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11th World Congress on

PLANT BIOTECHNOLOGY AND AGRICULTURE

March 05-07, 2018 | Paris, France

Scientific Tracks & Abstracts

DAY 1

Roberto Pasqualino, Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Complexity in the global agricultural system: Threats to human development and opportunities for science

Roberto Pasqualino
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The complexity of the global agricultural system is a tremendous barrier to the understanding of possible consequences and impacts of policies and business decisions on society at both global and national levels. Aiming at feeding 9 billion people by 2050, agriculture has a fundamental role for human development in providing livelihood to 40% of global population as both food and energy supplier, and representing a key leverage for most SDGs' achievement. At the same time agriculture is both a cause of, and the most vulnerable economic sector to, climate change. It consumes above 70% of freshwater withdrawal globally, and is heavily dependent on mineral resources at the cusp of global production. Continuous and cumulative environmental degradation puts agriculture at risk of dangerous ecosystem tipping points including sea level rise, change in nitrogen and phosphorus cycles, and most frequent and disruptive climatic shocks (i.e. extreme weather events). Aware of the long term risk to human condition on the planet, international agreements and measures will be gradually taken at both international and national levels to coercively bring the world within the ecosystem's limits in the next decades. Within a complex network of trading countries, such policies might result in economic shocks and cascade effects among countries with implication on their economic performance. A world system computer model is being developed relying on system dynamics modeling, networks, econometric analysis and public available datasets to model food and energy systems and trade among macro-regions and allows for testing of both climate and policy shocks to assess their possible outcomes and risks in the medium to long term future. The final outcome is to provide policy makers with a data transparent simulation tool to support clarity and resilience of decision making outcomes while leading on a global scale transition towards sustainability.

Biography

Roberto Pasqualino is a System Policy and Risk Scientist at the Global Sustainability Institute and works as a Research Fellow under the Centre for the Understanding of Sustainable Prosperity in the UK. His research interests are in global sustainability and systemic risk within financial and trade networks, mostly looking at the interconnection between natural resources availability and financial risk. He has demonstrated a passion for global system change and his expertise spans energy and agriculture systems modeling, supply chain management, finance and systemic inequality. His work in sustainability includes sustainable supply chains, global system modeling based on the famous limits to growth World3 model, and agriculture systems risks and complexity.

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Notes:

Petras Lazauskas, Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

The law of the field crop performance (agrophytocenosis) productivity: The key to the future of agriculture

Petras Lazauskas
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The worldwide conventional deep soil tillage by annual ploughing has no proved theoretical fundamentals and is based only on the primitive sensual empirical experience. The greatest disadvantage of this method is its negative impact on the soil: its degradation, soil carbon material mineralization, rising emissions of carbon dioxide, and climate warming. According to the geo-botany theory the typical field crops stands are natural field plant communities (agrophytocenosis). Their cognition productivity therefore should be evaluated from the theoretical point of view. The soil tillage and weed control can been proved by the novel law of crop and weed communities' performance. This law can be defined as follows: Productivity of a typical field plant community (agrophytocenosis), including overall dry mass of crop and weeds, growing under identical conditions is relatively constant. In general, this phenomenon can be described by the following equation: A=Y+X b, where A signifies maximum productivity of the whole dry mass of the whole community; Y - crop dry mass yield under the existing growing conditions of the community; X - weed mass; b - yield depression rate, indicating the degree of yield increase or decrease when weed mass changes by one unit. Based on this finding we can predict that this novel field crop performance productivity law will theoretically and practically revolutionize the cognition of soil tillage and weed control. Consequently, in the nearest future, the soil tillage and weed control disciplines will adopt this theoretical background and modernize the traditional empirical basis of soil tillage technologies. New theoretical cognition will have to reject annual deep plough and apply shallow precise soil tillage. These means will mitigate soil degradation, reduce the amount of carbon dioxide emission into the environment, slow climate warming, and will save costs of the non-regenerative energy in agriculture.

Biography

Petras Lazauskas has graduated from the Lithuanian Academy of Agriculture. As a Scientist, he started working on the problems of weed control applying a traditional empirical method of cognition. Subsequently, he was involved in a non-chemical weed control using theoretic geo-botanic method of cognition. He has participated in organic farming and weed control events in Germany, France, USA, Italy, Sweden, Czech Republic, Hungary, Latvia and Russia. In 1997, he has won a Bursary to attend the British Crop Protection Council Conference in Brighton.

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Alvaro Sotomayor, Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Development and results of agroforestry in Chile: A way to connect forest and agriculture

Alvaro Sotomayor
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Statement of the Problem: Since Chilean colonization, agricultural use in the fields has been developing thinking that trees were competitors of agricultural production, and consequently trees were burned or cut, even with state policies that promoted opening of native forests for development of agriculture and livestock. This situation has led to 49.1% of the national soil, equivalent to 36.8 million hectares, with some degree of erosion. The major factors responsible for this erosion have been human action, the geological processes of the landscape and the climatic aggressiveness.

Methodology & Theoretical Orientation: In Chile, during the last 15 years, an alternative agroforestry model has been studied for small and medium-sized agricultural producers, encouraging the introduction of woody species in the fields, considering the cultural identity, the life system of these producers and the conditions soil and climate. The establishment of trees on the farm is done under a different concept from traditional forest plantations, based on systems in an agroforestry approach.

Results: Thus, with this form of tree introduction, in an agroforestry approach, decreases in erosion processes have been obtained with reduction of soil losses of more than 1,700% in relation to traditional agricultural uses; reduction of wind up to 200% by the establishment of trees in silvopastoral design in prairies for livestock production purposes; increased productivity of forage species by the use of windbreaks by 41%; reduction of contaminants in watercourses through the use of biofilters, mitigation of climate change, and other social and economic benefits.

