air dried on clean surface. The randomly selected fruits were analysed for initial deposit of pesticides, and each lot of pesticide treated sample was subjected to different decontamination methods viz., washing under running tap water, 2% salt solution, cooking, and analysed for final remaining residues after treatment using validated QuEChERS method using GC-ECD, FPD and GC-MS. Cumulative effect of all three household process caused substantial reduction in residues up to 95%. However, cooking with pressure cooker for 5 minutes reduced pesticides from 30-93%.

Key words: Decontamination, Pesticide Residues, Tomato, Household preparations.

POSTER PRESENTATIONS

Poster Session

10th June 2014

01.45 pm- 02.15 pm

Salon Rose,

Galadari Hotel,

Colombo

1	Estimatiom of Greenhouse Gas emissions in the Cropland of South Korea	*Hyuncheol Jeong, Jongsik Lee, Eunjung Choi, Sanguk Suh and Kyuho So*
2	In vitro propagation, callus induction and evaluation of active component of ruta graveolens L.	*Zakaria I Al-Ajlouni, Shifaa D Abbas, Ibrahim M. Makhadmeh, and Mohamad A Shatnawi,*
3	Minerals, Proximate composition and Their correlations of medicinal plants from Jordan	*Ali Almajwal*

ESTIMATIOM OF GREENHOUSE GAS EMISSIONS IN THE CROPLAND OF SOUTH KOREA

[1]Hyuncheol Jeong, [2]Jongsik Lee, [3]Eunjung Choi, [4]Sanguk Suh and [5]Kyuho So

National Academy of Agricultural Science, National Academy of Agricultural Science

ABSTRACT

According to the IPCC (Intergovernmental Panel on Climate Change) Guideline, the greenhouse gases emission in agricultural sector of South Korea from 1990 to 2011 is calculated three categories of rice cultivation, agriculture soils and field burning of crop residues. The estimation methodology was separated the tier 1 using the defaults value and tier 2 using the country-specific emission factors and activity data came from the food, agricultural, forestry and fisheries statistical yearbook.

The methane (CH_4) emissions from the rice cultivation as the continuously flooded and intermittently flooded have decreased from 575 Gg CH_4 in 1990 to 324 in 2011. CH_4 emissions converted into CO_2 equivalent were 12,083 Gg CO_2-eq in 1990 and 8,813 in 2011. The greenhouse gas emissions from paddy field in Korea showed that it was gradually going down as the cultivation area decreased. The nitrous oxide (N_2O) emissions in agricultural soil have decreased 21 Gg N_2O to 19 during the same period. N_2O emissions converted into CO_2 equivalent were 6,370 Gg CO_2-eq 1990 and 5,759 in 2011. The CH_4 and N_2O emissions converted into CO_2 equivalent in field burning of crop residues were in 43 Gg CO_2-eq 1990 and 44 in 2011. There were no big changes of emissions by burning. The total greenhouse gas emissions in croplands sector in South Korea declined from 18,496 Gg CO_2-eq in 1990 to 12,616 in 2011. The greenhouse gas emissions in croplands sector in 2011 had occupied 2.1 % of the national total emissions.

Keywords: Greenhouse gas, Emission, Methane, Nitrous oxide, IPCC

IN VITRO PROPAGATION, CALLUS INDUCTION AND EVALUATION OF ACTIVE COMPONENT OF *RUTA GRAVEOLENS* L.

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ABSTRACT

Ruta graveolens belongs to Rutaceae family. Ruta graveolens commonly known as Rue, is a Jordanian medicinal plant and classified as strongly aromatic plant. It has some active ingredients such as Alkaloids-arborine, gamma-fagarine and rutin. R. graveolens plant is at risk of extinction, due to over-collection, overgrazing and deforestation. For better exploitation and protection from genetic erosion, this study was conducted to investigate the factors affecting R. graveolens in vitro propagation. Callus induction was conducted from leaf discs on MS supplemented with 4.0 mg/l NAA. Callus tissue was maintained by frequent subculture on Murashige and Skoog's (MS) media with 1.0 mg/l 2,4-D. Rapid multiplication of Rue was achieved by culturing shoot tip segments on MS medium containing (0.0, 0.1, 0.2, 0.3, 0.4, 0.5 and 1.0, mg/l) TDZ, 2-iP, zeatin and GA3. Zeatin at 0.5 mg/l resulted in the highest shoots number and length. Crude extracts of callus, in vitro and ex vitro of R. graveolens were extracted by different solvents like methanol and ethanol. HPLC technique was used for quantitative analysis of five active compounds in three culture types. The in vitro culture that extract by ethanol was contained the maximum metabolites content compared to callus and ex vitro cultures.

