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MARCH 24-26

6TH EDITION OF
GLOBAL CONGRESS ON

PLANT BIOLOGY AND BIOTECHNOLOGY

VIRTUAL EVENT

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BOOK OF ABSTRACTS

6TH EDITION OF GLOBAL CONGRESS ON

PLANT BIOLOGY AND BIOTECHNOLOGY

24-26 MAR

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ABOUT MAGNUS GROUP

Magnus Group (MG) is initiated to meet a need and to pursue collective goals of the scientific community specifically focusing in the field of Sciences, Engineering and technology to endorse exchanging of the ideas & knowledge which facilitate the collaboration between the scientists, academicians and researchers of same field or interdisciplinary research. Magnus group is proficient in organizing conferences, meetings, seminars and workshops with the ingenious and peerless speakers throughout the world providing you and your organization with broad range of networking opportunities to globalize your research and create your own identity. Our conference and workshops can be well titled as 'ocean of knowledge' where you can sail your boat and pick the pearls, leading the way for innovative research and strategies empowering the strength by overwhelming the complications associated with in the respective fields.

Participation from 90 different countries and 1090 different Universities have contributed to the success of our conferences. Our first International Conference was organized on Oncology and Radiology (ICOR) in Dubai, UAE. Our conferences usually run for 2-3 days completely covering Keynote & Oral sessions along with workshops and poster presentations. Our organization runs promptly with dedicated and proficient employees' managing different conferences throughout the world, without compromising service and quality.

ABOUT GPB 2022

GPB 2022 welcomes members from different parts of the world to join our Online Event - "6th Edition of Global Congress on Plant Biology and Biotechnology" scheduled during March 24-26, 2022. It includes prompt Keynote presentations, Oral presentations, and Poster presentations, interactive and informal exchanges. This is going to be one of the most remarkable events of the year. Through the theme "From Soil to Fork: Neoteric Innovations and Challenges in Plant Science" conference will explore the advances in the field. GPB 2022 goal is to bring together bright minds to give talks that are ideas-focused, and on a wide range of scientific sessions, to faster learning inspiration. It will provide an international platform to share expertise, foster collaborations, discover new information, and stay current with trends and networking.

KEYNOTE FORUM

DAY 01

6TH EDITION OF GLOBAL CONGRESS ON

PLANT BIOLOGY AND BIOTECHNOLOGY

24-26 MAR

Manuel Tornel[1]*, and Serrano MI[2]

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[2]ITUM - Table Grape Research and Technology, Blanca 30540 Murcia - Spain

Embryo rescue in mediterranean table grapes

The embryo rescue technique has been widely applied to embryo germination of stenospermic grapesin breeding programmes. In the stenospermocarpic genotype, the embryo abort after fertilization during development, so the selection of the sampling time and the growth medium are the most crucial to the success of this technique. This study investigated the effect of best sampling time and media composition on embryo rescue to avoid the high mortality rate. We sampled ovules 5 to 9 weeks after flowering,and we tried adding benzylaminopurine (BA) to the culture medium. The greatest percentages of embryo germination and normal plantlets were obtained when ovules were harvest at 8 weeks after flowering, indicating that it is suitable to harvest ovules at veraison. Murashige and Skoog medium with salts dissolved in half (MS1/2) was used with BA 0; 0,5 and0,25 mM. The percentage of embryos that developed cotyledons and roots were 5,8% with MS1/2 medium, 30,9% with MS1/2+BA 0,5mM and 42,7% with MS1/2+BA 0,25mM. Therefore, the 8-weeks-after-flowering harvest time and the MS1/2+BA 0,25mM medium were selected for use in the embryo rescue protocol in our breeding program.

Biography

Agronomist engineer and phD in agricultural research, lead the table grapes team of IMIDA, public institute of agrarian research. We developed together ITUM a genetic breeding program to obtain new seedless table grapes varieties with the use of biotechnological techniques such as in vitro culture and molecular markers for obtaining hybrids; in the field we use hormonal growth regulators (PGR). Breeder of 18 new varieties of which around 1.200 ha are grown in Spain; the first commercial farms are being planted in Chile, Peru and Australia; and in coming years in South Africa, Brazil and Mexico; two of the varieties have powdery mildew resistance genes, we are now focused on biological agriculture. Speaker at international congresses in Singapour, Mexico, Chile, Italy, Germany, Spain, Brazil, Argentina, Peru and Greece; and poster in Australia, Hong Kong and France. Actually, have more than 100 Plant Breeders Rights applications in the world.

Danijela Poljuha*, Mirela Uzelac, Ida Linic, Barbara Sladonja

Institute of Agriculture and Tourism, Porec, Croatia

Alien invasive plants as food and phytopharmaceuticals

The economic cost of ecological damages caused by invasive alien plant species (IAPS) is significant, but IAPS also have significant social, economic, landscape and ecological value and provide a range of ecosystem services. Some positive aspects of IAPS are their possible use as food and a source of pharmaceutically active compounds. This presentation will provide an overview of the results of the research project "NATURe as an ALLY: Alien invasive plants as phytopharmaceuticals – NATURALLY" (IP-2020-02-6899) funded by the Croatian Science Foundation. It will also offer an insight into the potential use of invasive plants Robinia pseudoacacia and Helianthus tuberosus found in Istria (Croatia) as food and phytopharmaceuticals.

Audience Take Away:

- Since today it is very difficult to avoid the introduction and spread of alien species, we are faced with the challenging task of achieving and maintaining balance in the so-called "New Ecosystems". This presentation will offer new solutions in invasive species management.
- The presentation will provide insight into the potential use of invasive plants as new ecosystem services providers.
- The presented results will contribute to raising awareness of the importance of invasive species management.

Biography

Dr Poljuha graduated from molecular biology at the Faculty of Science, University of Zagreb (Croatia), where she also holds a PhD degree in natural sciences in the field of biology. She has worked as a researcher at the Faculty of Science, University of Zagreb, The Institute of Agriculture and Tourism Poreč, and The Materials Research Center METRIS Pula. She has participated in 27 national and international projects and has published over 50 scientific papers. She is the founder of two laboratories and a Biotechnical Department. Her research interests are focused on invasive plants' phytochemistry, plant genetics, and molecular markers' application in the conservation of plant genetic resources. She is also involved with the popularization of science.

Samir C. Debnath

Research Scientist, St. John's Research and Development Centre, Agriculture and Agri-Food Canada, St. John's, Newfoundland and Labrador, Canada

Epigenetics and in vitro propagation of horticultural crop

The in vitro propagation to produce true-to-type plants are now well accepted worldwide for commercial propagation and production of horticultural crops. Fruits and vegetables contain valuable bioactive components that play significant role in anti-tumor, anti-oxidant, anti-ulcer, and anti-inflammatory activities. Although significant success has been achieved in the production of true-to-type horticultural crops using in vitro techniques, occurrence of variation in micropropagated plants is a major concern in commercial production. In the current presentation, in depth progress of somaclonal variation (genetic and epigenetic) in small fruit micropropagation is described. It also includes different molecular techniques used to monitor epigenetics in micropropagated berry crops along with application of epigenetic variation in micropropagated berry crops.

Audience Take Away:

- In vitro propagation; molecular techniques; somaclonal variations; DNA methylation.
- Applications of epigenetics in horticultural crop improvement.

Biography

Dr. Samir C. Debnath, P.Ag. is a Research Scientist at the St. John's Research and Development Centre of Agriculture and Agri-Food Canada (AAFC) in Newfoundland and Labrador and an Adjunct Professor of Biology at the Memorial University of Newfoundland. He has authored and co-authored more than 120 publications in peer-reviewed journals including review papers and book chapters. He has been a keynote speaker and an invited speaker at a number of international and national conferences and meetings, was the President of the Newfoundland and Labrador Institute of Agrologists (P.Ag.) and the Canadian Society for Horticultural Science; the Editor-in-Chief of the journal: Scientia Horticulturae, and a Special Issue Editor of Agronomy (MDPI). He was the Country Representative for Canada and the Council Member of the International Society for Horticultural Science. His research concerns biotechnology along with conventional method-based value-added small fruit and medicinal plant production, propagation and genetic enhancement. Much of his current work focuses on wild germplasm, antioxidant activity, biodiversity and micropropagation for berry crop improvement using in vitro and molecular techniques combined with conventional methods.

Benigno Villalon

Professor Emeritus, Texas A & M University, Plant Pathologist, Virologist, Geneticist, Plant Breeder

Texas Agricultural Experiment Station, P.O. Box 104, Weslaco, Texas, 78599-0104, U.S.A

The science of nutritional foods for health and other wellness information about cardiovascular diseases and cancers

I am a Biologist, eight years at Texas A&M University, three degrees, 38 semesters of plant, animal and soil science courses made me a Plant Pathologist, Virologist, Geneticist, a regular Plant Breeder. Fifty years of Plant Science Research and exercise has transformed me from a Plant Scientist, to a student of the science of foods for health and a human disease prevention information gatherer.

The USA wastes over $3.5 trillion trying to keep its sick citizens from dying, but they still die too soon. The obesity and diabetes rates in our country have reached tsunamic proportions. A weak immune system results in many human diseases (heart, hypertension, high blood sugar, obesity, diabetes, pancreas, liver, kidney failures, dementia and cancers). The metabolic syndrome can be the result of several inflammatory factors such as high triglycerides, low HDL, high number of small LDL particles (cholesterol carriers) and excess sugars, these things lead to disease. Abundant scientific evidence shows that we can maintain a healthy longevity by following simple lifestyle rules of prevention. This requires a dramatic lifestyle change including daily exercise to strengthen all organs (muscles, stimulate the brain) and reduce the metabolic syndrome by at least 80 % (Katz).

Food is the most important medicine in the world. Conversely, food is the most important poison in the world. Two main sources of food are animals and plants. Animal food (grass fed non-processed meats) provides good proteins, saturated fats, essential minerals and vitamins (not found in plants), and some carbohydrates. Good scientific evidence proves adequate cholesterol and animal saturated fats do not cause cardiovascular diseases (Kresser). Fresh unprocessed plant food provides good proteins, mono and polyunsaturated vegetable fats (i.e., avocados, nuts, olive and coconut oils, etc.), also essential vitamins, minerals, antioxidants, and mainly low glycemic index carbohydrates and high fiber. Good fresh vegetables include peppers, tomatoes, onions, garlic, legumes, all greens, include kale, spinach, (dressing = olive oil & apple cider vinegar), spices, etc. Both food sources provide enough essential nutrients and powerful heart healthy antioxidants. Science indicates 80% of vegans might have nutritional deficiencies in certain vitamins, minerals, etc. found only in animal foods. Beware of artificial supplements. One should limit to no consumption of processed polyunsaturated vegetables oils (trans fatty acids) as they may increase triglycerides, and omeg-6 fatty acids. These saturated fats (oils) include canola seed; corn seed; cottonseed; safflower seed; soybean seed; and sunflower seed. These oils (trans fatty acids) may be toxic (Mercola). Food is digested down to three main macromolecules: proteins, lipids, and carbohydrates. A perfectly balanced meal must contain the right proportions of these macromolecules in groups. A group collectively could be 9g protein, 7g fat, 1.5g carbohydrates for every meal. The average number of groups may be three to four per meal. No two human lifestyles are alike.

All foods contain carbohydrates. There are some 250 different kinds of sugars. There is no such thing as sugarless or sugar free foods. Excess sugars turn into fat and negatively impacts all body organs, leading to fatty liver, cirrhosis, and cancers. Sugars force the pancreas to produce insulin, insulin in right amounts is required for glucose cell absorption, for body energy, excess glucose leads to insulin resistance and type two diabetes (T2D). T2D is manmade and might be completely reversed without drugs and by reducing sugar intake. Conversely, glucose in proper proportion is the most important energy source for a healthy body.

Type 1 diabetes (T1D) is a chronic autoimmune disorder characterized by destruction of insulin-producing pancreatic β cells (any age). You might need insulin injections daily. Autoimmune disorders produce antibodies that also attack

many body organs, i.e., lupus, MS, Psoriasis, etc. Fructose goes straight to the liver, is toxic, stores fat, and leads to (fatty liver), cirrhosis and cancers. All fruits contain fructose, fiber may slow these processes, but it still is fructose. Eliminate high fructose corn syrup (Lustig).

Cancers, may not be prevented, however, new genetic immunotherapy, CAR-T cell and other new procedures are dramatically eliminating many kinds of cancers successfully (Allison).

So, eat food, not too much, mainly fresh vegetables, grass fed non-processed meats, minimize fruits, grain products (breads, cereal, pasta, heavy starches, pastries), sodas all kinds with high glycemic index sugars, exercise daily before breakfast, and live healthily ever after.

Eat food to reduce obesity, diabetes and cancer today. Eating to reduce obesity, diabetes and cancer can be accomplished simply by adding a few of our disease fighting foods to your meals each day. Like life itself, one's diet is all about making choices. Since we all eat every day, why not choose foods that can reduce your risk of disease? Listed below are some food facts, supported by scientific research, to help you get the most cancer/diabetes fighting benefits from your diet? Some scientific trials may be inconclusive?

Eliminate excess sugars to reduce weight, obesity, CVD, diabetes and cancers, etc.

Sugar is toxic, deadly, and 10 times more addictive than cocaine and or heroin (Lustig).

Be picky. Bell peppers contain 5 times more Vitamins C and A than tomatoes and 3 times more C and A than any citrus. Red Delicious apples have many cancer fighters. Peppers, tomatoes and onions contain many cancers fighting compounds (salsa picante). Red Wine grapes and many berries contain resveratrol, a cancer fighter. Eat Your Sprouts. Broccoli sprouts can contain more cancer-fighting properties than regular broccoli. Green teas contain cancer-fighting molecules. Most vegetables can be eaten fresh. Raw tomatoes are good but slightly cooking them in olive oil releases more lycopene, the cancer fighter. Chew Your Greens. Chewing kale, spinach, leafy greens with olive oil & apple cider vinegar helps to release enzymes that activate cancer-fighting molecules embedded deep in the leaves. Go Soy, fermented soy, like the kind used in miso soup, contains four times more cancer fighters than regular soybeans.

Choose one cancer fighting food for each meal. At 3 meals each day, that adds up to more than a 1,000 of cancer fighting food choices each year.

ACKNOWLEDGEMENTS OF SOME HUMAN DISEASE PREVENTION SCIENTISTS

DR. JAMES P. ALLISON, GENETIC IMMUNOTHERAPY, CAR-T CELL, CANCER

Dr. Robert Atkins High Protein, Low Carbohydrates

Dr. R. K. Bernstein Diabetes, Blood Sugar Meters

Dr. Johanna Budwig Essential Nutrients Cure Cancer

Dr. Aubrey de Grey Senescence, under 60, might live 1,000 years

Dr. William H. Hay Food Combining – 1911

Dr. David L. Katz Yale University Director Prevention Research Center

MS. Chris Kresser Paleo Nutrition, Functional & Integrative Medicine

Dr. Robert H. Lustig Excess sugar is addictive & fattening, Fructose goes straight to liver damage

Dr. J.P. Mercola Saturated fats & cholesterol are our friends

Dr. Weston A. Price Price Foundation-1930's, Saturated Fat, Nutrition & Physical Degeneration

Dr. Berry Sears Zone Diet

There are thousands of other internationally renowned Research Medical Doctors and Scientists dedicated to the prevention of human disease through proper nutritional foods for health.

Our government and the entire medical profession should emphasis human disease prevention.

DISCLAIMER: Any medical related information presented in this health/nutrition seminar is at best of a general nature and cannot be substituted for the advice of a medical professional, i.e., qualified doctor/physician, nurse, pharmacist/chemist, etc. None of the individual contributors nor anyone else connected to these presentations can take any responsibility for the results or consequences of any attempt to use or adopt any information presented. Nothing should be construed as an attempt to offer or render a medical opinion or otherwise engage in the practice of medicine.

Biography

Dr. Villalon, a full Professor and a senior resident research scientist at the Texas A&M University Research and Extension Center in Weslaco, Texas has authored over seventy-five scientific, refereed journal publications related to his pathology and breeding achievements. Ben's professional affiliations include the American Phytological Society with associate membership in the U.S. Southern, Mexican and Carribbean Divisions; the American Society for Horticultural Science; the Rio Grande Valley Horticultural Society (past president and secretary); Texas Association of Plant Pathologists and Nematologists and Gamma Sigma Delta Agricultural Honor Society. Dr. Villalon has served as a member of the Texas A&M University Graduate Faculty and has participated on fifteen different graduate student committees at both the M.S. and Ph.D. levels.