Conclusion: This way of reintroducing trees in the fields has been found to have a better acceptance than that of industrial plantations, where 93.1% of the farmers preferred to establish trees in an agroforestry arrangement versus 27.5% disposition to forest with traditional plantations; and, silvopastoral systems and windbreaks were preferred.

Biography

Alvaro Sotomayor is a Forestry Engineer with Doctoral studies in Spain and Masters in the United States. He has focused on the study of the potential of agroforestry in Chile, as a way of complementing forestry and agriculture with small and medium agricultural producers. His work at the Forestry Institute of Chile, as well as the Ministry of Agriculture, has allowed him to work with more than 1,600 farmers promoting agroforestry, obtaining resources from both the central and regional government, and from research funds.

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Sangwani Gondwe Makoko, Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

From farm to table: Rice quantitative value chain in Malawi

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Rice is the second main cereal crop from maize which accounts for 70,000 ha of cultivated land in Malawi. It is also an industrial crop grown by smallholder farmers. For some time yields of rice have been revolving around 1500 kg to 3000 kg against the potential of 4000 kg to 6500 kg which could be achieved if optimal factors of production are applied. Majority of smallholder farmers have low to medium levels of production and one factor that aggravates the situation is the use of poor quality and over recycled seed. The main players in the rice value chain are smallholder farmers, input suppliers especially fertilizers, middlemen/vendors, processors/packers and government. Each of these players has a unique role to play in the rice value chain and their benefits and challenges also vary. The quantitative value chain study was aimed at assessing the competitiveness of price for the various rice value chain stages and suggests weak links that require attention in order to improve its competitiveness. The study targeted rice growing schemes of Mphinga, Mkondezi, Msenjere, Lifuwu, Domasi, Likangala and Nkhate. Middlemen, traders, transporters, retailers and consumers operating in the schemes were interviewed using a semi-structured questionnaire. Focus Group Discussions (FGDs) were used to capture data from smallholder farmers. The study revealed that on average smallholder farmers sold their rice at $0.6 per kg while retailers got $1.13 per kg indicating a price margin of $0.53 between the two players. Lower prices received by farmers are basically because farmers mostly sell paddy which fetches lower price than milled rice sold by the subsequent players. It is therefore be recommended that smallholder farmers should make use of the cooperatives, bulk their rice, mill and package the rice as a group if they are to be competitive.

Biography

Sangwani Gondwe Makoko is a seasoned Agribusiness Specialist. Her current work with Africa Institute of Corporate Citizenship (AICC), Malawi (AICC) entails active involvement in the coordination of the National Rice Development Platform and the Legumes Development Trust whose mandates are to ensure the vibrancy of the rice and legume value chains in Malawi. She has received her Master of Science degree in Agricultural and Applied Economics and a Bachelor of Science degree in Agribusiness from the University of Malawi-Bunda College.

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Thuzar Linn et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Mapping and analyzing value chain of rice crop in Ayeyarwady region

Thuzar Linn and **Broos Maenhout**
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Statement of the Problem: In this paper, the value chain of rice crop in Ayeyarwady Region, Myanmar is analyzed. The issues with respect to the rice value chain are complex and multifaceted in this region. The challenge for Myanmar is thus to understand and, more importantly, identify the constraints facing the marketing system and develop strategies to overcome these bottlenecks. The purpose of this study is to structure of the rice value chain in Ayeyarwady Region, to analyze the marketing costs and margins of the various actors along the rice value chain, to study the socio-demographic characteristics of actors and to identify the different types of constraints on the value chain.

Methodology & Theoretical Orientation: The different characteristics of different actors are identified by purposive and simple random sampling methods. The descriptive statistics, cost and return analysis, and marketing cost and marketing margin analysis are used in this study.

Findings: The studied rice value chain encompasses different actors: i.e. farmer, primary collector, miller, wholesaler, retailer and exporter. In this value chain, the millers receive the highest profit share and the farmers have the highest marketing margin distribution. The observed rice value chain is not efficient since the marketing margin is unequally distributed along the chain. The encountered internal constraints are primarily material and production constraints. The external constraints are related to financial, distribution and institutional issues.

Conclusion & Significance: The rice miller is the most profitable actor and the primary collectors and farmers are the most vulnerable actors in the rice value chain. Farm mechanization and improving public and private extension programs are needed to raise the profit of the farmers. The development in infrastructure such as transportation, power supply and banking is needed to support through private-public partnership for the development of the rice value chain sector.

Biography

Thuzar Linn is a Doctoral student studying in the Department of Business Informatics and Operations Management under the supervision of Prof. Dr. Broos Maenhout in the Faculty of Economics and Business Administrations at the Ghent University, Belgium. She is currently a Doctorate student. She is an Assistant Lecturer and has more than 10 years of work experience in teaching and research. She has one international publication in the field of value chain analysis. Her doctoral research also specializes in the area of value chain analysis.

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Notes:

Mxolisi Arnold Stemele, Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Farmer's decision making toolbox for *Plutella xylostella* (L.) (Lepidoptera: Plutellidae) management on fresh market cabbage

Mxolisi Arnold Stemele
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Statement of the Problem: In absence of the pest economic thresholds, farmers apply insecticides prophylactically based on calendar-sprays with no regard to pest density. In addition, there tends to be no clear guidelines for the integration of the insecticides with the natural pest control. Consequently, the impact of the insecticides on Biological Control (BC) agents (compatibility), the impact of the BC agents on the pest (levels of parasitism), seasonality of pest and BC agent's populations and the action thresholds (weekly counts) of the insect pests are not taken into account in pest management decision making. This practice constitutes a major threat to biodiversity in agroecosystem and the surrounding environments.