Key words: Ruta graveolens, callus, secondary metabolites, HPLC

MINERALS, PROXIMATE COMPOSITION AND THEIR CORRELATIONS OF MEDICINAL PLANTS FROM JORDAN

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ABSTRACT

Ten medicinal plants (Corianderum sativum, Hibiscus sabdariffa, Lepidium sativum, Nigella sativa L., Petroselinum crispum, Salvia officinalis, Saponaria officinalis, Thymus capitatus, Origanum majorana, Trigonella foenum–graecum) were subjected to proximate and mineral analysis. Results showed that chemical composition of the investigated medicinal plants varied significantly. Protein (5.4 %) in T. foenum – graecum, fat (43.8%) in N. sativa, fiber (48.6%) in L. sativum and carbohydrates (65%) in H. sabdariffa. The highest ash content (17.5%) was found in P. crispum. Dry matter content ranged between 82.2 (P. crispum) and 97.2% (N. sativa). Mineral content found to vary significantly. Appreciable amounts of Ca, K, Na, Mg and P were found, whereas Fe, Cu, Mn and Zn found in trace amounts in all plants. The correlation values were positively significant between fat and Zn (r = 0.56), dry matter and Fe (r = 0.58). High significant correlations were also found between crude protein and fat (r = 0.40), dry matter and fiber (r = 0.48) and ash and carbohydrates (r = 0.47).

Keywords: Composition, minerals, medicinal plants

VIRTUAL PRESENTATIONS

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COMPARATIVE ANALYSIS OF INDIGENOUS SENSOR NODES WITH COMMERCIAL SENSOR NODES FOR USE IN SOIL MOISTURE: CASE STUDY WITH EGGPLANT PRODUCTIVITY UNDER A BED-PLANT BASED AUTOMATED MICRO-IRRIGATION FRAMEWORK

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ABSTRACT

The paper presents an indigenous development to overcome the requirement for sensor networks to operate for extended periods without capitulating to auto configuration, auto healing, low cost, and low power consumption. This development would make the technology a low cost one which can be easily used by marginal farmers in developing and economically backward societies. In this article an elaborate experimental framework is presented to elaborate the development, in this regard devices developed utilizes IEEE 802.15.4 which defines the physical and mac layer. The rest of layers are application oriented which are defined by the user. The moisture levels on the bed plant automated micro- irrigation system measured using the indigenous development is compared with the data retrieved from the commercial sensor nodes. Further yield and use of water for eggplant production using such indigenous development is also enumerated. The implication of this work is to reduce the cost of mechanization in agriculture and irrigation.

Keywords: micro-irrigation, eggplant, sensor nodes, indigenous, bed plant.

GEOINFORMATICS IN AGRICULTURAL TRANSFORMATION: CHALLENGES AND PROSPECTS IN NIGERIA.