SPEAKERS

DAY 01

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Qingfeng Song*, Xin-Guang Zhu

Center for Excellence in Molecular Plant Sciences, Chinese Academy of Sciences, Shanghai, China

Modeling and phenotyping canopy photosynthesis for higher crop yield potential

Canopy photosynthesis is the integral of photosynthesis of all the above ground parts of plant canopy. Canopy photosynthetic efficiency is a major determinant to biomass production and crop yield potential. The microclimate and photosynthetic properties of different leaves in a canopy are largely different and dynamic. To study canopy photosynthesis, we developed 3D canopy model and ray tracing algorithm for calculating canopy photosynthesis. With 3D model, we dissected the contributions of plant architectural, physiological and environmental factors to canopy photosynthesis. Currently, we have developed models of maize, rice, wheat and soybean. We also developed canopy gas exchange system (CAPTS) and high throughput phenomics platform for measuring canopy photosynthesis related traits. With CAPTS system, canopy photosynthesis rate of wheat grown in field was measured. We quantified the dynamic changes of crop canopy light use efficiency (LUE), energy conversion efficiency (ec) during a day and a growing season with canopy gas exchange method. Results show that the LUE of two wheat cultivars with different canopy architectures at five stages varies between 0.01 to about 0.05 mol CO2 mol-1 photon, with the LUE being higher under medium PAR. Throughout the growing season, the ec varies from 0.5% to 3.7% (11%~80% of the maximal ec for C3 plants) with incident PAR identified as a major factor controlling variation of ec. The estimated average ec from tillering to grain filling stages was about 2.17%, i.e. 47.2% of the theoretical maximal. The estimated season-averaged radiation use efficiency (RUE) was 1.5~1.7 g MJ-1, which was similar to the estimated RUE based on biomass harvesting. The large variations of LUE and ec imply great opportunity to improve canopy photosynthesis for greater wheat biomass and yield potential.

Audience Take Away:

- New research tools for plant canopy photosynthesis.
- New canopy models and methods used for studying canopy photosynthesis.
- Combination of plant phenomics technology and 3D plant modeling.

Biography

Dr. Qingfeng Song studied canopy photosynthesis with modeling and phenomics methods, he got his BS of bioinformatics at Shanghai Jiao Tong University in 2009 and joint the research group of Prof. Xin-Guang Zhu at CAS-MPG partner institute of computational biology (PICB) and he received his PhD degree in 2014 at Chinese Academy of Sciences. As research assistant, he worked at PICB for three years and obtained the position of research associate at Center for Excellence in Molecular Plant Sciences, Chinese Academy of Sciences, in 2017. He has published more than 30 research articles in SCI journals.

Jiraporn Inthasan[1,2]*, Nicola Lorenz[3], Chatprawee Dechjiraratthanasiri[1] and Richard Dick[3]

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[2]Biodiversity and Utilization Research Center of Maejo University, Chiang Mai, 50290, Thailand

[3]School of Environment and Natural Resources, College of Food, Agricultural and Environmental Sciences, The Ohio State University, Columbus, OH, USA

Soil enzymes and microbial communities as soil quality indicators in organic and good agriculture practices under fruit orchard management in northern Thailand

The Northern Thailand is one of the locations where fruit crops have long been grown, for many decades. At this present, organic farming and good agriculture practices (GAP) are considered for improving yield and quality as sustainable practices to reduce environmental impacts. On the organic system, soil fertility is conserved largely with manure and compost fertilizers in contrast to GAP that combine both organic fertilizer and chemical fertilizers, and commonly apply suitable amounts of pesticides or herbicides. There is little information on the impacts of organic system and GAP on the soil quality in Thailand. Soil enzymes and soil microbial communites indice as indicators of changes in soil quality under differing management practices. Therefore, in this study, we compared soil enzymes and microbial communities of soil samples under mango and longan orchards both in organic farming and GAP at Maejo University, Chiangmai, Thailand. The soil samples under fruit crops canopies were sampled (0-25 cm depth) and analyzed for 5 enzyme activities (acid phosphatase, alkaline phosphatase, β-glucosidase, N-Acetyl-β-glucosaminidase and arylsulfatase) and microbial community structure by ester-linked fatty acid methyl ester (EL-FAME) methods. Organic management occured in memorably higher soil enzyme activities such as acid phosphatase, β-glucosidase and arylsulfatase both in mango and longan orchards. Even though, GAP resulted in high reading of alkaline phosphatase and N-Acetyl-β-glucosaminidase. Total fungal, bacterial and arbuscular mycorrhizal fungi (AMF) by EL-FAME biomarkers were higher stimulated by the organic framing system than GAP. Management systems explained non-significant, on average of actinomycetes community indicators. The majority of impacts on soil enzymes and soil microbial properties occurred when only organic fertilizer was added under fruit crops canopies indicating that this practice had the biggest impact for improving soil quality.

Audience Take Away:

- This research will give information of soil quality under organic and GAP.
- For understanding the technique of soil enzymes and microbial community method.
- To explain advantage of both organic and GAP for sustainable agricultural.
- Encouraging people to care and protect environment.

Biography

Assistant Prof. Dr. Jiraporn Inthasan got the Doctor of Philosophy (Dr. sc. agr.) in Soil Science at Department of Soil Science and Land Evaluation, University of Hohenheim, Stuttgart, Germany in 2006. She is the lecturer at the Department of Soil Resources and Environment, Maejo University, Chiang Mai, Thailand since 2001. At this present, she has many courses in Bachelor and Master of Science programs about soil fertility, soil and plant nutrition, soil amendments and biological fixation. She got scholarship from The German Academic Exchange Service (DAAD), Office of the Civil Service Commission and Fulbright scholarship (USA) to contribute her experience. She has published more than 40 research articles in Thai and international journals.

Didier Lesueur[2,3,6,7]*, Viet San Le[1,2,3], Laetitia Herrmann[2,3], Van Huy Nguyen[4], Bui Le Vinh[5]

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Importance of fast-growing Australian acacia in Vietnam: Real opportunities for developing/formulating effective bio-inoculants for a production of healthy and vigorous seedlings

International funding agencies had put a lot of effort for financially supporting projects aiming the production of high-performing hybrids of Australian Acacias in Vietnam. The main consequence is the significant surface of forests covered by these hybrids across the country (mainly in Northern and Central Vietnam). These hybrids are widely used by the local populations because businesses related to this production were developed with significant incomes for the people dealing with it. Meanwhile, all these plantations contribute to the effort of soil restoration as these trees can symbiotically fix atmospheric nitrogen with a soil bacteria called rhizobia and released a part of it to the soil. But the current production of seedlings is not satisfying. Among all the difficulties we listed, we noticed that many private nurseries used unknown or mixed hybrid material; sometime seedlings are produced with seeds collected on hybrids; and instead of promoting effective bio-inoculants (such as rhizobia and mycorrhiza), the nurseries use massive amounts of chemical inputs killing all the beneficial living organisms contained in the soil. The main consequence of this is the low rate of survival of the seedlings after plantation in the field and the limited growth of the trees because there cannot take advantage of the nutrients supplied by the lacking symbiotic partners. The presentation is about describing the current situation and after what needs to be done for sustaining an effective production of vigorous and healthy seedlings of Australian Acacia including the selected hybrids. In addition of using a well-known plant material, we will make a big focus on the formulation and the development of effective bio-inoculants working for Acacia mangium only and for hybrids Acacia mangium x Acacia auriculiformis only as the literature shows that their symbiotic requirements are different. This is a real innovation in Vietnam where decades of projects were funded aiming to introduce new Acacia materials and hybrids in the country, to run clonal selection tests and to set up units in charge of producing by tissue culture micropropagation plantlets of the selected plant material. All these activities were undertaken without paying attention of the symbiotic partners of these Acacia trees. Currently, we pay the price of this absence and we consider it is time to move on with such bio-inoculant's approach with the overall objective to sustain these plantations in Vietnam and then to improve the livelihoods of small-holders financially depending of the wood production.

Audience Take Away:

- Will describe the current situation about the production of Australian Acacia seedlings in Vietnam with a focus on the Phu Tho Province which provides seedlings for the whole Northern and Central Vietnam.
- Will explain why it makes sense to pay attention to the symbiotic partners of these Australian Acacia if we want to sustain their growth.

- Will emphasize the methodology for formulating specific and effective bio-inoculants with beneficial microorganisms capable to enhance the Acacia trees growth.
- May be the opportunity for developing new partnerships with participants sharing the same interest on such topic.

Biography

Didier Lesueur received a PhD in Plant-Soil-Microorganism interaction from the University of Paris VI (Pierre & Marie Curie) in 1992. He has been getting a position in CIRAD for working in France at the BSFT laboratory, in Senegal, in Kenya, in Thailand and currently at CIAT-Hanoi. His main areas of research have been biological nitrogen fixation and the utilization of beneficial microorganisms for inoculating legumes and other crops within agro ecological systems in relation with nutrient cycles. He is currently coordinating the CMBP Asia-Pacific network on microbial biotechnologies aiming to develop soil biological indicators for improving soil health management by farmers. His field experiences are mainly in Africa and South East Asia. He has co-authored over 70 referred journal articles or book chapters and has trained 10 PhD students and 35 M.Sc. students from North and South. He is Editor board of 2 International journals.

Olesya Shoeva[1]*, Anastasiia Glagoleva[1], Elena Gordeeva[1], Varvara Zedgenizova[1], Tatjana Kukoeva[1], Igor Totsky[1], Shakhira Zakhrabekova[2], David Stuart[2], Mats Hansson[2], Elena Khlestkina[1,3]

[1]Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia
[2]Lund University, Lund, Sweden
[3]N.I.Vavilov All-Russian Research Institute of Plant Genetic Resources, Saint-Petersburg, Russia

Molecular-genetics control of polyphenolic compounds synthesis in barley: Revealing the genes and their functions

Phenolic compounds are plant secondary metabolites with important functions in plant physiology. In barley, flavonoids belonging to this group are synthesized in grain envelopes and influence significantly the quality of barley grain and its application. For example, proanthocyanidins (also known as condensed tannins) are undesirable in malting cultivars as they cause chill haze reducing beer quality. In contrast, anthocyanins that can accumulate in aleurone layer and pericarp causing blue and purple color of grain, respectively, are promising functional food ingredients and are desirable in cultivars for human nutrition. To modify phenolic content of barley grain by marker-assisted breeding or genome editing approaches, knowledge of genetic control of its synthesis is necessary. In this study, the genes underlining synthesis of anthocyanins and proanthocyanidins in barley grain were identified and features of their functioning were established. Ant1, Ant2 and Ant25, Ant27 were identified as specific regulators of anthocyanins and proanthocyanidins synthesis, respectively, while Ant13 was shown to participate in regulation both pathways. It was shown that Ant1 and Ant2 encode transcription factors with the R2R3-MYB and bHLH regulatory domains, respectively, and their co-activation in barley grain determines anthocyanin synthesis there. Based on decreased transcription of the genes encoding enzymes of flavonoid biosynthesis in ant25 and ant27 mutants in comparison to the parental cultivars the regulatory functions for the Ant25 and Ant27 genes were suggested. The locus Ant13 was established to encode WD40-type regulatory factor, that activate expression of the flavonoid biosynthesis genes required for both anthocyanins and proanthocyanidins synthesis. The natural and induced allelic diversity of the genes was studied. The results obtained are of great fundamental importance, as well as contribute to breeding for the content of polyphenolic compounds in barley grain.

Audience Take Away:

- The data are of fundamental importance and may be interesting for plant geneticists.
- The target genes for metabolic engineering of barley varieties with desirable profiles of phenolic compounds in grain may be interesting for breeders.
- The data on allelic diversity of regulatory genes controlling synthesis of phenolic compounds in barley grain and their genetics stocks represent useful information for breeders.

Biography

Dr. Shoeva studied Biology at the Novosibirsk State University, Russia and graduated as Biologist in 2008. She received her PhD degree under supervision of Prof. Elena Khlestkina in 2012 at the Institute of Cytology and Genetics, Siberian Branch of the Russian Academy of Science (ICG SB RAS), now she works for the same institution like a Senior Researcher. She has published more than 40 research articles devoted to genetic control of phenolic compounds synthesis in cereals.

Sunita Chandel* and Shivani Gupta

Department of Plant Pathology, Dr.Y.S.Parmar University of Horticulture and Forestry, Nauni, Solan (Himachal Pradesh)-India

Hot water and plant extract application in eradicating seed borne and field infection of septoria leaf spot (*Septoria lycopersici Speg*) infecting tomato and improving seed health

Septoria leaf spot of tomato (*Septoria lycopersici Speg*.) is a most devastating foliar pathogen infecting tomatoes world over. The disease produces symptoms with onset of monsoon in Himachal Pradesh, India as small, water soaked, circular to angular spots, with dark brown margins, spots bearing black pin head sized pycnidia in the greyish centre at the time of maturity. On advancement, spots get coalesced, symptoms slowly developed from lower to upper leaves giving blighted appearance. Morphological studies of the test pathogen revealed suppressive and somewhat fluffy type of colony with dull white to grey colour, undulated margin colony in the pure culture whereas pathogen produced ostiolated and globose pycnidia with an average size of 84mm, conidiophores of 4-12x2-4mm with an average size of 8x3mm in which conidia were hyaline, filiform, multi-septate with the size of 13.7x2.5mm. On the basis of morphological characters, the associated pathogen was identified as Septoria lycopersici Speg. Under pathogenicity test, to prove the Koch's postulates on cv. "Solan Lalima", the symptoms of the disease appeared on leaves after 14 days of pathogen inoculation suggesting incubation period of 336 hours best for occurrence. For disease management, physical and non chemical *viz*., different hot water treatments, six botanicals/bioformulation were applied to the seeds and in field. HWT at 48□C for 30 min. showed the maximum germination percentage (87.54%) value of seed growth parameters and recorded minimum disease severity and disease incidence of 47.01% and 33.26% ,both as seed treatment and under field conditions. However, in case of botanicals/bioformulations, garlic extract (*Allium sativa L.*) as seed treatment gave maximum germination percentage (87.69%) and other seed growth parameters with minimum seed infection (4.63%) while under *in vitro* garlic was most effective and significantly superior to all other treatments with 80.69 per cent inhibition in mycelial growth and also reduced the disease severity and incidence (36.78% and 42.09%) in field followed by beejamrit.

Biography

Dr. Sunita Chandel studied her BSc Agriculture from College of Agriculture, Solan under Himachal Pradesh Krishi Vishvidhalaya, Palampur, Himachal Pradesh, India and obtained her post graduate degrees in MSc and Ph.D in Mycology & Plant Pathology in years 1987 & 1991, respectively from Dr.Y.S.Parmar University of Horticulture and Forestry, Nauni, Solan (H.P).She joined at Assistant Professor in 1992 in the Department of Plant Pathology of the same University, elevated to Associated Professor in year 2001 and to Professor in year 2009.She was awarded University Merit Fellowship in B.Sc Agriculture, ICAR Junior Fellowship for Master's Research, worked as Research fellow in Ph.D programme and as Research Associate before joining the University. Did her post doctorate on the topic "Biological control in horticultural crops", under Commonwealth Academic Staff Fellowship (2005-06) programme from University of Aberdeen, Scotland, U.K. under the supervision of Steve Woodward and received SERC Fast track research proposal for Young Scientist (2001-2002)-Life Sciences of DST. She has published 125 research articles in SCI journals of National and International repute.

Vijayan Gurumurthy Iyer
Arunai Engineering College, India

Strategic environmental assessment(sea) process for sustainable environmental plant biology and biotechnology towards sustainable biotechnological development

Objectives: The objective of this investigation was to establish strategic environmental assessment (SEA) process in plant biology and biotechnology for the sustainable biotechnological development which could dominance biotechnological, economic and environmental factors in the World's plant biology and biotechnological projects.

Methods: SEA process is defined as a study and check of the potential impacts (effects) of a proposed project, program, plan, policy or legislative action on the environment and sustainability. The established method is a method that meets the needs of the present without compromising the ability and efficacy of future generations to meet their own needs. Firstly, environmental health impact assessment (EHIA) has been done by the systematic identification and evaluation of the potential impacts or effects of projects, plans, programs, policies or legislative actions with respect to the physical-chemical, biological, cultural and socioeconomic components of the total environment. Then the EHIAs for plant biology and biotechnological projects were fulfilled because social and environmental factors were considered. Finally, environmental impact assessment (PIA) process was checked for the sustainable biotechnological development.

Results: Established investigative environmental health pollution results were obtained at sites of chrome composite leather cladding rollers used in seed-cotton roller gins and bio-genetic manipulation of Bt seed-cotton fields.

Conclusions: EHIA is a sustainable project proposal for the genetically modified Bt seed-cotton plans, projects, policies, programs and legislative action. EHIA was conducted by visual inspection as environmental biotechnological health loadings. The SEA must be needed for making much earlier decisions in planning and decision-making process than EIA process.

Audience Take Away:

- The concept of strategic environmental assessment (SEA) process in plant biology and biotechnology for the sustainable biotechnological development which could dominance biotechnological, economic and environmental factors in the World's plant biology and biotechnological projects.
- Environmental health impact assessment (EHIA) has been done by the systematic identification and evaluation of the potential impacts or effects of projects, plans, programs, policies or legislative actions with respect to the physical-chemical, biological, cultural and socioeconomic components of the total environment.
- EHIA is a project proposal for the genetically modified Bt seed-cotton projects , policies, programs and legislative action.
- EHIA for plant biology and biotechnological projects were fulfilled because social and environmental factors were considered.

Biography

Dr. Vijayan Gurumurthy Iyer studied Environmental Science and Engineering Chemistry at the Indian School of Mines, Dhanbad, India and post graduated as M.Tech. in 1998. He received his PhD degree in 2003 at the same institution. He has served in Indian Council of Agricultural Research (ICAR) during 1985-1998 as a Technical Officer. Then served as Professor in Environmental Science and Engineering, Haramaya University, (FDRE) Harar, Ethiopia during 2014-2015. After one year, postdoctoral fellowship and PDF elaboration were supervised by Prof.Dr.Nikos E. Mastorakis in World Scientific and Engineering Academy and Society(WSEAS), Athens, GREECE. Dr. Vijayan Gurumurthy Iyer published more than 360 research articles in peer reviewed journals and conference proceedings / Books.