Methods: Population dynamics of *Plutella xylostella*, an important insect pest of cabbage and its dominant parasitoid, Cotesia vestalis (=*plutellae*) were investigated on cabbage treated with conventional and a selective insecticide under three insecticide treatment routines. The data was used to develop a simple framework to develop insect pest thresholds and estimate yields through integration of insect density, yield loss ratios, technical efficiencies and damage abetment factors. In addition, the impact of a conventional and a selective insecticide on the BC agents was investigated.

Findings: *Plutella xylostella* populations varied between the seasons, the conventional and a selective insecticide and the insecticide treatment routines. *P. xylostella* incidence correlated well with the effective yields and the mean action threshold for the optimal cabbage yields was estimated at as single larvae per plant. Parasitism of *P. xylostella* was higher in insecticide free and selective insecticide treated crop compared to conventional insecticides.

Conclusion: The results indicated that, while cabbage cannot be cultivated without applications of insecticide against *P. xylostella* during certain periods of the year, adoption of action thresholds reduce number of sprays. In addition, application of selective insecticides reduces the insecticides impact on the parasitoids population.

Biography

Mxolisi Arnold Stemele is an Entomology Lecturer at the University of Fort Hare, Eastern Cape, South Africa. His research interest includes biological control, host plant resistance, toxicology, insect-plant interaction chemical ecology, insect pathology and molecular approaches in entomological research. He is currently working on a project 'Decision making tools for farmers in pest management' and 'Molecular characterization and DNA barcoding of the Lepidoptera stem borers on cereal crops and natural vegetation'.

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Notes:

Amir Mor-Mussery et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

The role of the harvester ants, *Messor ebeninus* and *M. arenarius*, in rehabilitation and sustainable cultivation of degraded arid lands, the Northern Negev: A case study

Amir Mor-Mussery[1], **Michael Ben Eli**[2] and **Stefan Leu**[3]
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[2]The Sustainability Laboratory, USA
[3]Ben Gurion University of the Negev, Israel

Statement of the Problem: Many studies were conducted on the ants' life cycles; food supply etc., still their functioning in cultivated arid areas and as result, their rehabilitation efficiency for these areas is poorly analyzed.

Aim: Defining the harvester ants' impacts on different cultivated arid areas and their potential use for rehabilitation and sustainable management.

Methodology & Theoretical Orientation: A long term study carried out between 2008 and 2017 in the northern Negev (A heavily degraded and desertified area due to maximum levels of mismanagement, by repeated tilling and grazing without fertilizer inputs, fertility or grazing management) in different cultivated areas some conserved and other open lands on the harvester ants *Messor ebeninus* and *M. arenarius* functioning.

Findings: Our findings indicate that in tilled areas at the first years after conservation, the harvester ants raised yearly the soil organic matter in by 0.5%, due to their foraging, than by 0.5-1% per year by their nests functioning (which serve as sink for spreading nutrients in the area underground zone). At final state in well managed rainfed *Triticum aestivum* field we found an increase of 15% of the yields (grains and vegetative biomass for grazing) in 30% ants' nests cover. In rangelands we got a yearly continuant increase of 0.5-1% of SOM and for other fertility parameters as nutrients and vegetative biomass an increase of 30% per year caused by their nest-sink functioning and their soil loosening. In cultivated soil terraces the ants encouraged the herbaceous vegetal growth by their soil loosening, accumulated organic matter and enriched clay content.

Conclusion & Significance: Using adequate soil practices which do not interfere with ants' activity will accelerate rehabilitation, sustainable and profitable cultivation use for many degraded arid lands all over the globe.

Biography

Amir Mor-Mussery has his expertise on implementation of sustainable cultivation practices for arid loamy soils. His fields of interests include defying rehabilitation (or depredation) states of different cultivation practices, planning and monitoring grazing plans for arid rangelands, designing and managing agriculture terraces for halting runoff and rehabilitation of cultivated areas, savannas planning for increasing rangelands' productivity. He wrote many papers in peer reviewed journals on these issues and guide students and high school students on these issues.

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March 05-07, 2018 | Paris, France

Scientific Tracks & Abstracts

DAY 2

S Leelavathi et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Efficient transformation of submergence tolerant deep-water rice of North-East India and fast recovery of transgenic plants

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Rice is an important staple food for more than two billion people worldwide. Huge losses occur due to biotic and abiotic stresses. Submergence due to flash floods or heavy rains is a major abiotic stress affecting productivity of rice in low-lying areas. In north-east region of India well known for major genetic diversity of rice, several varieties are submergent tolerant for long periods. There are at least two different mechanisms involved in the submergence tolerance in rice, one mediated by Snorkel pathway and the other by Sub1 pathways. In order to characterize the functional role of each of the gene(s) involved in the submergence tolerance in these pathways, efficient transformation methods are needed for these genotypes. Here we present data on efficient transformation of two deep-water rice of North-East region of India namely Taothabi and Khongan. Transgenic rice plants that can be grown in the greenhouse were obtained in 35-45 days starting from the callus induction and co-cultivation by Agrobacterium. Molecular analysis confirmed stable integration and expression of reporter GUS gene. In addition to over express or down regulate genes involved in submergence tolerance, the methods developed will accelerate the functional validation of candidate genes identified through genomics studies.