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ABSTRACT

Agriculture plays a vital role in the economy of every nation. Today more and more lands are being developed for the production of a large variety crops and commercial purposes, in addition to fiber, bio-fuel, drugs and other products. Agricultural growth and productivity remains central to poverty reduction. But depletion and degradation of land and water pose serious challenges to producing enough food and other agriculture products. In order to feed the population, there is need for a new vision for agriculture. A fundamental constraint of agricultural transformation in Nigeria is the use of poor methods of data and information acquisition. The consequence is poor knowledge and unreliable data for planning and policy formulation. This has adverse implications for transformation since the bulk of agricultural production takes place under traditional systems, with a high dependence on natural forces and processes for the maintenance of yield and the quality of produce. To address the problem of misuse of land and improved productivity, it is necessary to adopt Geoinformatic techniques of Remote Sensing, Geographic Information System (GIS) and Global Positioning System (GPS) to enable the acquisition of relevant, timely data and information on land and activities which advances in remote sensing have. The paper reviews agricultural transformation in Nigeria, in the context of the emerging technologies. It expounded on the principles of Geoinformatics and their relevance in agricultural transformation. A critical analysis of the prevailing situation in Nigeria reveals the shortcomings of the current methods of data collection, analysis and management. This emphasizes the need to adopt Geoinformatic methods to improve agricultural productivity. The challenges in this wise are low level of technological development, inconsistency and inept implementation of government policies, low level of investment, small land holdings, heterogeneity of cropping systems and market imperfection. To surmount these constraints a number of measures are suggested. This will help in producing more food with fewer resources while reinvigorating rural economies.

Keywords: Geoinformatics, Agricultural Transformation, Challenge, Prospects, Nigeria.

IMPACT OF INDISCRIMINATE MINING ON AGRICULTURAL BIODIVERSITY IN GOA

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ABSTRACT

Agro biodiversity has evolved over the years particularly based on the surrounding environment. It harbors a great amount of diversity with respect to species diversity, crop diversity, etc. These contain reserves of genes which has increased productively providing a base for productive and sustainable agriculture. Rich amount of a well evolved system over time has been providing background support for rich resources. Thus this has facilitated development of agriculture. However, in Goa in recent years it has been noticed that these systems of ancient nature have itself been threatened due to the intervention of human activities in such and surrounding areas. More particularly the practice of Mining is on a rise for last few years in Goa, covering huge belt of land and eventually also harming the forest cover of the state. These forests (Western Ghats also form a part of Eastern Forest cover of Goa) have been deep and very rich bio-diversity hot spots in the world and house the diverse flora and fauna. But, due to the constant and prolonged threat of uncontrolled mining activities in the state these forested biodiversity areas are now in deep trouble.

This study tries to analyze the impact of indiscriminate mining activities on the agricultural biodiversity of Goa more closely to that of those areas in the proximity of the mines. Also the resulting effect of such mining activities on the productivity of agriculture is also looked at.

Keywords: - Agro biodiversity, productivity, mining, sustainability.

SHORT TERM IMPACTS OF BIOCHAR INCORPORATED SOIL ON EARLY GROWTH OF CAMELLIA SINENSIS L. (O.) KUNTZE

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ABSTRACT

Biochar is a fine-grained, highly porous charcoal substance which is used as a soil amendment. Many studies report that the effects of biochar depend on the source of raw material, pyrolysis temperature and particle size of biochar chips. Thus a series of experiments were conducted to test the impact of three types of biochar, and commonly used compost on selected soil properties, earthworm attraction, and root and shoot growth of tea (Camellia sinensis L. (O.) Kuntze) plants, using a glass house bioassay technique. The statistical analysis was done using general linear model procedure in SAS statistical software and mean separation done by least square means method. The earthworms in the biochar and compost mixed soils were over 50%, indicating their preference on biochar which concluded non toxicity of the added treatments on biological organisms. It had a significantly positive impact on shoot growth rate, root depth and root elongation rate of tea. Biochar had a significant short term impact on altering soil chemical properties but a beneficial impact was not observed in terms of soil biological properties and moisture contents of the amended soils. It is concluded that application of biochar has a significantly positive impact on shoot and root growth of tea in the short term. In contrast it is a good soil amendment which improves soil chemical properties within short period.