B N Hazarika

Central Agricultural University, College of Horticulture and Forestry, Arunachal Pradesh, India

Morpho-Physiological disorders of in vitro grown plants and their acclimatization

The benefit of any in vitro propagation only fully realized if there is successful transfer of plantlets from tissue-culture vessels to ex vitro conditions. A substantial number of micropropagated plants do not survive on transfer from in vitro conditions to greenhouse or field environment as plantlets developed within the culture vessels under low level of light, aseptic conditions contribute a culture-induced phenotype that cannot survive the environmental conditions when directly placed in a greenhouse or field. Plantlets or shoots that have grown in vitro have been continuously exposed to a unique microenvironment that has been selected to provide minimal stress and optimum conditions for plant multiplication. The culture conditions that promote rapid growth and multiplication of shoots often results in the formation of structurally and physiologically abnormal plants. Many a times they are characterized by poor photosynthetic efficiency, malfunctioning of stomata and a marked decrease in epicuticular wax. Understanding these abnormalities is a prerequisite to develop efficient transplantation protocols. The major abnormalities in in vitro culture of plants and the current and developing methods for acclimatization of in vitro cultured plantlets will be discussed.

Biography

Prof. B N Hazarika, PhD presently working as Dean, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh. Prof. B N Hazarika guided a number of PG &Ph D students, handled several externally funded research projects and organized 90 trainings. He has published 80 research papers, published 20 books, 25 conference papers and book chapter, 11 practical manual, 25 Bulletins, edited 13 souvenir and 245 popular articles. He contributed significantly in collection, morphological and molecular characterization of diverse genotype of various fruit crops, standardized good agricultural practices for some major fruit crops; introduced new fruit crops in the region.

Monika Garg*, Satveer Kaur, Anjali Sharma, Anita Kumari, Saloni Sharma, Payal Kapoor

National Agri-Food Biotechnology Institute, Mohali, Punjab, India, 140306

Anthocyanin biofortified, antioxidants rich colored wheat is a new research trend

Background: Wheat is a vital, staple, preferred, favored, and choicest energy source in many parts of the world due to the unique processing quality attributed to gluten that helps cooking it to bread, biscuit, pasta, noodles, etc. Colored wheat adds nutritional and functional health benefits to the energy-rich wheat. Colored wheat accumulates anthocyanins in the aleurone or pericarp layer of seed coat that give it the blue, purple, or black color.

Scope and approach: This review is a compilation of currently available information on the color wheat in the key aspects including biochemistry, food processing, nutrition, genetics, breeding, and effect on human health.

Key findings and conclusions: The rising number of colored wheat publications from 16 countries parallels the increasing demand for functional foods and nutraceuticals. Biochemists have identified and characterized different bioactive compounds, understood their functionality, studied underlying pathways and regulatory elements, and isolated anthocyanins for use as natural colorants. Breeding has increased its productivity while retaining the highest possible anthocyanin content. Nutritionists have characterized its health-promoting activities that are attributed to anthocyanins such as protection against metabolic syndrome, obesity, diabetes, hypertension, dyslipidemia, aging, cancer, and neurodegeneration. While the food processing efforts include the development of different colored wheat products and understand the effect of cooking on food functionality. Biologists emphasize on understanding the mechanism of anthocyanin development and transport in vacuoles and how it affects human health. But the generation of market and consumer awareness creation are key challenges ahead for its large-scale commercialization.

Biography

Dr. Monika Garg is Senior scientist at National Agri-Food Biotechnology Institute, Mohali, India. Before she had been working in International Centre, ICRADA, Syria and Tottori University, Japan. After Masters from Punjab Agricultural University, Ludhiana, India, she persued her PhD from Tottori University, Japan. She is not only good at scientific publications but has trasfered her technologies to several companies. With her core interest in genetics and plant breeding for human nutrition improvement, she works across the desciplines for functional characterisation of her innovations.

Vaschenko V.F Lipetsk

Elets State University, Russian Federation

Adaptive and productive potential and hormone balance

The theory of organogenesis from the initial cell of a whole plant and a method for considering the effect on apical dominance as the initiation of an adaptive, productive potential. shows the responsiveness of initial cells from treatment with homoproducers and mineral elements foliar, compensatory mechanisms of productivity elements and their ability to influence the ratio of hormones, stimulants and inhibitors on the growth and development of plants and sowing. The method of geographical testing makes it possible to consider the cultivation area and, in phases, the method and period of adaptation and the formation of productivity, on crops of the next and simultaneous dominance. The ecological test over the years in one zone sometimes exceeds geographical differences and shows the demand for soil and nutrition, which, with a favorable coincidence of precipitation and exactingness in phases and the ability to activate apical points or various elements of productivity, then natural demands exceed agrotechnical possibilities. The growth inhibitor ethylene contributes to the termination of growth and the formation of seed quality and maturity. Stimulants at the wrong time in phases can exogenously reduce the quality and value of the yield. On average, productivity corresponds to the favorable weather factors in the zone and is the result of the balance of hormones and trophic and agrotechnical factors. The hormone changes its status quickly, but there is a model of ideal productivity. Demanding or tolerance to agricultural technology is combined compensatory with the environment and is a stable deterministic property of the species. The need for phases can be ideal and can be compensated for in ontogeny in crops with another simultaneous apical dominance, but the number of stems in barley is the most capacious element of productivity and is formed earlier than the calendar, while in rapeseed the number of seeds is formed in the generative phase most capaciously. In the Russian Federation, the adaptive potential of rapeseed corresponds to isotherms of 17-19 oC and precipitation of June-July 50-70 mm in flowering, and in barley, a prolonged and cold spring or autumn (winter crops) in the phase of formation of the number of stems or early sowing. The weather differences exceed the zonal ones and this is an unfavorable year for rapeseed.

The phenotypic sign of orthotropy is formed as resistance to lodging by the hormone inhibitor ethylene, reduces the stimulant auxin and vegetative growth and is associated with unfavorable and arid conditions of arid conditions, illumination or cultivation zone and the morphological sign of erecdoid spike. Traits are homologous in different plant species. A single sowing treatment can change the stability of sowing and the quality of seeds only at the end of the formation of seeds, but then otherwise elements of productivity can be compensated unfavorably for quality and quantity due to the discrepancy between the status of hormones and the phase of development.

The relationship between productivity and adaptability, environment and technology in intact sowing and the realization of growth morphogenesis is integral and is a balance of hormones, stimulants and inhibitors simultaneously from nutrition, environmental precipitation, and can be a biological basis for plant growing as a craft of the possible. The productive and adaptive potential of a species can be considered the correspondence of the phase, environment and agricultural technology and the ability of hormone balance to activate the morphogenesis of a sufficient number of elements of productivity and quality of seeds and the corresponding vegetative mass.

Biography

He studied breeding at the Voronezh Agrarian University, defended his master's degree at the Moscow Institute of Agriculture and doctoral studies at Elets State University and held the position of assistant professor there. Published over 70 scientific articles in journals.

Elisa Ovidi[1]*, Valentina Laghezza Masci[1], Giovanni Turchetti[1], Daniele Zago[1], Ramona Iseppi[2], Carla Sabia[2], Stefania Garzoli[3], Antonio Tiezzi[1]

[1]Department for the Innovation in Biological, Agrofood and Forestal Systems, Tuscia University 01100 Viterbo, Italy
[2]Department of Life Sciences, University of Modena and Reggio Emilia, 41121 Modena, Italy
[3]Department of Drug Chemistry and Technology, Sapienza University, 00185 Rome, Italy

Biological and chemical characterization of Schinus molle leaf and flower extracts

Plant secondary metabolites are produced and used by organisms for defending or adapting purposes to the environment. Since long time, natural products have been used by humans as healing agents and still today they are the most important source of new potential therapeutic preparations. In this view, numerous research activities aim to define the biological properties of secondary metabolites.

The "pepper tree" Schinus molle L. is an evergreen ornamental plant belonging to the Anacardiaceae family, native in South America and widespread throughout the world. S. molle is a dioecious plant and male and female flowers are present on separate individuals with a sexual dimorphism in floral and other traits. It has peppery smell lanceolate leaves, pendulous branches with yellowish-white flowers arranged in clusters, and coral-red fruits in the size of peppercorns.

Our investigations aim to contribute for a deeper knowledge of the chemical composition and biological properties of male and female flowers and leaves during the off-flowering and flowering seasons of S. molle plants grown in central Italy. The extracts, obtained by using a sequential extraction with solvents of different polarities, and fractions obtained by silica column chromatography were analyzed by GC-MS to define their chemical composition. Cytotoxic activities were carried out performing MTT assays on, neuroblastoma SH-SY5Y cells and leukemia HL60 cells. Antibacterial activities were tested on the clinically relevant pathogens Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, Enterococcus faecalis, Candida albicans and Bacillus subtilis.

The obtained results showed differences in the chemical composition between male and female flowers and between leaves of male and female plants in flowering and not flowering organisms revealing the presence of sesquiterpene hydrocarbons, sesquiterpenes alcohols, monoterpenes and other terpenes with different relative abundance. S. molle extracts and derived fractions possessed interesting cytotoxic and antibacterial activities due to the richness of their chemical composition.

Our investigations confirm that S. molle is an important source of molecules and in this view further studies need to address such compounds for possible uses in aromatherapy and pharmacy.

Biography

Dr. Elisa Ovidi got her Master in Biological Science and the PhD Degree in Genetics and Cellular Biology at Tuscia University (Italy). She is a member of the Plant Cytology and Biotechnology of the Natural Substances Laboratory at Tuscia University and is involved in investigations concerning biology and chemistry of natural substances.

Carlos Pimentel

Department of Crop Science, Federal Rural University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil

Alleviation of water deficit effects on photosynthesis by phosphate foliar fertilization

Phosphorus is also an essential element for photosynthetic energy production and carbohydrate transport because there is an anti-port system with inorganic phosphorus (Pi) and triose-P in chloroplast membranes. Therefore, even under mild water deficit, a decrease in sink demand for sucrose due to paralyzation of plant growth causes either an increase in starch synthesis inside the chloroplast or a reduction in CO2 assimilation. Both processes can result from low Pi recycling from the cytoplasm to the chloroplast due to sucrose, especially fructose-1,6-bisphosphate accumulation, which regulates anti-port (PT systems), and sustains photophosphorylation and the Calvin cycle by controlling incoming Pi and carbon exporting in chloroplasts. An inadequate Pi supply to the chloroplast can limit ATP synthesis, even if the leaf phosphorus content is high, but in an organic form. Pi supply to the chloroplast is crucial for maintaining phosphorylation reactions during CO2 assimilation. One Pi is released from fructose-1,6-bisphosphate in the cytosol because of sucrose synthesis and export for other tissues, which will be used in the anti-port system. However, even under a mild water deficit, these soluble sugars are not exported and accumulate in the cytoplasm with the growth paralyzation, keeping phosphorus in an organic form. Some experiments were done to evaluate the effect of a foliar Pi spray before water deficit imposition. In a first experiment, carbohydrate content, net CO2 assimilation rate (A), and stomatal conductance (gs) were evaluated after an extra inorganic phosphate (Pi) supply at the pollination stage of the genotypes Carioca and Ouro negro. The treatments consisted of a foliar spray (12.5 mL of 10 g Pi L-1 solution, as ammonium dihydrogen phosphate (MAP: (NH4) H2PO4). In contrast, the other half of the plants were sprayed with 2.64 g N L-1, as urea ((NH2)2CO), to compensate for N added in the Pi treatment. In Phaseolus vulgaris L., different genotypes, grown in pots. The foliar spray was applied two days before the water deficit was imposed at the pollination stage. Under foliar Pi spray, the leaf starch content showed an increase for both genotypes. It enhanced A for water-stressed Ouro negro plants but not for Carioca plants, and among yield components, pod number per plant of Ouro negro showed an increase when using Pi supply. In another experiment with the genotypes A 320 and Ouro Negro, A and gs were not affected by Pi supply during dehydration. However, after rehydration A and gs for A320 and A for Ouro Negro, both supplied with Pi, were higher than for non Pi-supplied plants. In addition, the O2 evolution (Ac) of rehydrated A320 with foliar Pi supply was also higher than for non Pi-supplied plants, and the non-photochemical quenching (NPQ) was higher for rehydrated A320 without foliar Pi. The results revealed an up-regulation of the recovery of photosynthesis after water deficit induced by the foliar Pi supply, which was genotype-specific."

Audience Take Away:

- The results shows the beneficial effect of a foliar Pi spray before the pollination stage.
- The use of monoamonium phosphate (MAP) spray can alleviate the effect of environmental stresses.
- The results presented will help researchers working on agriculture to expand their research or teaching.
- The foliar Pi spray can improve yield in an agriculture rain-fed.

Biography

Prof. Pimentel graduated in Agronomy at the Federal Rural University of Rio de Janeiro, Brazil, in 1977. He then joined the research group of Prof. Vieira da Silva at the University of Paris 7 (Jussieu), Paris, France. He received his Ph.D. degree in 1985 at the same institution. In 1988, he was approved in a concurs of Associate Professor at the Federal Rural University of Rio de Janeiro. In 1994, he passed another Concurs and obtained the position of Full Professor at the same University. He did one year of sabbatical leave (1999-2000) supervised by Dr. Long at the University of Illinois, U.S., working on the FACE programs with the GHG effects on soybean and corn. He has published more than 60 research articles, with more than 3000 citations in Web of Science, two books for graduated programs on agriculture in Brazil, and created two new varieties of pearl millet for agriculture.

Regina Ninoles[1]*, Paloma Arjona[1], Isabel Molina[2], Eduardo Bueso[1], Ramon Serrano[1], Jose Gadea[1]

[1]Institute of plant molecular and cell biology Valencia, Spain
[2]Department of Biology, Algoma University, Sault Ste Marie, ON, Canada

Accumulation of kaempferol-derived flavonols dramatically impairs seed coat development and seed longevity

Seed longevity is defined as the total time span during which seeds remain viable. As seeds constitute the main system for plant propagation, increasing their longevity is a major challenge for the conservation of plant biodiversity and for crop success. In order to optimize their life span, seeds possess complex systems of protection, detoxification and repair. The protective mechanisms include the presence of the seed coat, which functions as a barrier between the embryo and the external environment, conferring physical and chemical protection. The chemical composition of this structure has revealed essential to maintain seed viability, and seed coat compounds such as suberin and flavonoids, accumulated in different layers during seed maturation, have been associated with longevity. However, the role of flavonoids in seed longevity is still not well understood.

In this work, we further investigate the relationship between flavonoids and seed longevity. Accelerating ageing assays over different flavonoid loss-of-function biosynthetic mutants show that tt7 is, by far, the most sensitive one. Reciprocal crosses indicate that the reduced seed longevity of the mutant has maternal origin, demonstrating the role of the seed coat in this trait. While its embryo shows no morphological changes, tt7 seed coat development is impaired, presenting defective suberin and mucilage layers and accumulating starch granules at the end of seed maturation. These defects are specific of tt7, as other flavonoid biosynthetic mutants do not share them. TT7 is a flavonol 3' hydroxylase that converts dihydrokaempferol to dihydroquercetin. Seeds of the tt7 mutant accumulate epiafzelechin-derived proanthocyanidins and kaempferol-derived flavonols, instead of the usual quercetin-derived ones. Genetic analysis indicates that accumulation of kaempferol-derived compounds in the seed coat are responsible of the observed structural defects. A dramatic alteration of the seed developmental programme in the tt7 mutant, is also evidenced by transcriptome analysis and our data suggest that auxin transport could be affected in tt7 seeds.

The characterization of tt7 and other flavonoid loss-of-function biosynthetic mutants made in this work evidences the relevance of flavonoid composition for seed development and highlights TT7 as an essential gene for proper seed coat development and for seed longevity.

Audience Take Away:

- This talk will delve into the role of flavonoids in seed longevity, a subject that is not completely understood.
- It would be shown that a tight regulation of seed coat flavonoid composition is essential for proper seed coat development and longevity.
- The presented work suggests that there is a relationship between flavonoids and auxin transport during seed development.
- This work constitutes a step forward in the understanding of the molecular mechanisms underlying seed longevity. This knowledge will be crucial for economy (crop success) and ecology (biodiversity).

Biography

Dra. Regina Ninoles studied Agricultural Engineer at the Polytechnic University of Valencia, Spain, and graduated in 2005. She then joined the research group of Prof. Serrano at the Institute of Plant Molecular and Cell Biology of Spain (UPV-CSIC) and received her PhD degree in 2011. After her postdoctoral training in the 'Valencian Institute of Agrarian Research' and in the 'Interuniversitary research institute for molecular recognition and technological development' supervised by Drs. Luis Navarro and Angel Maquieira, respectively, she came back to the IBMCP and continued making plants research until she obtained the position of Associate Professor at the UPV.