Biography

S Leelavathi has completed her PhD in Anther Cultures of different *Brassica* spp. and has equal expertise in rice anther culture and haploid generation at Bose Institute, Kolkata, India. At ICGEB, New Delhi, she is focusing on chloroplast transformation and expression of foreign genes including several cellulolytic enzymes, which resulted in several original papers and patents. She is also specialized in nuclear transformation techniques of different plants including rice, cotton, tomato, lentil, etc. Her research in cotton regeneration using metabolic stress and transformation using embryogenic callus as explants for *Agrobacterium*-mediated transformation is an important landmark not only in cotton biotechnology, but other crops as well. Presently, she is interested in use of plant produced cellulolytic enzymes in biofuel research and submergence tolerance in rice and transformation in pulses.

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Atif Idrees et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Protein baits, volatile compounds and irradiation influence expression profiling of odorant-binding protein genes in *Bactrocera dorsalis* (Diptera: Tephritidae)

Atif Idrees, Hehe Zhang, Mijuan Luo, Min kyaw Thu, PumoCai, Waqar Islam, Jiahua Chen and **Qinge Ji**
Fujian Agriculture and Forestry University, China

Chemical communication among insects is based on odorant-binding proteins (OBPs). Regulatory mechanism of OBPs in the perception of volatiles and host chemicals remain unclear. In present study, *Bactrocera dorsalis* OBPs (BdorOBPs) have been evaluated in response to different attractive protein baits, brewer's yeast volatile compounds and irradiation. Based on our previous study, we analyzed the expression of 10 OBP genes expression in the antennae of *B. dorsalis* during three mature life-stages i.e. pre-mating, post-mating and post-oviposition. *B. dorsalis* (Hendel) is one of the most economically important damaging fruit pests. Selected BdorOBP genes were found with one conserved PBP-GOBP except *OBP8* that contained two conserved domains. An un-rooted phylogenetic tree was constructed to show the relationships among the 10 BdorOBPs to other insects having same OBP family. We recorded significantly different transcriptome expression in each OBP genes at each stage in response to treatments. *OBP2* was significantly expressed in response to baits at each developmental stage while *OBP2, OBP5* and *OBP1* were largely expressed in response to combined volatiles treatments at all tested stages. *OBP3, OBP5* and *OBP10* showed high expression in response to irradiation at all tested stages. We infer that our treatments have significant influence on the transcriptome of OBP genes which may act in olfactory perception.

Biography

Atif Idrees is currently doing his PhD in Agriculture Entomology and Pests Management at Fujian Agriculture and Forestry University, China. He has done research in physiology, entomology and ecology. His most recent publication is 'Genetic resistance in chickpea against Ascochyta blight: Historical efforts and recent accomplishments'.

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Notes:

Yildiz Aydin et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Strategies for haploid plant production: Experiences from sunflower

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Haploid plants that inherit chromosomes from only one parent significantly facilitate the search and selection of favorable genes and the development of breeding genotypes. Haploidization techniques facilitate the production of pure lines from heterozygous plants in a single generation and represent significant advantages for plant breeders. Haploids can be induced by in vivo or *in vitro* methods. The *in vitro* methods that have been developed to induce embryogenesis are androgenesis, gynogenesis including parthenogenesis induced primarily by pollination with irradiated pollen followed by embryo rescue. Cultivated sunflower is a globally important oilseed, food, and ornamental crop. The main objective of the study on the production of haploid sunflower plants is to accelerate breeding programs through the use of homozygous broomrape and herbicide-resistant double haploid lines. The influence of pollen irradiation on the production of *in vitro* haploid plants from *in situ* induced haploid embryos was investigated in sunflower. Immature flower buds of the ovule donors were emasculated prior to anthesis and were bagged to avoid unwanted outcrossing. Pollinations were carried out on field plants, bagged before anthesis. For pollen inactivation were applied the gamma 60Co irradiation doses: 500 Gy, 1000 Gy and 1500 Gy. Irradiated pollens were used for pollinating the flower buds of the ovule donor. 14-16 days after pollination, immature embryos were observed on binocular microscope for detecting the embryo stage and then transferred to four different MS medium without any plant growth regulators to facilitate the maturation and development of plants. Concerning the number of embryos formed were obtained in pollen inactivation with doses 750 and1000 Gy. Nuclear DNA content of control (diploid) and haploid sunflower plants were evaluated by chromosome analysis and flow cytometry having "n" number of chromosome set.

Biography

Yildiz Aydin has completed her PhD degree from Marmara University, Department of Biology in 2003. Her expertise lies in plant tissue culture and application of PCR-based molecular markers to plant germplasm. Her current research work involves researching haploid plant production protocols for sunflower.

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Ahu Altinkut Uncuoglu et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

The use of DNA markers in plant breeding for disease resistance: From PCR-based approaches to allele specific markers

Ahu Altinkut Uncuoglu, Yıldız Aydin and **Ezgi Çabuk Şahin**
Marmara University, Turkey

Marker-assisted breeding is defined as the application of molecular markers in combination with linkage maps and genomics, to alter and improve plant traits on the basis of genotypic assays. Yellow rust, caused by *Puccinia striiformis* f.sp. tritici, is one of the major devastating factors worldwide in common wheat (*Triticum aestivum* L.). It is vital to identify associated DNA markers for Yr genes that can be used for marker assisted selection in wheat breeding programs to develop new cultivars with higher resistance. Here we report on the identification of six polymerase chain reaction (PCR)-based DNA markers (*Xgwm382, Xgwm311, wmc658, PK54, BU099658, C6*) linked with yellow rust resistance. Another issue requiring marker-assisted breeding are resistance for *Plasmopara halstedii* responsible for downy mildew disease and *Orobanche cumana*, holoparasitic plant called as sunflower broomrape, lead to loss of yield discount up to 100%. Single nucleotide polymorphism (SNP) markers linked with Pl_8, Pl_{13} and Pl_{arg} resistance genes for downy mildew disease in combination with competitive allele specific PCR (KASP) assay which is a fluorescent tagged allele specific PCR method that is more efficient way to determine SNPs like insertions and deletions than other PCR techniques were identified. SNP markers (*NSA2220* and *NSA2251* for *Pl8* gene, *NSA0052* and *NSA0354* for *Pl13* gene, *NSA2867* and *NSA6138* for Plarg gene) were found discriminative among resistant and susceptible parents and their F2 populations. Also, evaluation of *O. cumana* races by KASP assay has been performed and SNP197 marker converted from the one SSR marker (*Ocum-197*), was found as a distinctive marker for *O. cumana* races. All these efforts mentioned above show the potential use and power of PCR-based and sequence-based DNA markers in plant breeding programs particularly for disease resistance in wheat and sunflower.