Key words: Bioassay, Biochar, Compost, Root elongation, Tea

POTENTIAL TO GROW *IPOMOEA AQUATICA* IN KITCHEN WASTEWATER HYDROPONICS

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ABSTRACT

In this study the potential of growing Ipomoea aquatica in hydroponic system using kitchen wastewater was assessed. Twenty one households were selected from seven areas of Jaffna Peninsula, Sri Lanka with three households from each area. Kitchen wastewater used in the experiment was analyzed in every week for nitrate N, phosphorous, potassium, calcium, pH and EC. Ground water of respective households was also analyzed for the same properties. Five Ipomoea aquatica cuttings were placed in three liters of waste water kept in plastic pots. In each household plants were grown in two pots. Growth of plants was analyzed by weight increase. At the end, nitrate N in plant tissue was measured. Analysis of the experiment was done by paired-T test and DNMRT at significance level of 0.05. Nitrate N and EC in kitchen wastewater did not show significant difference with ground water. However, phosphorous, calcium, and pH in kitchen wastewater showed significantly higher than with those of ground water. Potassium in kitchen wastewater showed significantly lower than that of ground water. The average biomass increase of Ipomoea aquatica grown in kitchen wastewater was from 5.07g to 39.58g in three weeks. The nitrate content of tissue was well below the hazard level for consumption. The study therefore indicates that Ipomoea aquatica could be grown in kitchen wastewater hydroponic system in the tested areas which not only fulfills the family need of leafy vegetable but also efficiently use the wastewater.

Key words: Ipomoea aquatica, hydroponics, wastewater

VARIATIONS OF CARBON FRACTIONS IN SOILS OF IRANAMADHU IRRIGATION COMMAND AREA, KILINOCHCHI, SRI LANKA

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ABSTRACT

Increasing population imposes demand on agricultural output which often leads to degradation of natural resources. Carbon sequestration is a crucial process which increases soil fertility at the mean time reduces the green house emission. This study was carried out in uplands and lowlands of Iranamadhu irrigation command area of Kilinochchi district. The upland and low lands were further divided into cultivated and uncultivated areas. Total organic carbon (TOC), microbial biomass carbon (MBC), $KMnO_4$ oxidizable carbon (POC) and water soluble carbon (WSC) were measured in two depths (0-20cm and 20-40cm) in both cultivated and uncultivated areas of upland and lowland. The experimental design was a three factor factorial with three replicates. TOC, MBC, WSC and POC were ranged from 0.07 - 1.02%, 0.001 – 0.016%, 0.002 – 0.101% and 13.65 – 690.12 mg/kg respectively. TOC was significantly higher in upland soils compared to low land areas. On the other hand TOC was significantly higher in surface soils than sub-surface soils. Microbial biomass carbon was significantly higher in uncultivated areas than cultivated areas while higher in top layer than sub-surface layer. Neither POC nor WSC had any significant difference with elevation, land use and depth wise. This experiment shows that, carbon sequestration potential is high in upland areas of uncultivated soils compared to lowland soils.

Key words: Organic carbon-pools, water soluble carbon, $KMnO_4$ oxidizable carbon, microbial biomass carbon

GREEN FOOD CONSUMPTION GAP: WHAT MOTIVES PREDICT GREEN FOOD PURCHASING BEHAVIOR IN SRI LANKA

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ABSTRACT

It is a global phenomenon that people have increased emphasis for the choice of green or organic foodstuffs. Today, Sri Lanka is confronted with multiple crises relating to food consumption behavior due to the environmental issues and health hazards in non-communicable diseases. Sri Lanka is aspiring to motivate people to choose green foodstuffs and environmental safe consumption. Although the green food products are attracting consumer demand, the real factors affecting green food purchasing decisions in the Sri Lankan context are not yet sufficiently discovered empirically and this study attempts to address this research gap. Therefore, the main objective of this research is to explore key drivers for the green food purchase behavior in the Sri Lankan context by conducting expert survey using semi-structured qualitative in-depth interviews. A judgmental sample of 30 experts was drawn who is knowledgeable experts from the environmental bodies, organic/agro food farming and industry people. Thematic analysis was used to analyze the data. The finding suggests that health factor and food neo-phobia may be the most important motives for creating demand for the organic products in the country. Experts further highlighted the some important motives for creating good demand for organic foodstuffs in the country namely; needs of creating consumer awareness about green products, importance for introduction of eco-certification or label initiatives, importance of more government involvement and supports, increase availability of true or trustworthy green food products from the agricultural business sector. The findings has theoretical and practical implication for both academic and practitioners in formulating marketing strategies and promoting green food purchase for environmental sustainability. The novelty of the paper is addressed the organic or green food category in Sri Lanka from the experts survey point of view.

Key words: Green/Organic Food, Green Food Consumption, Purchasing Motives