KEYNOTE FORUM

DAY 02

6TH EDITION OF GLOBAL CONGRESS ON

PLANT BIOLOGY AND BIOTECHNOLOGY

24-26 MAR

Sandhya Samarasinghe[1]*, and Pramuditha Waidyarathne[1,2]

[1]Complex Systems, Big Data and Informatics Initiative (CSBII), Lincoln University, Christchurch, New Zealand

[2]Coconut Research Institute, Bandirippuwa Estate, Lunuwila, Sri Lanka

Structural properties of the ABA signaling network defines the evolutionary success of the system

Stomatal closure, the most rapid physiological response in plant leaves to drought stress, is the means by which plants prevent water loss and avoid desiccation of their cells. Guard cell signalling network is a complex and an evolutionarily well conserved system organized to control the stomatal aperture in response to drought stress. This system comprises of interconnected proteins, lipids, small molecules and various other conditions of the guard cell to facilitate the communication flow in the whole system in response to environmental signals to achieve stomatal closure. Network topology, which defines the connectivity of elements in a system, can reveal the influence of network structure on the functional and dynamical properties of a system. Therefore, it is of interest to find out how the structural properties of guard cell signalling network have defined its evolutionary success through a study of its topological properties. We assembled the guard cell signalling network by expanding the existing network in literature with new knowledge and conducted a systematic study of its topological properties. The study revealed modularity of the ABA signalling network as a system of subsystems identified by topological distance measures and centrality measures. Network was decomposed into three interconnected subsystems comprising seven self-organised functional modules along with a number of hub elements that provided an easy to understand view of ABA signalling system. These interconnected subsystems with functional modules elicit an appropriate and timely response to environmental signals by means of a collection of feedback processes with shifting dominance in time and space. The study also revealed that the ABA signalling network shows characteristics of a scale-free network pointing to its evolutionarily success. Further, the network is sensitive to hub element removal but robust to removal of sparsely connected elements. This system of subsystems view enabled by modularity revealed a meaningful and coherent organization of the structure and function of the complex ABA network. In systems thinking, this defined hierarchy, coupled with a tight binding by feedback loops with shifting dominance in time and 6th Global Congress on Plant Biology and Biotechnology space, provides the ABA network with resilience to function in a variable environment with minimum time delay thereby enabling its evolutionary success. The systems view presented here can contribute to improving plant stress tolerance in a changing climate.

Audience Take Away:

- The audience will gain a high-level functional view of the ABA signaling system involved in guard cell stomatal closure.
- It will provide an improved understanding of stomatal closure from a holistic perspective.
- It can contribute towards advancing biotechnology approaches to improving plant stress tolerance.
- It can be used to expand research and teaching on ABA signaling and plant stomatal closure.
- It can invite new experiments to test some of the findings.

Biography

Dr Sandhya Samarasinghe is a Professor of AI and Complex Systems at Lincoln University, New Zealand, where she is also the Head of Complex Systems, Big Data and Informatics Initiative (CSBII). She graduated with MS and PhD (Engineering) from Virginia Tech, USA. Her current research involves Computational Systems Biology where she uses AI, Neural Networks and Complex Systems Modelling to address complex intractable problems in biology from a holistic systems view. Her research covers modelling cell signaling networks, cell cycle and self-repair and regeneration of biological organisms. She has published books, book chapters and over 160 peer-reviewed publications on modelling and biology and produced many AI models for industrial applications. She is a Fellow of the Modelling and Simulation Society of Australia and New Zealand and Senior Member of Institute of Electrical and Electronics Engineers (IEEE).

Valasia Iakovoglou, Nikolaos Tsakiris

UNESCO chair Con-E-Ect, Drama, Greece

Save water while enhancing restoration success under the challenges of climate change

Increased aridity levels is one of the predicted climatic alterations. Restoration efforts particularly in the semi-arid areas of the Mediterranean region pose many obstacles that associates with higher frequency and intensity of drought events. Safeguarding the biodiversity levels of those ecosystems by increasing restoration success is of crucial importance. Research have shown that seedlings that have undergone a period of stress, can better overcome adverse growth conditions. Based on the presented research, seedlings of forest species were subjected to irrigation treatments. The results of this research have indicated that seedlings treated with reduced water frequency prior to field transplanting, were able to successfully maintain their growth under field conditions. Consequently, the benefit is dual when applying reduced watering; save water while increasing transplanting success under field semi-arid Mediterranean summer growth conditions.

Audience Take Away:

- Tool to increasing restoration success.
- Ways to resolve water-related problems under the challenges of climate change.
- Understand the impact of species.

Biography

Dr. Valasia Iakovoglou is a distinct graduate of Iowa State University, USA. She has more than 20-yrs of national/international research and teaching experience as an Ecophysiologist/Silviculture expert in seedling production and Restoration/Conservation of Ecosystems with emphasis on Biodiversity under the challenges of Climate Change. She has received numerous scholarships, awards and recognitions. She is an editor of nine international journals and a reviewer in more than fifteen with one of them being the Intergovernmental Panel on Climate Change (**IPCC**). She has more than 100 publications (such as books/book chapters and peer-reviewed scientific papers). She is active in many scientific societies such as the Mediterranean Experts of Climate and environmental Change (**MedECC**) and associations such as the "Association of Inter-Balkan Woman's Cooperation Societies (**AIWCS**)" of UNESCO Center, where she serves as Board Member. Currently she is the Director of the Ecotourism Sector of the UNESCO chair Con-E-Ect.

Jorge A. Zavala

Chair of Biochemistry / Research Institute in Agricultural and Environmental Biosciences, School of Agronomy, University of Buenos Aires and CONICET, Argentina

Field-grown soybean responses to stink bugs attack

Soybean (*Glycine max L.*) is the world's most widely grown seed legume. One of the most important pests that decrease seeds quality and reduce yield of soybean crops is the southern green stink bug (*Nezara viridula*). However, insect damage triggers accumulation of defensive compounds, such as protease inhibitors (PI), isoflavonoids, and reactive oxygen species to stop stink bug feeding, which are regulated by jasmonic acid (JA). The aim of this study was to identify and characterize the role of LOX isoforms in the modulation of chemical defences in growing seeds of field-grown soybean as response to *N. viridula* attack. Stink bug attack increased LOX 1 and LOX 2 expression, and activities of LOX 1 and LOX 3 isoenzymes in developing soybean seeds. In addition, stink bug damage and MeJA application induced expression and activity of both cysteine PI and trypsin PI in developing soybean seeds, suggesting that herbivory induced JA in soybean seeds. Moreover, the high PI levels in attacked seeds decreased cysteine proteases and α-amylases activities in the gut of stink bugs that fed on field-grown soybean. In this study we demonstrated that LOX isoforms of seeds are concomitantly induced with JA-regulated PIs by stink bug attack, and these PIs inhibit the activity of insect digestive enzymes. To our knowledge no study before has investigated the participation of LOX in modulating JA-regulated defences against stink bugs in seeds of field-grown soybean, and the impact of soybean PIs on α-amylase activity in the gut of *N.viridula*

Audience Take Away:

- They can induce soybean defenses to decrease stink bug damage.
- How will this help the audience in their job?
- Learning the mechanism of plant responses to herbivory will help to manipulate plant responses against insect pests
- Is this research that other faculty could use to expand their research or teaching?
- Studying soybean seeds responses to herbivory can be used a model of plant responses against herbivory and help to study similar responses in other crops.

Biography

Dr. Zavala studied Agronomy at the University of Buenos Aires, Argentina and graduated as MS in 2000. She then joined the research group of Prof. James at the Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences (IGIC-BAS). He received his PhD degree in 2004 and a two-year postdoc at the Max Planck Institute for Chemical Ecology, Jena, Germany. After two year postdoctoral fellowship at the University of Illinois at Urbana-Champaign supervised by Profs May Berenbaum and Evan DeLucia, USA he obtained the position of an Associate Professor at the University of Buenos Aires, School of Agronomy. He has published more than 70 research articles in SCI(E) journals.)

SPEAKERS

DAY 02

6TH EDITION OF GLOBAL CONGRESS ON

PLANT BIOLOGY AND BIOTECHNOLOGY

24-26 MAR

Tri Martini*, Heni Purwaningsih, Arif Anshori, and Widodo Suwito

Researchers, Yogyakarta's Assessment Institute of Agricultural Technology, Indonesia Agency of Agricultural Research and Development, Indonesia

Influence of the height of the growing place on the yield and quality of flower seeds on shallot (*allium ascalonicum l.*) in yogyakarta province

Yogyakarta Special Region (Daerah Istimewa Yogyakarta/DIY) with its specialty has the potential of a large area, with a diversity of elevations, ranging from highlands to lowlands or land on the coast in the height range of 0-2911 meters above sea level. DIY consists of Kulon Progo Regency, Bantul Regency, Gunung Kidul Regency, Sleman Regency, and Yogyakarta Municipality. The diverse state of agroecosystems can be grouped in coastal land agroecosystem zones, rice fields, lowland dryland, and highland dryland. The purpose of this study is to find out the influence of place height on the results and quality of shallot seeds. The research was conducted on-farm research in Selopamioro village, Imogiri Subdistrict, Bantul (400-700 HSL); Hargobinangun village, Pakem Subdistrict, Sleman (> 700 HSL); and Gerbosari village, Samigaluh subdistrict, Kulonprogo (< 400 HSL), in April - August 2017. This experiment was conducted with a Randomized of Complete Block Design (RCBD) nested, with a design of one-factor treatment and blocks in the form of villages in one province at that height. Factors used are the altitude of the place consisting of lowlands (<400 mL), medium plains (400–700 HSL), and plateaus (>700 HSL). The observed parameters are microclimate sand, soil ground content and soil chemical fertility, plant physiological activity, and analysis of the results and quality of shallot seeds. The results of this study show that differences in the height of places will affect the differences in microclimate, in the form of air temperature, soil temperature, air humidity, and soil content which will later affect the results of shallot seeds and the quality of growing power of shallot seeds, while other quality variables are influenced by chemical fertility conditions in the soil, as in the weight of shallot seeds that are affected by the content of Ca and C-organic.

Biography

I am Dr. Tria (Tri Martini Patria), a researcher in the field of crop protection from AIAT Yogyakarta, a research institute under the Ministry of Agriculture located in Yogyakarta Province. Graduated from a doctoral program at Universitas Gadjah Mada in 2014. Have experience in conducting research in Food Crops and Horticulture commodities, including releasing varieties of several types of floriculture in Indonesia. Research related to land resources was conducted to find out the potential for the development of agribusiness areas in DIY provinces.

Muhamad Yasin Hasanul Gaffar*, A Muliadi, Faesal, and M Azrai

Research staf of ICERI – Indonesia

Yield stability and prospect of anthocyanins corn in Indonesia

Anthocyanins held to increase of human health. The origin of anthocyanins corn is from Mesoamerica it is a pigment that give color of purple to black may affect to anticipated of viral (virus), cholesterol, heart disease, obesity, and cancer. It has many excellent characters and higher economic value, that makes it an importance raw material for food industries, textiles, paper making and feed. Anthocyanins corn is a recessive characteristic, production must be isolated from normal/dent to prevent losing the periculiar starch and color properties. Most anthocyanins corn presently grown in Asian countries includeding in Indonesia are local cultivars. The content of anthocyanins corn was higher 330% than check local variety. There are cultivar also have some unfavorable traits which are specific adaptations, disease susceptibility, non uniformity, and low yield. The yield stability experiments conducted as EVT (evaluation variety trial) in 2017 to evaluate of F1 top cross hybrid under six environments in central corn of IND. The objective of this experiment was to find out yield stability of genotypes. Genotype was stable could be promising as new candidate variety to find of prospect to develop of hybrid corn which is high content of anthocyanins. Ten genotypes (G), and six environments (E) ; e1.Maros expm farm, e2:Bajeng, e3:Bontobili, experimental farm of Sidondo (e4) in Cenral Sulawesi, farmers field in Polman (e5) West Sulawesi and in Pakanbaru-Riau (e6) were evaluated under rainy and dry season (S). Variable to observed were analyzed by statistical with three factors interaction (GxExS). The result shown that top cross hybrid of G1. PMU(S1) Synt.F.C1-2-3 x tester (PPH.S2.C2) was founded potential of yield 9.78 t/ha and average 8.60 t/ha. The hypothesis of H0:β=1 was significant different to stable and coefficient effect shown that yield be increasing if planted condition was high adapted. The characters height of ear plant was suitable in selection criteria, be founded around middle of plant height. The asi (anthesis silking interval) were founded three days, plant aspect and husc cover was be score one. The G1 could be promising as new hybrid of anthocyanins corn and could be as raw material for pharmacy to generate of ingredients or medicine.

Biography

My nickname is yasin, I was born on 8 Feb 1954 in majene district of west sulawesi province, after graduating from high school continue to faculty of agriculture in Hasanuddin University in Makassar (Capital city of south sulawesi), majoring in agronomy. I was assistant of statitics and mathematic untill finished of S1 program. In 1980 I'm employee as researcher agronomy in agriculture depart. Continuing S2 program in IPB (Bogor agric Inst) in major of Statictical Aplication. I'm got of goverment staff as researcher for breeding corn in ICERI (Indonesian Cereal Research Institute), and I'v released of eighy OPVs and four hybrids corn), cover planted of farmers over > 500.000 ha. My books essay three statistics and two corn breeding. After retirement in agric depart, as principal of research expert. now I'was a lecturer in agric faculty of Muslim Univ. of Makassar.

Valter Henrique Marinho dos Santos[1,2]*, Paulo Benevides[2], Felipe Fernandes Canos[3], Celia Cristina Malaguti Figueiredo[3], Luciana Pereira Silva[4], Regildo Marcio Goncalves da Silva[3]

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Antioxidant activity and microencapsulation of the extract enriched in fruit Anthocianins (peel and pulp) from Chrysophyllum Cainito L.

The secondary metabolites are natural compounds that are produced by plants that have as main objective protect plants from biotic and abiotic stresses, besides great nutritional values and pharmacological for human diet and aromatic and dye properties. These compounds are separates in three major groups: terpenes, phenolic compounds and nitrogen containing compounds. Anthocyanins are phenolic compounds found in certain plants that give them their black, purple, blue, or red color, they present antioxidant activity which may be responsible for some biological activities including the prevention or lowering the risk of cardiovascular disease, diabetes, arthritis and cancer. Theses pigments are present in the fruits of the Chrysophyllum Cainito L. (purple Abiu). Based on prior knowledge of the substances present, this work was carried out to obtain the extracts rich in anthocyanins (pell and pulp), microencapsulation of the extracted content, to quantify the content of total anthocyanins, phenols and flavonoids, evaluation of the antioxidant activity and quantify the classes of anthocyanins present in the extracts by HPLC. The results of the study indicate that mainly the samples of peel fruit presented the highest results phenolic, flavonoids and anthocyanins content, efficiency to encapsulate and release the components present in the extract and the antioxidant activity. Thus, C. cainito can be considered a good source of antioxidants possible applications in the pharmaceutical, food and cosmetic industries, of which they show greater interest in these substances for the manufacture of products capable of offering benefits in fighting diseases and in aesthetic issues related to damage caused by oxidative species or that have free radicals in the composition.

Audience Take Away:

- The knowledge generated by my research will help viewers in prospecting for plants for economic as well as academic purposes.
- Use of methodologies and technologies to choose plants with biological activities.
- Certainly, because the methodologies carried out in the research can be applied in practical classes and research in other areas.

Biography

Valter Henrique Marinho dos Santos, graduated in Biological Sciences from Unesp, specialist in Chemistry from the Federal University of Lavras and PhD in Biological Sciences (Botany) with emphasis in phytochemistry from Unesp. Researcher at Atina - Ativos Naturais, responsible for the development of raw materials of plant origin for the pharmaceutical, food and cosmetic industries. Permanent professor of the Professional Masters Course in Sciences Applied to Health - Universidade do Vale do Sapucaí (Univas).

Bahadır Torun

Biology Department, Aydın Adnan Menderes University, Aydın, Turkey

CRISPR regulation of plant microbiota: A review

Humans and probiotic bacteria are inseparable for thousands of years. They help us process nutrients better, fight pathogens, and more. Just like us plants have mutualistic relationship with microorganisms. It is well known that plant microbiota is related to plant growth promotion factors and protection against pathogens and other stress factors. Using these interactions for more efficient production to meet the demand will also help to protect the environment. Designing a microbiota that will meet our needs is an important part of the process. Using a molecular approach will be the most efficient way.CRISPR/Cas genome editing tools allows us to make most specific modifications on the microbiome. With these tools we can enhance the capacity of the plant microbiome or alter the plant to benefit more from already existing microbiota.

To use these tools, we first need a good understanding of plant-microbe interactions. We also need a good understanding of modern technologies and bioinformatics. CRISPR/Cas is basically, the immune system of prokaryotes. Components of this immune system can be programmed and can be used for different purposes including genome editing. The main components of CRISPR/Cas are a guide RNA and Cas endonuclease.The important part is protospacer adjacent motif (PAM), a sequence for gRNA to recognise. The rest of the process is easier. The gRNA-Cas endonuclease searches the target sequence along with PAM. After finding their target, they cut the DNA. This allows us to make genetic modifications on any sequence we want with the highest specifity available.

Audience Take Away:

- Audience will be able to design their experiments with CRISPR tools.
- Audience will gain a new insight in most recent methods and technologies.
- Different branches of science can modify this method for their needs.
- This method the most recent method for genome editing.
- This is the most specific method for genome editing and success rate is higher the previous methods.