Biography

Ahu Altinkut Uncuoğlu is currently working as Faculty of Engineering, Department of Bioengineering, Marmara University. She has completed her PhD at TUBITAK Marmara Research Center in 2001. Her research interest and specializations include biotic (plant diseases) and abiotic (drought and salt stresses) stress tolerance in crops at molecular level, molecular breeding, Marker Assisted Selection (MAS) studies in plant breeding, plant tissue culture and haploid plant production, association mapping and DNA barcoding studies in plants, understanding plant biodiversity at molecular level, technology transfer and university-industry relations in biotechnology area.

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Pooran Chand, Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Relationship between physiological traits and grain yield in wheat (*Triticum aestivum* L.) under heat-stress environments

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The effects of heat stress on wheat are dependent on the intensity, type and duration of the stress. High temperature represents a major constraint affecting wheat, particularly at the reproductive stage, in many parts of the world. While a systematic understanding of the physiological basis of differences in heat tolerance of wheat cultivars are lacking, a number of physiological traits are associated with performance under heat stress and may be used to increase selection efficiency. Therefore, the present study was aimed to investigate the relationship between canopy temperature depression, membrane thermo-stability and other physiological traits with grain yield and yield-contributing traits under heat stress environments in wheat and identification of suitable genotypes for higher production and productivity in the target environments. An experiment was conducted during winter season of 2015-16 using 48 diverse wheat genotypes with three dates of sowing (15 November, 15 December and 5 January) to assess the relationship of physiological parameters with grain yield under heat-stress environments. The analysis of normal, late and very late sowing, revealed that all the characters showed sufficient amount of variability in all three environments among all the genotypes under study and gives ample scope for further selection of the traits under consideration. Maximum variation was observed for characters, like canopy temperature depression and membrane injury. Most of the characters had high heritability (broad sense) in pooled analysis. Traits, like canopy temperature depression (at anthesis), canopy temperature depression (10 days after anthesis), membrane injury, had high heritability estimates and which can be utilized as selection criteria in stress environments. Grain yield showed positive and significant genotypic correlation coefficients with canopy temperature depression at anthesis, canopy temperature depression at 10 days after anthesis and membrane injury per cent. Based on the genotypic coefficient of variation, phenotypic coefficient of variation, genetic advance and heritability, the traits canopy temperature depression at anthesis, canopy temperature depression at 10 days after anthesis, membrane injury percent and relative water content can be used as selection criteria for improving the grain yield heat tress environment.

Biography

Pooran Chand has expertise in teaching and development of wheat and rice varieties with reference to heat and drought tolerant through conventional and non-conventional methods. He has published more than 50 research papers in different reputed research journals and associated in the development and releasing of 14 varieties in different crops.

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DAY 3

Prae-ravee K-hasuwan, Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Development of organic farming using participatory guarantee systems: A case study in land reform area, Ayutthaya province, central Thailand

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Statement of the Problem: Farmers who are members of a Lat Bua Luang Community Rice Center (LBLCRC) in land reform area, Ayutthaya province, central Thailand, used conventional farming techniques and did not have enough profit to feed their family members. They then switched to organic rice cultivation to reduce their production costs and initiated organic vegetable production to boost their income using Participatory Guarantee Systems (PGS). PGS can improve local organic farming practices through the sharing of knowledge and experiences. PGS certification also has less administration and lower costs than third party certification. However, PGS is not prevalent in Thailand because most producers and consumers lack understanding of its processes and advantages. This study thus aims to examine the outcome of organic group processing and the interaction between the LBLCRC-member farmers and other stakeholders from participating in PGS.

Methodology & Theoretical Orientation: Collaborative action research using a concept of empowerment theory was conducted to promote the organic group processing and the ability to control selling prices. The face-to-face interviews and focus group discussions were also taken place during data collection procedures.

Findings: The participation in PGS can improve organic group process skills of the LBLCRC-member farmers and strengthen them to have better access to domestic markets rather than limiting their organic products into a local niche market.

Conclusion & Significance: PGS may be a promising alternative for smallholder farmers to develop organic group processing and to increase market accessibility. Further studies in the way to scale up other land reform areas under organic farming using PGS should be emphasized.

Biography

Prae-ravee K-hasuwan is currently working at Ministry of Agriculture and Cooperatives, Thailand and has expertise in organic agriculture standard, sustainable agricultural development, and agricultural land reform. Her working model focuses on promoting farmers in land reform areas of Thailand to be self-sufficient and to have a better living. She has operated the model through research, monitoring, and evaluation.

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Pooran Chand, Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Molecular characterization of rice (*Oryza sativa* L.) germplasm using SSR marker

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Molecular marker technologies can assist conventional breeding efforts and are valuable tools for analysis of genetics relatedness and the identifications and selection of desirable genotypes for crossing as well as for germplasm conservation in gene banks. The objectives of the present investigation were to evaluate genetic divergence, molecular characterization of 30 rice genotypes using twenty SSR markers and to evaluate the efficiency of SSR markers. Among the used 20 primers, only 15 primers amplified well and revealed polymorphic bands, whereas, remaining 5 primers showed no reaction in PCR amplification. The allele length for these 15 primers varied from 100 to 500 bp. Total of 20 alleles were detected in 30 rice genotypes and number of alleles per locus ranged from 1 to 3 with an average of 1.93 per locus. The highest number of alleles (3.0) was detected in the locus RM1, RM2-, RM26 and the lowest number of alleles (1.0) was detected from RM22, RM 138, RM182 and RM 189. The PIC (Polymorphism Information Content) values for different SSR loci across the 30 rice genotypes ranged from 0.066 (RM138 and RM 182) to 0.9 (RM31) with an average of 0.605. The PIC values indicate that RM31 might be the best marker for diversity analysis. Resolving power of the microsatellite markers used ranging from 1.6332 (RM20) to 4.3664 (RM26) with an average of 2.4686. Jaccard's similarity coefficient revealed that Punjab Basmati 3 and Vallabh Basmati 24 were ascertained to be the genetically divergent from the other genotypes. The similarity coefficient values indicated, a wide genetic base of 30 genotypes used in the experiment. The resolving power and PIC value of primers shows that they are highly polymorphic and informative. The result derived from the analysis of genetic diversity at DNA level could be used for designing effective breeding programs aiming to broaden the genetic basis of commercially grown varieties.

Biography

Pooran Chand has expertise in teaching and development of wheat and rice varieties with reference to heat and drought tolerant through conventional and non-conventional methods. He is currently teaching Postgraduate and PhD courses on Principles of Quantitative Genetics and Advanced Biometrical and Quantitative Genetics. He has published more than 50 research papers in different reputed research journals and is associated with the development and releasing of 14 varieties in different crops well adopted by the farmers.

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PLANT BIOTECHNOLOGY AND AGRICULTURE

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Young Researchers Forum

DAY 3

Andres Felipe Gonzalez Mora et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Design and construction of a dehydrator by instant controlled pressure drop (ICPD) for specialty coffee

Andres Felipe Gonzalez Mora, Adriana Meneses-Suarez, Jose Gamboa-Gamboa, Sebastian Gutierrez-Pacheco and **Alfonso Parra-Coronado**
National University of Colombia, Colombia

The specialty coffee represents 12% above the consumption of coffee in the world. This product is characterized by the flavors given by certain microclimate, besides to achieve the stringent quality control. Therefore, it is necessary to carry out the techniques that optimize the process related to coffee conservation. Nevertheless, the conventional coffee drying does not allow a quickly and uniform process, affecting the grain quality and beverage characteristics. This work presents the design, construction and evaluation of a coffee dehydrator by instant controlled pressure drop (ICPD). The setup is composed by a treatment chamber, vacuum pump, control devices for the pressure drops and an electrical heater to transfer warmth through the coffee mass (1 kg) disposed inside the treatment chamber. To evaluate the process, the drying kinetic of coffee (*Coffea arabica*) was considered. Factorial design 3^2 was adopted, taking as factors the coffee origin (Nariño, Cundinamarca and Sierra Nevada) and the wet processing coffee phases (cherry, mucilaged and parchment coffee). The conception considered that high frequency and major difference of pressure represent major air flow through the treatment chamber, ensuring an improvement in the drying kinetic. The design was made to experimental specialty coffee drying, but the setup could be adapted and scaled to dehydrator for other products.

Biography

Andres Felipe Gonzalez Mora is a Researcher at National University of Colombia. He has knowledge in postharvest and storage of grains and fruits, modeling and simulation of drying process and biosystems control. In addition, he has experience in research projects about storage methods of mango (Mangifera indica).

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Francy Vanegas et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Impact of dehydration by successive pressure drops on specialty coffee

Francy Vanegas, Sara V Noel, Rafael L Sandoval, Alfonso Parra and **Sebastian Gutierrez**
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The dehydration process reduces the water content of a product to preserve for a long time. However, dehydration operation could carry out oxidation, undesired chemical reaction and loss of quality. In the case of the specialty coffee beans, to keep its volatile components, it is not advisable to dry it over 40° C. This condition involves the development of new techniques, not only to improve the drying kinetics, also to obtain products with good properties. The dehydration by successive pressure drops (DPD) is a drying system which uses a repetition of compression and decompression cycles, DPD is slightly new for the heat sensitive products, but it had not still been used with the specialty coffee beans. The aim of this work is to define a methodology to evaluate the operation conditions on the DPD system over the drying rate (g H2O/kg coffee per h) for specialty coffee. Central Composite Design (CCD) was used to evaluate the two important operation factors of dehydrator: vacuum time and atmospheric pressure time. In conclusion, this methodology allows restrict the operation region to coffee drying. Along the experimental process, a pre-drying treatment was made to establish a uniform initial moisture content. After that, coffee beans were dried by DPD, with a vacuum pressure time of 13s and atmospheric pressure time 3s, over environmental temperature (15-20 °C). It is necessary to take into account that another response variable could be adopted as grain degradation, organoleptic quality or porosity. Also, response surfaces from different variables could be combined to obtain not only the optimization of drying kinetics, but product with attractive properties for the consumer.

Biography

Francy Vanegas is an Agricultural Engineering student at National University of Colombia. She has participated in 12th Latin American Congress of Agricultural Engineering with the article “Effect of different packages on mango quality (*Mangifera Indica* L.) sugar variety” and 7th Latin American Congress of Agricultural Engineering Students with the article “Behavior of Compression on altered and unaltered sols at different depths”.