Biography

Dr. Bahadır Torun studied Biology at Ege University, Turkey, and graduated in 2010. He then completed his master's degree in 2013 at Anadolu University, Eskişehir. He received his Ph.D. degree in 2018 at Aydın Adnan Menderes University. He studied at the University of Science and Technology in Poland for six months. After two years of experience in the private sector, he returned to research, He has published 18 research articles in SCI(E) and other indexedjournals.)

Remya Mohanraj
Houston Community College, Houston, TX, USA

Immunostimulatory phytochemicals from pseudo cereals

Phytochemicals found in plants, play a significant role in contributing to the wellbeing of human populations and from time immemorial, we have been consuming a large number of these phytocompounds as part of our diet. In the recent past, there has been a revived interest in the consumption of pseudo cereals because of their nutritional value and various health benefits. The wide array of phytochemicals present in pseudo cereals confer them with medicinal properties that include reinforcing the immune system. Such compounds could potentially lead to the discovery of novel immune boosters. Keeping the above background in mind, this discussion is aimed at throwing some light on immunostimulatory phytochemicals that could be obtained from some pseudo cereals.

Biography

Dr.Remya Mohanraj earned her doctorate from Bharathiar University, India. Her area of research includes plant tissue culture, phytochemical analysis and isolation of therapeutic biomolecules from medicinal plants. She has been teaching college students for more than 15 years and has held several leadership roles viz. head of the department, course director and aassistant registrar. She has served in the academic council and board of studies and facilitated curriculum development and curriculum changes. In addition, she had initiated and significantly contributed to the development of various laboratories and is a recipient of three grants. Dr. Mohanraj is a reviewer and editorial board member in various International scientific journals. She has published 23 articles in scientific journals and has presented in 25 scientific conferences. She has authored 6 book chapters and is currently a Faculty in the Department of Biology, Houston Community College, Houston, Texas, USA.

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The changes in floss properties, seed germination and protein expression of *Calotropis procera* in response to natural and artificial fruit dehiscence

A technique was established, based on artificial fruit dehiscence, to collect seeds and silk fibers of C. procera without any loss. The seeds and floss obtained by this method were compared with those collected naturally. Natural fruit dehiscence caused a marked decrease in seeds and fibers yielded from C. procera. The seeds and fibers obtained under artificial fruit dehiscence were approximately 6- fold higher than those obtained under natural fruit dehiscence. Furthermore, the application of artificial fruit dehiscence treatment had further advantages, such as a decrease in fiber diameter, and an increase in fiber density and cellulose content. However, this treatment had a slight negative impact on seed biomass and fiber birefringence. Fiber length, lignin and ash content of fibers were not affected by artificial fruit dehiscence.Seed germinability and seedling biomass were slightly decreased following application of artificial fruit dehiscence in comparison with natural fruit dehiscence. A significant difference was observed between the two treatments in amylase activity, soluble sugars and protein content. Some variation in protein expression was also apparent. Artificial fruit dehiscence lowered the expression of the short chain dehydrogenase, elongation factor 1-alpha, and peptidyl-prolyl cis-trans isomerase in comparison with natural dehiscence. Conversely, the expression of chitinase was enhanced in response to the artificial fruit dehiscence. Two conserved protein regions (prrl and vvet) were also observed.

Biography

Dr Ali Ibrahim obtained his M.Sc. and PhD in Plant Physiology in 1993 and 1999, respectively from Faculty of Science, Mansoura University, Egypt. During his PhD study he travelled abroad for two years at Wales University (at the Center of Arid Zone Study), UK. He worked as associate professor at Umm Al Qura University, Saudi Arabia for about 9 years. In 2017, He was promoted as professor of Plant Physiology at Botany Department, Faculty of Science, Port Said University and become the head of this department. He published about 30 research article in an international journals. Nowadays, he is the vice Dean of Education and student affairs, Faculty of Science, Port Said University.

Shamansur Sagdullaev[1]*, R.P.Zakirova[2]

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Phytochemical studies of the flora of central Asia, development of cell technologies for endemic species and prospects for the use of plant metabolites in agriculture

Medicinal plants of Central Asia are an extremely important part of the biological resources of the region. The Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan is one of the world leaders in the field of research, creation and introduction into medical practice of medicinal and agricultural preparations of plant nature.

Over the past 2017-2021, the structures of more than 100 new compounds (alkaloids, glycosides, terpenoids, polysaccharides, etc.) have been confirmed, more than 3,000 new compounds of various classes and groups have been synthesized. 20 original antiarrhythmic, hepatoprotective, phytoestrogenic, antiviral and other drugs have been developed, 7 drugs have been approved for wide use in medicine, and clinical trials of 7 drugs have been approved. New phytopreparations for the protection of cultivated plants with fungicidal and insecticidal, stress-protective activity are being created. Environmentally safe growth regulators for grain and oilseed plants are being developed for their cultivation in the stressful conditions of Uzbekistan (salinity, drought, high temperatures).

The declining reserves of valuable wild-growing, including endemic, plant species and the growing demand for medicinal and agricultural herbal medicines dictate the need to develop new biotechnological methods for obtaining plant materials.

The genus Astragalus L. of the Fabaceae family is one of the largest in the flora of Central Asia. 254 species are known on the territory of the Republic of Uzbekistan. At the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan, for the first time, cycloartan compounds were found in plants of this genus. For them, hypocholesterolemic, hypotensive, cardiotonic and other types of activities have been established.

We have carried out work on the development of obtaining a cell culture of the endmic of Central Asia of the plant Astragalus babatagi M. Pop. (Leguminosae). The plant is a source of Cyclosiversioside A, Cyclosiversioside B and Cyclosiversioside C.

Cell cultures are used as models for studying the pattern of biosynthesis of biologically active compounds. The Institute obtained cell culture lines of an endemic species - Ajuga turkestanica (Rgl.). The plant is of great interest as a source of phytoecdysteroids and other biologically active compounds.

As a result of the cultivation of A. turkestanica callus tissue, dedifferentiated and morphogenic cell cultures were obtained that retain the ability to grow on a medium without growth regulators for 5 years. Comparative analysis by HPLC showed that both lines of cell cultures produce ecdysteroids ecdysterone and turkesterone, identified two phenylpropanoid glycosides ayugatriazide A and B.

Audience Take Away:

- Information will be provided on the directions in the field of phytochemical research, which are carried out at the institute.
- Listeners will learn useful information about plant substances that can be used in agricultural practice to maintain a sustainable agrocenosis.
- On the example of two endemic species of the republic, the possibility of using methods of cell cultivation of plant cells to identify some aspects of the biosynthesis of primary and secondary compounds will be shown.

Biography

Shamansur Shahsaidovich Sagdullaev began his career at the Institute of the Chemistry of Plant Substances in 1974. The main area of his scientific interests is the technological research of the processes of extraction and fractionation of plant substances, the development of technological schemes for the complex processing of plant materials. In 1984 he obtained PhD degree, in 2007 - the Doctor of Chemical Sciences, approved in the rank of Professor.Since November 2006 Sagdullaev Sh.Sh. – director of Institute of Chemistry of Plant Substances. He is the author of more than 250 works, including 4 monographs, 50 patents. Sagdullaev Sh.Sh. is the Editor-in-Chief of the international journal “Chemistry of Natural Compounds”

Eulalia J Gomez Santiesteban[1]*, San Juan AN[2], Estupinan S[2], Acosta R[2], Dopico D[2], Perez, M[2], Michelena G[1], Faife E[1], Diaz de los Rios M[1]

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Bioproducts: An alternative in Cuban agriculture

In Cuba, an eminently agricultural country, the application of modern biotechnology techniques to obtain bioproducts (biopesticides, biofertilizers and biostimulants), within the practices of sustainable agriculture and biodiversity conservation is a necessity every increasingly demanded for food production.Among the advantages that are obtained with the use of bioproducts in agricultural management, they can be noted as significant: the contribution of essential nutrients to meet the needs of crops, the productivity of the soil is not affected with its use and in addition, they favor crops more productive and of better quality.

The tremendous growth of the world market is backed by a growing demand for organic food in the world and the improvement of the standard of living, as well as the growing concern of the negative impact of chemical fertilizers on the environment. In this sense, Cuba has made significant progress, there is a wide range of bioproducts developed by several scientific institutions in the country and a program has been established that can expand the production and use of bioproducts throughout the Cuban archipelago.Among the institutions with an image of excellence in the scientific work, showing a wide and diverse crop of bioproducts of different agronomic actions, is the Cuban Research Institute of Sugar Cane Derivatives (ICIDCA).

From the studies carried out with different microorganisms, technological procedures have been developed for the production of the following commercial bioproducts: Biostimulants (BIOENRAIZ®), whose active ingredient is indole acetic acid (AIA) and the BIOJAS® product, consisting of jasmonic acid. NITROFIX® biofertilizers (Azospirillum), atmospheric nitrogen fixing microbial inoculant and plant growth stimulator, whose active ingredient is the bacterium Azospirillum brasilense.

Biopesticides consisting of active metabolites and not biomass have also been developed, among which are GLUTICID®, which is a foliar antifungal that contains antimicrobial metabolites, salicylic acid and siderophores and a bioherbicide consisting of phytotoxins, both produced from Pseudomonas. aeruginous PSS. VERTICID, which is used for the control of Bemisia tabaci and other pests (Homoptera and mites) in potato and vegetable crops and whose active substance is the spores of Lecanicillium Attenuatum as well as NEMACID, which is used for the control of nematodes with an active ingredient that is given by the alkaline proteases produced from this fungus.

FitoMas, classified as bionutrient, promotes the resistance of plants and can be applied in polycultures, with a significant positive environmental impact, since it avoids the use of chemical fertilizers and promotes the development of beneficial entomofauna (insects). Full cycle (or closed cycle): research, production and marketing centers under the administration of ICIDCA have allowed the introduction of FITOMAS®, NITROFIX®, BIOENRAIZ®, ICIBIOPGLU®, BIOFER® and TOMATICID® bioproducts into the Cuban market.

Audience Take Away:

- Participants will have the opportunity to learn about the quarry of bioproducts developed by ICIDCA and be able to contact our Institute if they wish to carry out collaborative actions, research-development projects, technology transfer or buy our products. - The presentation discusses the proven efficacy of our bioproducts, capable of supporting the accelerated growth of agricultural production and achieving an improvement in soil degradation.
- The participants of the event will be able to learn about the development of new bioproducts in Cuba from biotechnological processes using the fermentation of fungi and bacteria in media composed of by-products of the sugar industry.

- The use of ICIDCA's bioproduct quarry simplifies the work of specialists and farmers to select which products are required according to the manifestations of the crops in terms of the presence of pests, nematodes and fungi, the soil conditions, the application dose, and the increase in agricultural yields
- The presentation shows the benefits of using bioproducts in terms of soil pollution mitigation, reduction of the use of pesticides and chemical fertilizers that are toxic to man and the environment.
- Bioproducts are attractive due to their low residuality and the lower probability of development of resistance by the target organism due to their complex mode of action

Biography

Eulalia J. Gomez Santiesteban degree in Chemistry at the University of Havana. Master in Microbiology mention Fermentations in 1999 and Assistant Professor of the Agrarian University (UNAH) since 2003. He has 30 years of experience in research for the development of technologies for the production of pesticides of microbial origin and production and application of biofertilizers in agriculture. Several of its results have been introduced in agricultural production. Author of three patents related to the subject and three awards from the Academy of Sciences of Cuba. He has published more than 50 research articles in national and international journals.

Khezir Hayat Bhatti[1]*, Bardak A[2], Dulumpinar Z[3], Tekerek H[4], Rahman M[5], Akyol I[6], Parlak, D[7], Khan, R.S.A[8], Celik, S

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Association mapping for fiber quality in upland cotton

The genetics of high quality lint is complex which hinders the breeding progress towards for achieving the high lint yield and quality. Integration of DNA markers for selecting the desirable cotton plants producing the high quality fiber can accrelelate the breeding progress. In this regard, 289 diverse cotton genotypes developed in different cotton growing countries were subjected to charcaterise for ginning outturn (GOT) percentage and fiber qaulity triats. Genotyping-by-sequencing (GBS) assay identified 4730 single nucleotide polymorphsims (SNPs) in these genotypes. In total 332 marker-trait assocations were found. A total of 11 significant SNPs were found for GOT percentage. Out of the 41 SNPs associated with staple length, 11 were found the most signficant, of these seven were mapped to Chr-19. Out of these, the most signficant SNPs 'A8810' and 'A9078' were identified by both the models using GLM and MLM. Out of the 32 QTLs identified, 11 QTLs were novel. Out of these, four QTLs for fiber length were showing larger impact on the trait, i.e. qFL (P=1.1E-06; R2= 0.17875), qFL (P=3.7E-06; R2= 0.21967), qFL (P=0.000013; R2=0.19023) and qFL (P = 0.00001; R2=0.16858). Similarly, for fiber maturity, our of the three novel QTLs, one expressed larger impact on fiber maturity trait (P=0.00003; R2=0.1695). Therefore, we concluded that SNPs can be used as canidate markers for fiber traits which will ultimately assist in marker-aided selection.

Biography

I have been engaged in cotton breeding for about 18-years. Cotton is the ultimate source of natural fiber all over the world which always needs fine fiber from textile perspectives and seedcotton from farmer point of view. I have been involved in variety development with economical traits. I played a major role for the development of 8- varieties released for general cultivation. During Ph. D; I have used GBS for the identification of loci connected to fiber quality. I found 11 novel QTLs connected to different quality traits.

Tamanna Bhardwaj*, Renu Bhardwaj

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Harnessing melatonin and plant growth promoting rhizobacteria (PGPRs) competency to mollify cd toxicity in *B. junea L.*

Microbes of phytomicrobiome are related to plant tissues and in association with plants form the holobiont. Beneficial microorganisms include those that establish synergistic associations with plant roots in order to shore up nutrient mineralization and availability. They aid plants by promoting their growth and in suppression of diseases. Heavy metal resistant plant growth promoting rhizobacteria (HMR-PGPR) are well known for resisting heavy metal toxicities and enhancing plant growth and yield. Melatonin (MEL) is a phytohormone that has a significant role in heavy metal remediation in various plants. It is a pleiotropic molecule with many diverse actions in plants. It is considered primarily an antioxidant with important actions in the control of reactive oxygen and nitrogen species (ROS and RNS), among other free radicals and harmful oxidative molecules present in plant cells. Since rhizobacteria and melatonin hormone have been reported to ameliorate various stresses, it was proposed to observe the combined effect of these to counter Cd toxicity in B. juncea L. Two strains were decided namely Pseudomonas putida (M1) and Pseudomonas florescence (M2) which were procured from MTCC, Chandigarh. It was observed in the present study that Cd stress (0.3mM) altered physiological and metabolic processes in Brassica juncea L. It was observed that supplementation with microorganisms in Cd exposed seedlings resulted in reducing toxicity levels by upregulating antioxidative defense responses and increasing the levels of different secondary metabolites such as phenolic compounds and osmolytes. The histological studies also provided insight into impact of ROS on cellular processes, thereby strengthening the proposed hypothesis. The study may play an important role in understanding the stress protective role of melatonin and rhizobacteria in plants under metal stress.

Audience Take Away:

- Till now an extensive amount of work has been done on classical Plant hormones, in our study the new hormone i.e. melatonin is considered to study its impact on *B. juncea* under cadmium stress.
- Along with melatonin an organic amendment is done by adding plant growth promoting rhizobacteria (*Pseudomonas putida and Pseudomonas florescence*).
- The impact of both plant growth regulator and plant growth promoting rhizobacteria will be understood.

Biography

Tamanna Bhardwaj, graduated (B.Sc. Medical) from BBK DAV college for women, Amritsar in 2017. She then did her post-graduation (M.Sc. Botany) from Dept. of Botanical and Environmental Sciences, Guru Nanak Dev University, Amritsar in 2019. She got first rank and is gold medalist. She soon enrolled herself into Ph.D. by joining research group of Prof. Renu Bhardwaj at Dept. of Botanical and Environmental Sciences, Guru Nanak Dev University. She is working on plant stress physiology and phytoremediation. She has been awarded DST- INSPIRE fellowship from Govt. of India. She has published three book chapters and one paper in SCI(E) journal.

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Prebreeding and germplasm enhancement in chickpea: A way forward for pulse sustainability

Precise phenotyping and expensive phenotyping platforms have been a bottleneck for chickpea improvement, recent advances in genomics technologies and the availability of ample genotyping platforms have made the cost of genotyping much cheaper in comparison to phenotyping. With the advent of FIGS approach, development of TILLING population and identification of putative candidate genes for various stresses both biotic and abiotic, prebreeding and germplasm enhancement through targeted introgression of genomic regions from wild species and landraces appears a way out for base broadening and improvement of pulse crops. QTLs from donor ICC 4958 has led to development of drought tolerant introgression lines BGM 10216, 10218, BG 3097, BG 4005 into AICRP programme. These lines are carrying the drought QTL on LG4 and are showing better yield (ranging from 10-12 %) over the recurrent parent. Wilt QTLs on LG 2, from the donor WR 315 have been introgressed into the lines BGM 20211, 20212 which have proved their superiority and were released as WRIL variety Pusa Chickpea Manav. Genomic selection by way of development of training population and model fitting has been done in chickpea for yield improvement. Thus, the recent developments in sequencing technologies, saturated genetic maps, QTL maps as well as sequencing are greatly helping in using marker assisted technologies to be applied in pre breeding and germplasm enhancement of pulse crops. Genomics-assisted breeding for marker-assisted backcrossing (MABC) for introgressing QTL region, marker assisted recurrent selection, gene pyramiding, marker-assisted selection (MAS) and genomic selection are now underway routinely for pulse crop improvement.