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Notes:

Moumita Malakar et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Consequences of divergent vase solutions on post-harvest durability and quality of *heliconia* inflorescences

Moumita Malakar, Pinaki Acharyya and **Sukanta Biswas**
University of Calcutta, India

Heliconia the most flourishing cut flower in the tropics owing to its charismatic form and alluringly blended hues of its bracts. To label post-harvest complications and to protract vase life for a substantial span present experiment was designed employing antithetical vase solutions of various concentrations and fresh, mature, cut spikes of nine different Heliconia species and varieties. T_5 and T_6 treatment combinations contain $AgNO_3$ @1500ppm and $Cacl_2$ @ 750mg/l along with 8- HQC @500mg/l and Sucrose 2% outstandingly elevated solution uptake and flower opening inside bracts principally in all species and varieties respectively. Untreated spikes of *Heliconia. psittacorum* var. 'Lady di', *Heliconia wagneriana, Heliconia stricta, Heliconia stricta* var. 'Dwarf Jamaican Red' and *Heliconia metallic*a exhibited noteworthy fresh weight retention on 8th days exceptionally while in contrast T_4, T_5, T_7 and T_3 evinced themselves unrivalled for rest of the genotypes on same duration. To preserve bract and flower's carotene, anthocyanin and chlorophyll pigments all treatment's impact were truly species specific apparently. T_7 and T_9 hold GA_3 @ 80ppm and Citric acid @ 200mg/l along with germicide and sucrose respectively besides T_5 and T_6 also yield utmost vase life being impeded senescence in all inflorescences. These identical treatments amplified the levels of catalase, peroxidase enzymatic activities and collaterally declined the lipid peroxidation on 7th days in the bract. Therefore, present study concludes that $AgNO_3$, $Cacl_2$, GA_3 and Citric acid at mentioned concentration renders magnificent beneficial effects on vase life attributes being subsisted with oxidative stress of *Heliconia* inflorescences.

Biography

Moumita Malakar, INSPIRE Fellow (SRF) of University of Calcutta, India is presently pursuing 'Doctoral Program' on Horticulture, specializing in 'Floriculture & Landscaping'. The investigation on 'impact of various vase-solutions on post-harvest life of *Heliconia* inflorescences' is the worthy portion of my thesis work. She studied longevity of few ornamental foliages and flowers too but as *Heliconia* presently is highly priced in flower plaza especially in west-Bengal, there arises a need to extend its vase-life. The positive impact on entrepreneurs of this authentic endeavor is ascertained and will keenly influence the wealth since *Helilconia* is an emerging 'specialty cut flower' in West-Bengal, India.

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Muhammd Nadeem Hafeez, Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Mutated and wild type *Gossypium* Universal Stress Protein-2 (GUSP-2) gene confers resistance to stresses in *Escherichia coli*, *Pichia pastoris* and cotton plant

Muhammd Nadeem Hafeez
Center for Excellence in Molecular Biology, Pakistan

Gossypium arboreum is considered to be a rich source of stress responsive genes and EST data base revealed that mostly of its genes are uncharacterized. The full length *Gossypium* universal stress protein-2 (*GUSP-2*) gene (510 bp) was cloned in *E. coli*, *Pichia pastoris* and *Gossypium hirsutum*, characterized and point mutated at three positions separately at 352-354, Lysine-60 to proline (*M1-usp-2*) and 214-216, aspartic acid-26 to serine (*M2-usp-2*) and 145-147, Lysine-3 to proline (*M3-usp-2*) to study its role in abiotic stress tolerance. It was found that heterologous expression of one mutant (*M1-usp-2*) provided enhanced tolerance against salt and osmotic stresses, recombinant cells have higher growth up to 10-5 dilution in spot assay as compared to Wusp-2 (wild type GUSP-2), *M2-usp-2* and M3-usp-2 genes. *M1-usp-2* in Pichia pastoris transcript profiling exhibited significant expression (7.1-fold) to salt and (9.7) and osmotic stresses. *M1-usp-2* gene was also found to enhance drought tolerance and significant expression (8.7) in CIM-496-Gossypium hirsutum transgenic plants. However, little tolerance against heat and cold stresses both in recombinant yeast and bacterial cells was observed. The results from our study concluded that activity of *GUSP-2* was enhanced in *M1-usp-2* but wipe out in M2-usp-2 and M3-usp-2 response remained almost parallel to *W-usp-2*. Further, it was predicted through in silico analysis that *M1-usp-2, W-usp-2* and *M3-usp-2* may be directly involved in stress tolerance or function as signaling molecule to activate the stress adaptive mechanism.

Biography

Muhammd Nadeem Hafeez is currently working as a Researcher at Center for Excellence in Molecular Biology (CEMB), Lahore, Pakistan. He has expertise in gene editing, cloning and plant transformation. He has developed a first triple gene genetically engineered cotton variety of Pakistan, which confers significant resistance against biotic and abiotic stresses.