Audience Take Away:

- Pre breeding, Genomic selection for crop improvement.
- Modern molecular techniques can be used for crop improvement.
- Yes, this research that other faculty could use to expand their both research and/or teaching.
- This technology has already been applied for developing improved chickpea cultivars.
- It leads to precision breeding.

Biography

(Dr C. Bharadwaj has 23 years of Scientific Experience in breeding legumes and pulses. As a breeder par excellence, he is focused on marginal and sub marginal chickpea farmers to increases their livelihood through developing fifteen chickpea varieties having climate resilience. He has lead or leading several multi-disciplinary and multi-national grants/projects during last 10 years. He is the Principal investigator for the prestigious US $ 8 million ICAR-Bill & Melinda Gates Foundation project on "Application of next generation breeding, genotyping and digitalization approaches for improving the genetic gain in Indian staple crops" . He leads several other projects in collaboration with ICRISAT, ICARDA, UWA Perth, and University of Saskatoon, GCP, CIMMYT and the sort. He is also the ICRISAT Steering Team Member for GOBII programme. He is elected Fellow of Indian Society of Pulses Research and Development, Kanpur, India and has been its serving Councilor for North West Zone for two terms and Fellow of Indian Society Genetics and Plant Breeding, New Delhi India. He has published more than 140 papers in peer review journals with a i10 index of 40 and research gate score of 34.51)

POSTERS

DAY 02

6TH EDITION OF GLOBAL CONGRESS ON

PLANT BIOLOGY AND BIOTECHNOLOGY

24-26 MAR

Bonnin Marie[1]*, Santini Jeremie[2], Morillon Raphael[3], Liliane Berti[4]

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[3]Morillon Raphael, research director, Equipe "Amelioration des Plantes a Multiplication Vegetative",UMR AGAP, CIRAD, Montpellier, France
[4]Liliane Berti, professor, Professor, CNRS, Equipe de Biochimie et Biologie Moleculaire du Vegetal, UMR 6134 SPE, Universite de Corse, Corsica, France

Polyploidy and adaptations to environmental stress: Physiological, biochemical and genomic determinants of tolerance in citrus polyploid rootstocks

The Mediterranean basin is one of the main citrus production areas in the world. It ranks third behind China and Brazil. In the heart of the Mediterranean, Corsica is located at the northern limit of the citrus production area (40° North). It benefits from pedoclimatic conditions favorable to the cultivation of citrus fruits. However, this citrus cultivation can be endangered by the emergence of strong abiotic constraints. Indeed, the current climate changes result in an increase in the frequency and intensity of stress episodes in plants. In Corsica, these climatic changes can be characterized by episodes of intense drought that force producers to irrigate their crops more intensively. This results in an increase in soil salinity. The increase in salinity leads to a decrease in growth, tree productivity and citrus quality. The selection of rootstocks adapted to these emerging abiotic constraints seems to be a key criterion to facilitate the adaptation of citrus crops. Work carried out by the University of Corsica, CIRAD and INRAE for about ten years now, has shown that tetraploid citrus rootstocks (4x) would be more resistant to nutritional stress, cold and water deficit compared to diploid rootstocks (2x) which are the most commonly used. However, the molecular and genetic basis of this adaptation is not well known, so this thesis aims to study the mechanisms promoting the response to environmental stresses of 2x and 4x citrus rootstocks. It is highly probable that 4x rootstocks show a better tolerance to salt stress but the reasons for this better adaptation remains to be elucidated. To understand and identify the mechanisms involved, we will develop an integrative approach including the study of physiological (photosynthetic capacity, stomatal conductance, chlorophyll fluorescence), biochemical (oxidation markers, specific activity of enzymes involved in the management of oxidative stress), genetic (transcriptome analysis by RNA-seq) and epigenetic (methylome analysis by Bs-seq and Me-Dip-seq) mechanisms. At the end of this work, we will be able to provide new evidence to explain the advantages of tetraploidy over diploidy. We will be able to determine if there is a constitutive preadaptation linked to tetraploidy or if tetraploidy improves the response to stress through phenotypic plasticity.

Audience Take Away:

- Salt stress is an emerging problem of great importance for world agriculture. This research project gives a way of working on how to anticipate the problems related to climate change on crops, because the problem of salinity in arid and semi-arid regions is even more worrying as it is increased by the phenomenon of climate change.
- The strength of this project is to propose an integrative approach that uses different techniques and different skills (bioinformatics, physiology, biochemistry, molecular biology, genetics). The audience will appreciate the integrative approach of this work.
- This research project addresses various approaches in several disciplines of biology, such as bioinformatics, physiology, biochemistry and genetics. It is of great interest to academics to demonstrate how to link these disciplines to understand the mechanisms of salt stress response in its entirety.
- Our integrative approach uses different techniques, and we propose differents experimental setups that could inspire other teams willing to study like us the tolerance of higher plants, in particular perennial plants, to abiotic stress.
- To cope with biotic and abiotic constraints, citrus fruits are grafted on rootstocks selected for their adaptation

properties. The increase in salinity in the Mediterranean area associated with climate change requires the development of new.

- rootstocks with better adaptation capacities to salt stress. It is therefore very important to propose an integrative approach that allows the study of physiological, biochemical and genetic determinants of stress tolerance, particularly salt stress in the Mediterranean area.
- Management of large data set.
- Bio-informatics software and computational approaches Pan-genomic.
- Transcriptomics.
- study of metabolism (photosynthesis) Transmission and scanning electron microscopy antioxidant molecule assay.
- determination of the activity of enzymes involved in antioxidant metabolism.

Biography

Currently in Ph.D at the University of Corsica on the project "polyploidy and adaptation to environmental constraints determining physiological, biochemical genetic tolerance of tetraploid rootstocks of citrus". I have a Master degree in Biology and Plant Valorization " of the University of Strasbourg speculation "Molecular Biology and Biotechnology of Plants". In 2018, I joined the team "RNA degradation" at the Institute of Plant Molecular Biology (IBMP). This allowed me to participate in the project "Identification of TUTases involved in viral RNA uridylation of Turnip Mosaic Virus" where I performed a transcriptomic study by RNAseq, using Illumina high-throughput sequencing. In January 2019, my research in Strasbourg focused on the functional study of the UCN endonuclease, a component of Processing bodies (PB) in Arabidopsis thaliana.

Marouane Ben Massoud[1,2]*, Oussama Kharbech[1], Abdelilah Chaoui[1], Astrid Wingler[2]

[1]University of Carthage, Faculty of Sciences of Bizerte, LR18ES38 Plant Toxicology and Environmental Microbiology, 7021, Bizerte, Tunisia
[2]School of Biological, Earth & Environmental Sciences, University College Cork, Distillery Fields,North Mall, Cork, T23 N73K, Ireland

Effect of exogenous treatment with nitric oxide (NO) on redox homeostasis in barley seedlings (*Hordeum vulgare L.*) under copper stress

The present research investigates the protective mechanism of nitric oxide (NO) in regulating tolerance to Cu-induced toxicity in shoots of barley (Hordeum vulgare L.). After10 days, treatment with 200 µM CuCl2 caused a significant reduction in growth and photosynthetic efficiency concomitant with a strong increase in the contents of reactive oxygen species (ROS), antioxidant enzymes activities such as catalase (CAT), superoxide dismutase (SOD), guaiacol peroxidase (GPOX) and glutathione peroxidase (GPX). An increase in the lipid peroxidation markers malondialdehyde (MDA) and lipoxygenase activity (LOX) indicated oxidative stress. Furthermore, inhibition of growth in 200 µM Cu-treated plants was associated with a reduction in carotenoids, chlorophyll and maximum photosystem II efficiency. However, copper treatment provoked a strong increase in activity of the glutathione-ascorbate cycle enzymes ascorbate peroxidase (APX), dehydroascorbate reductase (DHAR), monodehydroascorbate reductase (MDAR) and glutathione reductase (GR), but a decrease in levels of the non-enzymatic antioxidant compounds glutathione (GSH), ascorbate (AsA). The addition of 500 µM of the nitric oxide (NO) donor, sodium nitroprusside (SNP), to the growth medium alleviated Cu toxicity by reducing Cu uptake and enhancing antioxidant capacity, as indicated by increased contents of GSH and AsA. The current results show that NO addition can alleviate Cu toxicity by affecting the antioxidant defense system, photosynthetic system and maintaining the glutathione-ascorbate cycle status, suggesting that NO treatment protects proteins against oxidation by regulating the cellular redox homeostasis.

Biography

Dr. Marouane Ben Massoud studied Biology at the University of Carthage, Tunisia and the University College Cork, Ireland. He currently works at the School of Biological, Earth and Environmental Sciences, University College Cork. Marouane does research in Cell Biology, Physiology, Molecular Biology and Proteomics. Their current project is 'Alleviation of heavy metals toxicity in germinating seeds by exogenous chemical effectors'.

KEYNOTE FORUM

DAY 03

6TH EDITION OF GLOBAL CONGRESS ON

PLANT BIOLOGY AND BIOTECHNOLOGY

24-26 MAR

Stefan Gandev

Fruit Growing Institute, Bulgaria

Modern techniques for walnut propagation - Hot callus, epicotyl grafting and water nutrient solution system

Three modern techniques for walnut propagation are considered - hot callus, epicotyl grafting and water nutrient solution system. The presented results aim to compare the above methods, as well as to give the relevant conclusions and recommendations for use by manufacturers.The experiments were conducted in the period 2015-2021 at the Institute of Fruit Growing, Bulgaria. Plants of common walnut (Juglans regia L.) for rootstocks and the Bulgarian walnut variety ''Izvor 10'' for scions were used. At this stage of the study, the results show that the percentage of callus formation is different in the three methods of grafting. The average interception rate during the survey period was 85.5% for the hot callus method, 71.0% for epicotyl propagated plants and 37.5% for water nutrient solution system. It can be concluded that propagation of walnut using the techniques of hot callus, epicotyl grafting and water nutrient solution system is possible. The most useful technique for practice is hot callus method.

Audience Take Away:

- Modern techniques for walnut propagation - hot callus, epicotyl grafting and water nutrient solution system.
- Relevant conclusions and recommendations for use by manufacturers.

Biography

Stefan Gandev is a professor, PhD and DSc. in the field of fruit growing. He is an author of 108 publications with and co-author of 4 monographs. He has also developed a technology for walnut propagation, and is a co-breeder of two new walnut cultivars. Professor Stefan Gandev is a Chairman of the Scientific Council for Fruit Growing and Viticulture at the Agricultural Academy, a member of the editorial board of the journals 'Plant Sciences', 'Journal of Mountain Agriculture on the Balkans' and in 'Acta Horticulturae' issues 1139 and 1259. He has been a convener of an international symposium and has been a moderator and member of the scientific committee of a number of other international symposia. Prof. Stefan Gandev is a member of the 'Plant Genetic Resources' and 'Pome and Stone Fruits' commissions of the International Society for Horticultural Science. Prof. Gandev is a director of the Institute of Fruit Growing and a member of the Advisory Council on Fruit Growing at the Minister of Agriculture in the Republic of Bulgaria.

Rueda Puente Edgar Omar

University of sonora. Agriculture department, sonora, Mexico

The halophyte *Salicornia bigelovii* and the interaction with plant growth promoting bacteria: A model of interaction of plant-microorganism in deserts areas

The halophyte *Salicornia bigelovii* is vegetal with high potential to be improved in the deserts and sea costs of the northwest in México; however, its productivity depend of the nitrogen aportation, and others macro and micro nutrients essentials. Nitrogen-fixation by bacteria associated to the roots of *Salicornia bigelovii* and similar halophytes is an important source of available nitrogen in salt marsh ecosystems. However, the diversity of Salicornia's rhizosphere is unknown. Areas in the volcanic zone of Sonora Desert and around the Bay of La Paz in Baja California Sur, Mexico were sampled to detect nitrogen-fixing bacteria associated to this halophyte: where 38 colonies were isolated. Two isolated microorganisms showed high acetylene reduction activity. The bacterium was identified as a *Bacillus amilolyquefaciens* and *Klebsiella pneumoniae*. Those bacteria, in conjunction with *Azospirillum halopraeferens*, were tested for growth-promoting ability when inoculated on *S. bigelovii* genotypes under several saline concentration conditions. During germination and early seedling growth, *K. pneumoniae* and *Bacillus amilolyquefaciens* showed high specificity. Also, the growth and development of the same two genotypes of *S. bigelovii*, were evaluated under field conditions. *Bacillus amilolyquefaciens*, *Klebsiella pneumoniae* and *Azospirillum halopraeferens* increased some growth and development parameters, using measures of weight, length of plants, and biochemical characteristics, including total protein, ash, and total lipid content in selected plant parts. The findings suggest that yields of both genotypes of S. bigelovii, under field conditions, can be improved by the application of *Bacillus amilolyquefaciens*, *K. pneumoniae* or *A. halopraeferens* strains. This is the first report of *Bacillus amilolyquefaciens* as nitrogen-fixing bacterium associated to the halophyte *Salicornia bigelovii*.

Audience Take Away:

- 75% of food production occurs in arid areas...salinity is increasing in these areas. It is necessary to publicize plants tolerant to salinity from deserts and with agro-industrial potential and irrigated with sea water and the use of biological alternatives.
- course yes!!!...they are technologies that can be used in any environment.
- A global problem is the scarcity of fresh water, and the use of seawater with halophytes is an alternative.

Biography

Awarded with the Doctor Honoris Causa degree by the International Organization for Inclusion and Educational Quality. Level two in the National System of Researchers of CONACyT. Six occasions as distinguished 2004-2006-2008-2010-; 2012-; 2014-2015; Qualified to audit and implement institutions management systems by Mexican Accreditation Entity (EMA: ISO 9001: 2015 Quality Management Systems; ISO 14001: 2015 Environmental Management System; ISO 21001: 2018 Management System for educational organizations; ISO 50001 Energy management systems; Certification in labor competence in the EC0217-CONOCER Competency Standard (teaching of training courses in a group face-to-face manner; Member of the Inter-secretarial Commission for Biosafety of Genetically Organisms Modified in Mexico.

Mohammad Babadoost

Department of Crop Sciences, University of Illinois, Urbana, IL 61801, USA

Phytophthora blight (*Phytophthora capsici*): A serious threat to pepper and cucurbit production

Phytophthora blight, caused by oomycete *Phytophthora capsici,* is a serious threat to production of peppers and cucurbits worldwide. *P. capsici* can infect pepper plants at all growth stages, causing seedling death, root rot, crown rot, stem blight, and fruit rot. *P. capsici* can strike cucurbit plants at any stage of growth and causes seedling death, vine blight, leaf spot, and fruit rot. The infection usually appears first in low areas of the fields where the soil remains wet for longer periods of time. *P. capsici* is a soilborne pathogen and survives between crops as oospores in soil or mycelium in plant debris. An oospore is formed when mycelia of two opposite mating types (A_1 and A_2) grow together. Oospores germinate and produce sporangia and zoospores. Sporangia form when the soil is at field capacity and they release zoospores when soil is saturated. In Illinois, integrated approaches are used to manage *P. capsici* in peppers and cucurbits. Four approaches were evaluated for managing this disease in peppers, which included: (i) using resistant cultivars, (ii) induction of resistance in plants by red-light treatment, (iii) crop rotation, and (iv) fungicide application. In cucurbits, the disease is managed by: (i) seed treatment, (ii) crop rotation. (iii) removing or discing infected plants in low area, (iv) sanitation, and (v) fungicide application. At present, the following fungicides are used to manage Phytophthora blight of peppers and cucurbits in Illinois: chlorothalonil + oxathiapiprolin (Orondis Opti), cyazofamid (Ranman 400SC), ethaboxam (Elumin 4SC), fluopicolide (Presidio 4SC), mandipropamid (Revus 2.09SC), and mandipropamid + oxathiapiprolin (Orondis Ultra).

Biography

Mohammad Babadoost received his MS degree from Washington State University and Ph.D. degree from North Carolina State University, both degrees in plant pathology. In 1999, he joined the faculty of the University of Illinois at Urbana-Champaign, where he is now a Professor of Plant Pathology and Extension Specialist. Mohammad conducts research and extension programs on the biology and management of vegetable and fruit crops diseases, and teaches “Plant Disease Diagnosis and Management.” He has served as an editor of several peer-reviewed journal in the United States and worldwide. Dr. Babadoost is an author or a co-author of more than 450 peer-reviewed articles, book chapters, monograph, bulletins, and extension publications. He has involved in various teaching, research, and extension programs in 41 countries and developed a profound commitment for establishing food security in the world.

SPEAKERS

DAY 03

6TH EDITION OF GLOBAL CONGRESS ON

PLANT BIOLOGY AND BIOTECHNOLOGY

24-26 MAR

O P Shukla*, Mukul S Verma, SKS Chauhan
JK Paper Ltd, Unit: CPM, Fort Songadh, Gujarat, India

Subabul (*leucaena leucocephala*) clonal forestry : A path forward for solution of fibre resource development to paper industries in India

India is one of the major producers / consumers of Paper and Pulp products (4% of global share). Approximately one fourth of its raw material has been wood based and from the years nineteen eighties onwards, there has been a paradigm policy shift to open competitive economy. Development challenges thus faced by the industry since then, includes development of robust raw material base, from agro –social forestry on private lands.

JK Paper Ltd has annual production capacity of about 6,00,000 TPA and having 3 integrated pulp and paper plants located at Songadh (Gujarat), Rayagada (Orissa) and Kagaznagar (Telangana) producing writing & printing paper and virgin packaging boards.

For sustainable raw material supply, JKPL is promoting social & farm forestry plantation programme in mill's catchment area from the year 1996-97. JKPL has started its plantation program from 1996 and till 2020-21, 205009 Ha brought under green cover through farm forestry by distributing more than 63 crores plants in last 10 years.

Subabul (Leucaena leucocephala) is widespread species in world originated in Central America and Mexico. The leuceana was transferred to Asia from west Mexico in 16th and 17th centuries at the time of Galleon trade. Subabul spread in worldwide at South America, Asia, Southern USA, southern Europe, Australia, Africa and many oceanic islands with warm climates.`

The major constraint faced by Subabul planting farmer is productivity per hectare which is 60-70 MT/hectare in 3 years cycle. That is the reason why large area is required for production of 80 Lac MT of wood in 4 major Subabul wood producing state and farmers remuneration is lower side.

To focus on the wood productivity in Leucaena, we have started tree improvement program in 2014-15 by inter specific hybridization, selection from diverse population and mutation through gamma radiation.

Selection of superior genome through phenotypic identification for its superiority over natural population will be called plus tree which was coppiced and produced clone in vivo & in vitro technology.

In order to have a broader genetic base and to improve yield per unit area, a systemic genetic approach in research and development of Leucaena is being undertaken. Selection of plus tree in Gujarat and Maharashtra States at different sites has been done. To date, about 3,500 plus trees have been selected. A further short list of the top 10 plus trees was selected for testing of pulping properties at our R&D laboratory. We have also collected coppice cuttings from these plus trees and have developed rooting methodologies in mist chambers. Progeny testing for these plus trees has been done. Results show that CPM 3, CPM 29 and CPM 32 have 125% growth compared with the control of existing Leucaena field clonal plantations. Vegetative multiplication in vivo is going on for commercial production of plant and this year 3 million clones will be planted in Gujarat and Maharashtra during 2021-22. During progeny trial research we have observed that this genetic superior plus tree is very fast growing and produce 85 CMT/hectare of wood in 18 months whereas normal productivity by seedling through seed is 60 -70 CMT per hectare in 3 years. This clone is game changer in farmers' field for their economic viability as compared to their routine agriculture crops in Gujarat and Maharashtra. Farmers will get Rs. 2.8 Lacs gross income per hectare in 18 months (i.e. Rs. 1.87 lac /Ha/year) by planting this clone whereas seed origin plants generate Rs.77,000/Ha/year in the rotation of 3 years which is 143% higher than seed origin plantations and very much comparable even higher than 25% with the cotton and wheat remuneration i.e. Rs.1.50 Lacs/Ha/year.

Biography

Mr. Om Prakash Shukla is Post Graduate in M.Sc (Genetics) and SFRC. He started his service in 1983 at Nepa Ltd and during his 39 years of service he has served Sirpur Paper Mill, JK Paper Ltd, Unit Rayagada, BILT APR Unit in India for Plantation, Bamboo and Hardwood procurement. Currently he is working with JK Paper Ltd, Unit CPM as Chief General Manager (RM). He has visited Vietnam, Indonesia, Myanmar, Gabon, South Africa, Mozambique, France and Brazil for Forestry works. He has published 11 full length, 6 Abstract papers on tree improvement for pulpwood & pulp yield productivity and attended 12 Conference and seminars at National and International level.

Kamini Devi[1]*, Puja Ohri[2] and Renu Bhardwaj[1]

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[2]Department of Zoology, Guru Nanak Dev University, Amritsar

The influence of black carbon and biostimulant: Emerging adsorbent substrates for amelioration of metal toxicity in tomato seedlings

With the advancement of industries and agriculture technologies, there is inexorable upsurge in the metals and agriwaste pollutants which freely infiltrate the food chain which is hazardous for sound ecosystem. Current studies indicate the potential of biochar in mitigation of pollution loads in the habitat. The biochar (BC) adsorbs heavy metals and enhance the nutrients and microflora of the soil. The salicylic acid (SA) plays an important role in modulating the biotic and abiotic factors. The current study was therefore planned to evaluate the favourable effects of biochar (10g/kg soil) supplemented with salicylic acid (2.5 mM) in the amelioration of chromium stress in tomato seedlings. The present study showed that the 0.25 mM Cr caused toxicity in the tomato seedlings grown under in vitro and in vivo conditions. Cr toxicity increased the oxidative stress that further altered the activities of antioxidative enzymes like Catalase (CAT), Glutathione-s-transferase (GST), Glutahione peroxidase (GPOX), Ascorbate peroxidase (APOX), and Glutathione Reductase (GR), Superoxide dismutase (SOD), Guiacol peroxidase (POD) and Polyphenol peroxidase (PPO). Supplementation of seedlings with Biochar and Salicylic acid dwindled the toxicity of Cr by elevating the levels of antioxidant enzymes and photosynthetic parameters of tomato plants. The gaseous exchange parameters were measured after 45 days of seed sowing using Infrared Gas Analyzer (LI-COR LI-6400XT portable open photosynthesis system) and the fluorescence quenching in Photosystem II were analysed by PAM (Pulse-amplitude modulated chlorophyll fluorometry). The result of the present study suggested that the addition of black-carbon (BC) and biostimulant (SA) may play important role in amelioration of chromium toxicity by regulating the antioxidative defense system in tomato seedlings.

Audience Take Away:

- Cheap and Sustainable Agriculture Waste Management.
- Creating entrepreneurs in village and town.
- Enhance crop and herbal productivity.
- Biochar was able to remove 90% of the targeted pharmaceuticals, Pesticides, and heavy metals.

Biography

Kamini Devi, Research Scholar, at the Guru Nanak Dev University, Amritsar, Punjab, and Post Graduated in Master of Science in Botany in 2017. She has joined the Plant Stress Physiology Lab of Prof. Renu Bhardwaj in 2019 at Guru Nanak University. She has contributed as a co-author in 1 review article in Frontiers in Plant Sciences and 2 Book Chapters in reputed journals.

D.J.Patel

Ex. Principal and Dean, B. A. College of Agriculture, Anand Agricultural university, Anand-388110, Gujarat

Emerging nematode problems of crops in India

Phytonematodes are ubiquitous browsers of crop roots. About 3000(10 % of 30,000 parasites identified so far)plant parasitic nematodes attack different agricultural and horticultural crops and induce about US Dollars 524 billion annually monetary losses in crops globally. In general, 12-13% crop losses are exclusively due to phytonematodes. In India, It is about Rs .2108 crores only in 24 crops covered under AICRP on Nematodes estimated due to already known nematodes attacking crops in 2005.

But recently in last one decade, root – knot nematodes (mostly *Meloidogyne incognita*) has been observed/recorded to attack new crops viz. Gherkin, Crossendra, Carrot, Coleus, Gerbera, Tuberose, Cabbage & Carnation in poly houses, Pomegranate, Mulberry, Olive, Castor, Groundnut, Cotton, Lac, Potato tubers, etc. Infection of *M.graminicola* on rice is a serious threat to farmers in almost all rice growing areas of the country. Now, *M. incognita* is reported to attack wheat crop which may perhaps create a big threat to Rice-Wheat Cropping system in Punjab, Haryana, Western UP, Bihar, etc. Similarly *M. graminicola* is observed to attack even Onion and Garlic in Shimoga area of Karnataka. Maize has been observed to be attacked by stubby, stunt& spiral nematodes in Shimoga area of Karnataka and even root- knot nematodes in Gujarat.

A new species , *M. enterolobii* is seriously attacking Guava fruit crop In TN, Karnataka, Gujarat, etc. Likewise, M. indica ,so called as Asian Citrus Root- Knot Nematodes is reported on citrus first time from Gujarat. It has been also observed on citrus in other states as well. Cowpea and Castor are also hosts of this nematodes. Potato Golden Nematodes(*Globodera rostochiensis* & *G. pallid*)are new threat to potato growing areas of J& K and HP, though it is only known to be restricted in Ooty & Koddaicanal hills in TN.Even few varieties of Marigold (*Tagetes* Spp.) well known as antagonistic crop, is attacked by root- knot nematodes. Field Tuberose is severely attacked by Leaf & Bud nematodes(*Aphelenchoides bessyii*)in West Bengal, Assaam and other N-E states. Weeds like Parthenium, Chenopodium, & Poi are also observed to be attacked by RKN.

Hence, it is suggested to initiate research programs on these new nematodes attacking different crops by the scientists.

Biography

Born on June 5, 1944 at village Sapawada, Ta. Idar, Dist. Sabarkantha. Received B. Sc.(Agri.) degree with first class in 1967 and M. Sc.(Agri.) & Ph.D. in Plant Pathology with specialization in Plant Nematology with first class in 1972 & 1976 as in-service. Joined as Senior Research Assistant (Plant Pathology) in Bidi Tobacco Research Station, Institute of Agriculture, Anand on June28,1967. Subsequently served as Instructor in Plant Protection, Nematologist, Professor& Head, Dept. of Nematology, In Charge Director of Campus at Anand & Navsari and retired as Principal & Dean, B. A. College of Agriculture, AAU, Anand on June 30, 2004 after serving for 38 years in the fields of education, research, extension education and administration in Agriculture. Published 240 research papers in national and international journals, 9 book chapters, 3 bulletins & 3 review articles. Received 4 national and international trainings in Nematology. Presented 148 research papers in national & international seminars, attended 93 national & international workshops/seminars/symposia, 22 memberships in scientific societies. Received 10 awards/medals, served in more than 24 scientific & educational institution, worked as Presidents of Nematological society of India & Indian Society of Mycology & Plant Pathology. Worked as expert s inscientific panels, members of several QRTs, Chairman of QRT on AICRP ON Nematodes. Guided 8 M.Sc.(Agri.) and 6 Ph.D. students in Plant Nematology. Delivered several radio talks/ door darshan programs for farmers. Organized several scientific seminars/ workshops/ farmer's training programs. Visited USA, UK, Germany, Israel, China, Uganda, Kenya , Malawi, Tanzania Nepal. Presently working as advisors/consultants in few firms.

Pooja Singh[1]*, Angkita Sharma[1], Srikanta Ghosh[2], Bidyut Kumar Sarmah[3], Preeti Arivaradarajan[1], Tankeswar Nath[3], Shoma Paul Nandi[1], Dr. Shoma Paul Nandi, Dr.TankeswarNath

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Comparative metagenomic analysis of fungal diversity in *Argemone mexicana* from different regions of northeast India

Argemone mexicana is considered as an essential plant in India with immense medicinal properties. The plant sap contains a lot of secondary metabolites, which is used exhaustively in traditional medicine. *A. mexicana* is known to harbour endophytes. Rhizospheric soil is the source of these endophytes.. Therefore, fungal communities in the rhizospheric soil, root and shoot of *A. mexicana* plant from two different ecological niches were studied.The site selection for sample collection was done based on our previous studies conducted on *A. mexicana* samples (Upadhaya D et al., 2020). The studies showed that Amlighat samples produce secondary metabolites having high acaricidal properties as compared to Dergaon samples of *A. mexicana* plant.

In this study, Illumina sequencing for the internal transcribed spacer 2 (ITS2) region of fungal community was used to analyze endophytic fungi diversity in rhizospheric soil samples and plant tissues (root and shoot) from two different locations (Dergaon and Amlighat) of Assam, India. The samples were coded, like Amlighat- root (ARS), Amlighat- shoot (ASS), Amlighat- rhizosphere soil (ARSS), Dergaon- root (DRS), Dergaon- shoot (DSS) and Dergaon- rhizosphere soil samples (DRSS) of A. mexicana plant. The OTU, Chao1, phylogenetic diversity and Shannon indexof fungal species were highest in number in Dergaon samplesin comparison toAmlighat samples. In addition Simpson index values indicated that fungal community diversity was greater in Amlighat samples (ASS and ARS) than in Dergaon samples (DSS, DRS) except DRSS samples which showed highest Simpson index.

High-throughput sequencing identified a total of 3 phyla, 6 classes, 15 orders, 66 families, 125 genera and 273 fungal species including unknown and unidentified taxa in the root, shoot and rhizosphere soil samples of A. mexicana. Based on Venn- graph, Krona plot, Heatmap, and cluster analysis, similarities in fungal communities was found at high level in all samples. The dominant fungal phyla were Ascomycota and Basidiomycota in the samples. It might be possible that these common fungal communities are responsible for the production of acaricidal compounds because these fungi are presented in plant samples at different relative abundance. NGS data were submitted in the BioProject database at NCBI as accession number PRJNA728854, PRJNA728856, PRJNA728860, PRJNA728865 and PRJNA728868.

Audience Take Away:

- This is a research work. Metagenomics study is used to know total microbes present in the sample by Next Generation Sequencing (NGS).
- Earlier we were depended on plants for the drugs. Some researches proved that endophytes can also produce plant secondary metabolites.
- *Argemone mexicana* plant is well known medicinal plant. We want to know that whether its endophytes have ability to produce similar compounds or not.

- We isolated fungal endophytes from the root and shoot samples. We cultured only culturable fungal endophytes in our lab. That is why, we preferred NGS to know the non-culturable fungal endophytes.
- If the researcher wants to know the non-culturable microbes then he/she can use NGS.

Biography

Ms. Pooja Singh studied B.Sc. (Biology) and M.Sc. (Biotechnology) at CCS University, Meerut. M.Tech (Biotechnolgy) did from Dr. APJ Abdul Kalam Technical University, Lucknow. She has qualified UP-CET (Biotechnology), GATE-2013 (Lifescience), GATE-2014 (Biotechnology), CSIR-UGC NET-Lectureship and CSIR-UGC-NET JRF (Lifescience). She joined INMAS-DRDO for 1 year as a trainee. After that she joined IARI, Pusa for her M.Tech dissertation. Then she joined Amity University, Noida as a Project Assistant in 2017. Now she is doing PhD Biotechnolgy in the same university. She has published 5 research articles and 2 review articles, 1 short communication and a book chapter in Scopus journals. She has presented research work in 6 international conferences.

Abeer Abdelaty Ahmed* and Amal A. El-Mahdy

Seed Technology Research Department, Field Crops Res. Inst., Agriculture. Res. Center (ARC), Giza. Egypt

Improving seed germination and seedling growth of maize (*Zea mays, L.*) seed by soaking in water and *moringa oleifera* leaf extract

Germination traits are the key factor in higher productivity of crops. Thus, laboratory tests were made to enhance the germination of the seeds. One of the best strategies to promote seed germination was soaking the seeds in water and Moringa leaves extracts (MLE.) before planting. This experiment was carried out to evaluate the optimal soaking duration to enhance seed germination and seedling growth of hybrid 178 maize. There were three soaking durations; 12 hours, 16 hours, and 20 hours, along with the un-treatment (0 hour or without soaking). While the other factor was the concentration of the soaking seeds solution in Moringa leaves extract which was (0.25, 0.5 and 1.00 g) at the ratio of 1:10 (w/v) beside to hydro-priming (soaking in water) and control (un-treatment), each with four replications. Seed germination (%), germination index (GI), germination speed index (SGI), germination rate (GR, day), mean germination rate (MGR, day), seedling shoot length (cm), seedling root length (cm), seedling length (cm), seedling fresh weight (g), seedling dry weights, (g) seedling vigor 1 (SV1) and seedling vigor 2 (SV2) were evaluated. Results showed that maximum value germination traits were found in hybrid 178 of Maize which soaked at 20 hours of duration, followed by soaked at 16 hours then at 12 hours soaking compared with un-soaked seed. The germination and seedling characters, improved with soaking in Moringa leaves extract. 0.25 g/mm MLE. was the best treatment, followed by 0.5 (g) and hydro-priming gave higher values, as to seed germination and seed vigour compared with other treatment. Field emergence experiment gave the best values for dry weight(g) and seedling vigour (SVII) with 0.25 g/mm then 0.5 g/mm and hydro-priming under soaked seed to 20 hour com. This suggests that soaking in Moringa leaves extract as 0.25 concentrate under 20 hour soaking was a suitable treatment that can improve germination and seedling growth in hybrid 178 maize.This experiment was carried out to evaluate the optimal soaking duration(12, 16 and 20 hours) and using Moringa leaves extract which was (0.25, 0.5 and 1.00 g). Results showed that using Moringa leaf extract at a concentration of 0.25 g/mm for 20 /or 16 hour durations as a seed soaking treatment, it can stimulate the rapid of germination, promote germination percentage, and have positive effects on seedlings growth, resulting in healthy and strong seedlings.