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Moumita Malakar et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Molecular characterization of ten *Heliconia* (Heliconiaceae) genotypes by means of RAPD markers

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University of Calcutta, India

Heliconia a trendiest specialty cut flower of tropics is securing popularity for its inflorescence's charismatic form and alluringly blended hues in the world and in Indian market too. It is a monophyletic genus with roughly 200 to 250 species of neotropical origin. It resides alone in *Heliconia*ceae family of Zingiberales order former incorporated in Musaceae for fusion of inverted flowers, single staminode and drupe type fruits elite for it. Exploitation of molecular markers may aid in perceptive recognition of several species and varieties of them since taxonomic confusions and uncertainties subsist amid them. In this context, ten species and varieties were analyzed using RAPD markers. Chosen thirty primers among seventy, amplified 1281 polymorphic DNA fragments with each primer giving a mean of 42.7 polymorphic bands. The genetic similarity matrix constructed with Jaccard's coefficient using RAPD marker scores showed that the highest value was between *H. psittacorum* var. Choconiana and *H. psittacorum* var. Lady Di (0.384), while the lowest was between *H. psittacorum* var. Choconiana and H. stricta var. Dwarf Jamaican Red (0.244). Ten species and varieties of *Heliconia* formed three distinct clusters at similarity coefficient value of 0.33, implying a parallelism between genetic and morphologic or taxonomic variability of *Heliconia* genotypes. Golden Torch, Choconiana, Lady Di and *H. wagneriana* included in cluster I while Choconiana, Lady Di formed a more cohesive entity. On the contrary, *H. stricta* var. Dwarf Jamaican Red produced a separate cluster validating that taxonomically related entries clustered together and distant ones segregated. So, the current sequels demonstrate that RAPD is a rapid, relatively economical and functional for the characterization of genetic divergence between different *Heliconia* genotypes.

Biography

Moumita Malakar is a Senior Research Fellow (INSPIRE Fellow) at University of Calcutta, India, pursuing Doctoral program on Horticulture, specializing in Floriculture & Landscaping. She studied longevity of few ornamental foliages and flowers.

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Nabil B et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Nutritional, physicochemical properties and shelf life of crackers based on cladode flour of *Opuntia ficus indica*

Nabil B[1], **Saadouni N**[2], **Bouchdoug M**[1] and **Mahrouz M**[1]
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Sustainable food production is the need of the hour. These foods can help to prosper the local economy and improve the health of consumers. Indeed, consumers are requiring new foods rich in nutrients, with acceptable organoleptic quality. For this, current research has used alternative sources of plant origin rich in bioactive compounds, in the development of new food products (biscuits). Cladodes of *Opuntia ficus indica* one of these plant origins which contain several bioactive compounds that have proven their importance in the prevention and cure of many chronic diseases (cancer, hypertension, obesity, cardiovascular disease), this is the reason why the cladode flour is currently used in pharmacological and food industry. Our study shows that crackers based on cladode flour of *Opuntia ficus indica* present an interesting source of major and secondary nutrients and trace elements essential to the growth and development of the human body since the levels of certain elements far beyond the daily needs recommended by WHO. Functional properties were studied, and results showed that the flour obtained from cladodes has a great technological potentiality as water absorption capacity (4.87±0.09%), swelling capacity (30.16±1.89%) and bulk density (0.95±0.009 g/ml) compared to the whole wheat flour. All results for the composite flour showed that bulk density, water absorption capacity, swelling capacity and solubility index increased according to increased levels of cladode flour enhanced, whereas gelatinization temperature and oil absorption capacity decreased; in on the other hand the least gelation concentration has to remain constant for all composite flour. The Proximate composition of crackers shows a variation according to the content of cladode flour (Crude fat, ash content, pH, Titratable acidity, °Brix and Moisture). The water activity of crackers is similar whatever the content of cladode flour and it is in the standard of the baked products (Aw=0.4 to 0.6). This work demonstrates the nutritional potential benefit attributed to this species, allowing the possibilities of using it as an alternative power source for both humans and animals for its remarkable therapeutic effect with no secondary effect.

Biography

Nabil B is currently a PhD student belonging to the research team of innovation and sustainable development expertise in Green Chemistry. She is currently studying at Semlalia Science Faculty, University Cadi Ayyad Marrakech under the supervision of Professor Mustafa Mahrouz. She pursued Master's degree in Food Technology from the University Cadi Ayyad in 2014. She is currently a participant in a scholarly project: Priority Research program (PPR-B-Mahrouz-FS-UCA- Marrakesh).

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Moussaoui Haytem et al., Adv Crop Sci Tech 2018, Volume 6
DOI: 10.4172/2329-8863-C1-005

Enthalpy-entropy compensation analysis of the powder of *Taraxacum officinale's* leaves in moisture sorption phenomena

Moussaoui Haytem, Idlimam Ali and **Lamharrar Abdelkader**
Cadi Ayyad University, Morocco

Taraxacum officinale is a kind of flowering plant that belongs to a vast family of Asteraceae. This family is represented by more than 2500 species. They are utilized for various purposes that include for dyspepsia, bile stimulation, bruises, rheumatism, eczema and muscle aches. Moreover, the powder of dandelion is used as special ingredients in soups, salads, green tea and wines. The *Taraxacum officinale* used in this study were collected locally in Settat region, Morocco. The aim of this study is to determine the experimental sorption isotherms and the net isosteric heat of sorption to conserve the powder. These isotherms are a powerful tool to know the state of water inside the product and his functional availability in the biological and chemical substances. The sorption isotherm curves were determined experimentally for the carob seeds at 3 temperatures (30, 40, 50 °C) and relative humidity within the range of 5-90% commonly used in the drying and storage. The net isosteric heats of sorption of water were determined from the equilibrium data at different temperatures. The compensation theory was further used to good straight lines were observed for adsorption and desorption. The Gibbs free energy values are positive ($\Delta G\beta>0$), indicating that the sorption processes are not spontaneous.

Biography

Moussaoui Haytem is currently a PhD student and a Member in Laboratory of Solar Energy & Aromatic and Medicinal Plants, ENS Marrakesh, Physics Department, Cadi Ayyad University, Marrakech, Morocco. He is also an Industrial Engineer. Moreover, he is a Member in Techno-Sharing Club for Student Development. He has participated in several social activities whose aim is to help the homeless children and the old men in house of the elderly.

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