Audience Take Away:

- This research will help researchers through using important plant extracts for enhancing germination and seedling growth especially with the most crops in the world its maize. Also technique which used during prepares extract and results very unique, perhaps they will use it with another crop too.
- We used new concentration no one used before so this will be quite benefit to all researchers.
- Through this research we improved germination traits of maize therefore the maize seed will be able germinate perfectly with increase seed germination percentage will provide cost of seed and number of seed which we need to grow.

Biography

Abeer Abdelaty Ahmed, Senior Researcher (PhD), Seed Secience and technology Dept., Field Crops Research Inst., Agriculture Research Center, Egypt. I was graduate B.Sc (Agronomy Sciences), Fac.of Agric, Ain Shams Univ.2000. M.Sc.(Agronomy Sciences), Fac.of Agric, Ain shams Univ. under title: " Response of some wheat genotypes to salinity and drought 2006", Dr. Abeer gets her Ph.D. from (Agriculture Research Center), Field Crops Inst., Faculty of Agriculture, Ain Shams University Under title" Identification and yield performance of some faba bean germplasm".Oct/2014 under my supervisor. I have travelled to many countries to attend many trainings about agriculture as China , India and Netherlands. I have many published research about crop production, plant genetic resources and seed science and technology.

Chao Shen[1,2]*, Nian Wang[1], De Zhu[1], Pengcheng Wang[1], Maojun Wang[1] and Zhongxu Lin[1]

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G. tomentosum genome and interspecific ultra-dense genetic maps reveal genomic structures and flowering depression in cotton

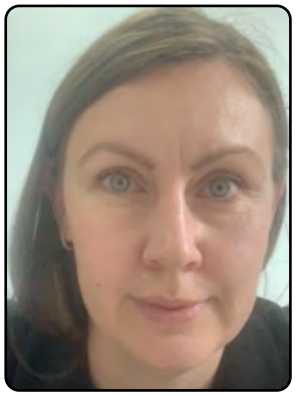
The high-quality reference-grade genome for *Gossupium tomentosum* can greatly promote the progress in biological research and introgression breeding for the mainly cultivated species, G. hirsutum. Here, we report a high-quality genome assembly for *G. tomentosum* by integrating PacBio and Hi-C technologies. Comparative genomic analysis revealed a large number of genetic variations. Two re-sequencing-based ultra-dense genetic maps were constructed which comprised 4,047,199 and 6,009,681 SNPs, 4,120 and 4,599 bins and covering 4,126.36 cM and 4,966.72 cM in the EMF2 (F2 from *G. hirsutum* × *G. tomentosum*) and GHF2 (F2 from *G. hirsutum* × *G. barbadense*). The EMF2 exhibited lower recombination rate at the whole-genome level as compared with GHF2. We mapped 22 and 33 QTL associated with crossover frequency and predicted *Gh_MRE11* and *Gh_FIGL1* as the candidate genes governing crossover in the EMF2 and GHF2, respectively. We identified 13 significant QTL that regulate the floral transition, and revealed that *Gh_AGL18* was associated with the floral transition. Therefore, our study provides a valuable genomic resource to support a better understanding of cotton interspecific cross and recombination landscape for genetic improvement and breeding in cotton.

Audience Take Away:

- The high quality *G. tomentosum* genome revealed massive interspecific structure variations.
- Differences of interspecific genetic variation between EMF2 and GHF2.
- A higher collinearity between the genetic and physical maps in *G. hirsutum* × *G. tomentosum* population?
- Less recombination rate and crossovers discovered in *G. hirsutum* × *G. tomentosum* population Genomic regions and candidate gene uncovered flowering hybrid breakdown in *G. hirsutum* × *G. tomentosum*.

Biography

Chao Shen obtained a PhD in Plant Genetics & Breeding from Huazhong Agricultural University where he studied the genetics, genomics and molecular biology in cotton. During his postgraduate, he used genome sequencing to address the cotton introgression lines, the cotton polyploidy genomics and domestication population genetics project. In 2019, he joined Guangdong University of Petrochemical Technology. At present, 25 academic papers have been published in high-level SCI journals at home and abroad, serving as editorial board member of International Journal of Genetics and Genomics, Journal of Modern Agriculture and Biotechnology and Annals of Genetics.



Bianca Eugenia Vodnar[1,2]*, Lavinia Florina Calinoiu[2], Laura Mitrea[2], Bernadette Emoke Teleky[2], KatalinSzabo[2], Silvia Amalia Nemes[2], Gheorghe Adrian Martau[2], Gianina Crisan[1]

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Blueberry leaves, an alternative source of polyphenolic compounds

The berries of *Vaccinum corymbosum L.* represent a rich source of polyphenolic compounds, which are known for their biological activities and their contributions to a healthy diet. The blueberry leaves are the main by-products of berry harvesting, annual significant amounts of leaves are discarded, which could be a valuable source of bioactive compounds.

In the present study, ultrasound-assisted extraction technology was used to determine and compare the chemical and biological profiles of leaves from six commercial blueberry (*Vaccinium corymbosum L.*) varieties, with the same geographical origin. Comparisons among cultivars aimed to evaluate differences between the polyphenolic composition of leaves and to analyze their antioxidant, antimicrobial, and antimutagenic activities.

For all six blueberry varieties, the class of phenolic compounds found in the highest concentration was hydroxycinnamic acids, followed by flavanols, and then closely flavonols.

Of all the phenolic compounds identified, feruloylquinic acid was identified in the highest amount for all varieties, at the lowest level, registered in the Spartan variety to the highest level, registered in the Nelson variety.

Regarding the group of flavonols, the major phenolic compound identified was rutin (quercetin-rutinoside), which recorded the highest values in the case of Toro, Nelson and Elliot leaves.

In the flavanol group, procyanidin dimer and procyanidin trimer were identified in remarkable quantities for all six leaf varieties.

The anthocyanin group, represented by three cyanidin derivatives, was present only in small amounts, for only three varieties: Elliot, Toro and Spartan.

The leaf extracts of the cultivars Toro, Elliot, and Nelson appear to be good sources of antioxidants, registering high percentage inhibitions of DPPH radicals. The blueberry leaf extracts had a strong antibacterial activity and a low antifungal capacity, and a low-to-moderate antimutagenic capacity towards *Salmonella typhimurium* TA98 and TA100 strains, with Toro leaf being the best candidate.

All of these biological activities indicate health-related benefits, recommending them as suitable candidates for medical and pharmaceutical applications. The present study adds significant knowledge to the field of blueberry leaves, supporting the ultrasound-assisted extraction technique as a useful and green method to provide alternative sources of bioactive compounds.

Audience Take Away:

- Blueberry leaf extracts are a rich source of potent phenolic antioxidants.
- Cultivars significantly influence the phenolic composition and content, the antioxidant and antimutagenic capacities of *V. corymbosum L.* leaves.

Biography

Bianca Eugenia Vodnar studied Pharmacy at the University of Medicine and Pharmacy Craiova and graduated in 2007. She received her PhD in Pharmacy in November 2020 at 'Iuliu Haţieganu' University of Medicine and Pharmacy, Cluj-Napoca. Within the PhD, she focused on the characterization of the chemical composition and biological activitities (antioxidant, antimicrobial and antimutagenic) of some Vaccinium spp. leaves. She is resident pharmacist, research assistant and postdoctoral researcher in the project 'ACAMed-Academy of Research Entrepreneurs in Medicine'.

Aparna B. Gunjal

Department of Microbiology, Dr. D.Y. Patil, Arts, Commerce and Science College, Pimpri, Pune, Maharashtra, India

Antioxidant and bioautography of medicinal plants – *Eugenia jambolana* and *Asparagus racemosus*

Medicinal plants represent a rich source of antimicrobial agents. Plants are used medicinally as a source of important drugs. The present work deals with antioxidant activity and bioautography of plant extracts viz., Eugenia jambolana and Asparagus racemosus. They showed the antioxidant activity. The inhibition of growth on bioautographic TLC plates against the test organisms was shown by Eugenia jambolana. The results suggest that all the plant extracts can serve as a potential source of pharmaceutically important bioactive compounds which could be useful in controlling the growth of various pathogenic bacteria.

Biography

Dr. Aparna B. Gunjal has completed her B.Sc. from Annasaheb Magar Mahavidyalaya, Hadapsar; M.Sc. from Modern College Arts, Commerce and Science College, Ganeshkhind and Ph.D in Environmental Sciences subject from Savitribai Phule Pune University, Pune, Maharashtra, India. She is working as Assistant Professor in Department of Microbiology at Dr. D.Y. Patil, Arts, Commerce and Science College, Pimpri, Pune, Maharashtra, India. Her research areas of expertise are solid waste management; plant growth promoting rhizobacteria; e-waste management; bioremediation; etc. Aparna has 121 publications to her credit. She has received 15 Awards for the Best Paper presentations and also received the travel grants. Aparna has also received Pune Municipal Corporation Award for excellent work in Environmental Sciences Research in 2015, The Elsevier Foundation - TWAS Sustainability Visiting Expert Programme" in 2018 and Young Researcher award with Innovative Technology. She has worked on composting aspect as a Senior Researcher Assistant at Hongkong Baptist University, Hongkong. Aparna is Reviewer for many Journals.

Abdul Hakkim[1]*and Sajeena S[2]

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Precision farming - A scientific approach for enhancing soil and crop health

Precision agriculture is defined as the art and science of utilizing advanced technologies for enhancing crop production and minimizing potential environmental pollution / degradation. Precision farming, which is also referred to as hi-tech farming, is known as technology enabled, information based and decision focused method of farming. which uses the inputs most efficiently and judiciously to maximize productivity and profitability with minimum impact on soil and environment. The objective of precision farming is to match agricultural inputs and practices to localized conditions within a field to do the right thing in the right place, at the right time and in the right way. Agriculture is the largest user of water, which consumes about 80% of the exploitable water resources. The major components of precision farming include micro irrigation, fertigation, plastic mulching, crop geometry and integrated pest and disease management.

To bring more area under irrigation, it has become necessary to introduce micro irrigation for economizing the use of water and to increase productivity per unit of water. Micro irrigation is the slow and regular application of water directly to the root zone of the plants through a network of economically designed plastic pipes and low discharge emitter. It can be considered as an efficient irrigation method, which is economically viable, technically feasible and socially acceptable. It enables watering the plants at the rate of its consumptive use thereby minimizing the losses such as deep percolation, runoff and soil evaporation. Simultaneous application of soluble fertilizers (plant nutrients) and water through an irrigation system is called fertigation. It is an eefficient and precise method of application of inputs and provides good environmental stewardship. Mulching refers to the practice of covering the plant basin with some materials to prevent the evaporation loss. In precision framing it is always recommended to go for plastic mulching, which can enhance the water use efficiency and fertilizer use efficiency. The plastic mulching in addition to prevention of evaporation loss, helps to maintain the soil structure and regulates the soil temperature, which is essential for effective microbial activity. Plastic mulching completely eliminates the weed growth and prevents the leaching of nutrients during heavy rainfall. Crop geometry refers to the practice of maintaining optimal crop to crop and row to row spacing, in order to accommodate maximum number of seedlings in the available land area. It is also referred to as high density planting. Integrated pest and disease management is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties.

Precision farming offers a variety of potential benefits in profitability, productivity, sustainability, crop quality, food safety, environmental protection, on farm quality of life and rural economic development. This scenario forces us to think about efficient irrigation system like micro irrigation combined with fertigaion to have more crop per drop. Hence precision farming can be considered as the future of energy, soil and conservation and food security.

Audience Take Away:

- Farmers can adopt various interventions of precision farming in order to ensure food security.
- By adopting various precision farming techniques, they can ensure ater and energy conservation.

Biography

Dr. Abdul Hakkim, V.M. obtained B.Tech (Agricultural Engineering) and M.Tech (Soil & Water Engineering) from Kerala Agricultural University during 1990 and 1993 respectively. He was awarded with Ph.D (Soil & Water Engineering) by Tamil Nadu Agricultural University in 2009 and PG Diploma in Agricultural Extension Management (PGDAEM) by MANAGE, Hyderabad in 2012. Presently he is working as Professor and Head, Division of Agricultural Engineering, Regional Agricultural Research Station (RARS), Pattambi. He has 27 years of teaching, research and extension experience. He has published 2 books, 38 research papers in various National and International Journals.

Md Noor Alam Chowdhury

Senior Scientific Officer, Spices Research Centre, Bangladesh Agricultural Research Institute, Shibganj, Bogura, Bangladesh

Study of genetic diversity in char land chilli

The experiment was conducted at Spices Research Centre, Shibganj, Bogra during 2015-2016 with a view to study the genetic diversity and selection of suitable genotype for future breeding program. Ninety five chilli lines of char land were used in this study. D2 analysis of 95 chilli lines and analysis of variance were done. The lines were grouped into seven clusters. It was found that the inter-cluster distance was larger than the intra-cluster distance. The highest intra-cluster distance was observed in cluster I(1.0953) and the lowest was in cluster III (0.533).The highest inter-cluster distance was observed between clusters V and I (16.752), followed by cluster II and I (14.571), III and I (12.767), VII and V (11.305). The lowest inter-cluster distance was observed between cluster III and II (2.516) followed by V and II (2.577). It may be concluded that the cluster V and I (15) could be used for future breeding work.

Biography

Mr. Chowdhury is a horticulturist. He has been working at Spices Research Centre, Shibganj, Bogura as a Senior Scientific Officer under Bangladesh Agricultural Research Institute, Joydebpur Gazipur, Bangladesh. He is involved in onion and chilli improvement program of Spices Research Centre. Earlier he worked in World Vision Bangladesh, Fruit Improvement Project (FIP), Garlic Improvement Project, under Department of Horticulture of Bangladesh Agricultural University, Mymensingh, Bangladesh. His research experience is more than 22 years. During that period, he worked with varietal improvement of horticultural crops especially on onion and chilli improvement program. He has published 38 scientific articles in different journal from home and abroad. He was involved as a senior breeder for releasing four spices crop variety (Onion, Chilli, Chive and Mint). Recently he screen out one onion line against thrips which is world wide problem of onion cultivation.

Namik Rashydov[1]* Kutsokon NK[1], Khoma YA[1], Kozikova DO[1], Khudolieieva LV[1], Kryvokhyzha MV[1], Litvinov SV[1], Rakhmetov DB[2]

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[2]M. M. Gryshko National Botanical Garden NASU, Kyiv, Ukraine

Evaluation of prion-like proteins synthesis of the plant under influence stress factors

The prion-like proteins have a unique biochemical memory through destructive self-organizing changes of conformation and function. They have a general biological nature, and their behavior was widely studied in mammals, bacteria, and fungi. Recently, we and other authors suggested that stress factors might cause prion-like properties in plant proteins. However, available data is preliminary and hardly convincing. Therefore, it is timely to explore if selected plant proteins, having crucial biochemical functions, such as cupins, auxin-binding proteins, RuBisCo and other photosynthetic proteins, can acquire prion-like properties due to influence of the chronic stress factors.

The aim of our study is the transition of the α-structure to β-conformation in proteins and the appearance of amyloid aggregates in plant cells challenged by suboptimal conditions under influence abiotic stress factors using state-of-the-art proteomics, microscopy, and molecular biology. Our previous studies showed that under chronic irradiation in the Chernobyl zone flax accumulates proteins with prion-like properties (Gábrišová et al., 2016). Moreover, we demonstrated with FTIR spectrometry that in X-ray-irradiated Arabidopsis thaliana transition of the α-state of proteins to β-conformation increased by 12% (Litvinov et al., 2018). Changing the conformation of proteins and increasing the relative proportion of β-sheets compared to the α-helices, which are dominant in proteins at the normal conditions, is a sign nascent of prion-like proteins in plants species.

Biography

Namik Rashydov since 2003 till present – Head of Laboratory of Biophysics of Signal Systems, Institute of Cell Biology and Genetic Engineering, National Academy of Sciences of Ukraine, Department of Biophysics and Radiobiology, Kiev; International scholarships/trainings:FP7 Program People Marie Curie Actions International Research Staff Exchange Scheme (IRSES 2013-2017, #612587). Short-term research visits to Gottingen University (Germany), Institute of Plant Genetics and Biotechnology, Slovak Academy of Sciences (Nitra, Slovakia), Aberystwyth University (Aberystwyth, UK), Institute of Experimental Botany, Czech Academy of Sciences (Prague, Czech Republic), NATO Advanced Training Courses 2005, 2006, 2007, 2009, 2010 – Speaker and participant of several NATO training courses (supported by NATO travel grant), Speaker of the conferences: PSB 2016 (St.-Petersburg), SEAB 2016 (Antalya), IPC 2016 (Berlin), SEAB 2017 (Minsk), Institute of Experimental Botany 2017 (Prague), Zhytomyr University 2018 (Ukraine), National Scholarship Program of Slovak Republic for the support of mobility of students, PhD students, university teachers and researchers, project "Chernobyl seeds", Dr. Martin Hajduch, Institute of Plant Genetics and Biotechnology, Nitra, Slovak Republic (2007, 2 months & 2010, 2 months), Speaker of the training course "Molecular Aspects of Salt and Drought Tolerance in Crops (plants)", Genetic Engineering Research Center (GERC), Faculty of Agriculture, Cairo University, Egypt, September, 2007.

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