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Joint Event On

2ND EDITION OF

PLANT SCIENCE AND MOLECULAR BIOLOGY WORLD CONFERENCE &

AGRICULTURE, FORESTRY, AND HORTICULTURE WORLD CONFERENCE

19-21 October 2025

Plant Science and Molecular Biology World Conference
PMBWC 2025

Agriculture, Forestry and Horticulture World Conference
AFHWC 2025

Venue

Millennium Paris Charles de Gaulle
2, Allée du Verger
95700 Roissy-en-France, Paris, France

PMBWC & AFHWC 2025

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ABOUT US

Precision Global Conferences

Precision Global Conferences is a highly established scientific conference organizer. We take high integrity in conveying your achievements to the world and emphasize your incredible work and scientific contribution. Precision global conferences have developed the progression, broadcast, persistence, research, and development activities in cancer, neurology, and nursing science.

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This conference will emphasize the outstanding works and their medicinal consequences through hybrid presentations. If you're searching for a perfect podium that can reflect your professional ethics and voice your appointment, we are here with the best team, welcoming your honorable presence.

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KEYNOTE SESSIONS 01

DAY 1

Linh T.M. Hoang*, Ha TT Nguyen, Sudipta Das Bhowmik, Sagadevan Mundree

School of Agriculture and Food Sustainability, The University of Queensland, Brisbane, Queensland, Australia

Genome Editing for Enhanced Salt Tolerance in Rice (Oryza Sativa)

Salinity is a major constraint limiting global crop productivity. Salt-affected soil areas is rapidly expanding globally over recent decades due to the impacts of climate changes and human activities. Rice (Oryza sativa L.) is one of the most important stable crops that feed almost a half of the world's population. However, rice is very sensitive to salinity stress and is currently listed as the most salt sensitive cereal crop with a threshold of 3 dSm^{-1} for most cultivated varieties. Proline has been reported play an important role in abiotic stress tolerance in plants. Our previous investigation on proline-related gene expression patterns in wild and cultivated rice exposing to salinity stress indicated that wild rice O. australiensis plants accumulated proline by activating the genes related to proline synthesis, including OsP5CS1, OsP5CS2, and OsP5CR,and depressing proline degradation OsProDH gene at early as 1h after exposure to salt stress. Salt-sensitive cultivated rice Nipponbare, in contrast, upregulated the proline degradation gene OsProDH at the early stage of salt exposure (1h after salt treatment) and did not activate proline synthesis genes as early as it was in the wild rice.This researchinvestigates whether editing (knock out) Proline dehydrogenase in rice cultivar Nipponbare (OsProDH) usingCRISPR-Cas9(Clustered Regularly Interspaced Short Palindromic Repeats) could enhance salt tolerance in this cultivar.A total of 65 putative OsProDH edited Nipponbare rice lines were generated using Agrobacterium-mediated transformation of rice calli;27 of them wereconfirmedOsProDH-edited by Sanger sequencing. These edited lines were evaluated for salinity tolerance using morphological and physiological assessments. Results showed that different edited events resulted in different salt-tolerantlevels in edited lines.

Biography

Dr Linh Hoang is an Advance Queensland Industry Research Fellow (Mid-career) in the School of Agriculture & Food Sustainability, the University of Queensland. She was the holder of an Australian Development Scholarship (AusAID) and an Endeavour Postgraduate Award for her Master's and PhD studies. Linh was awarded Best Paper Award for Early Career Scientist in 2015 by the Australian Society of Plant Scientists for her research paper published in the Functional Plant Biology Journal. She has been researching abiotic/biotic stress tolerance, nutritional enrichment, value-adding to Agricultural waste, and enhanced carbon capture/climate change resilience on several crops, including rice, pigeonpea, chickpea, mungbean and grasspea. Her research focuses on using advanced biotechnology, including genome editing for the generation of climate-smart crops. Linh has received an Advance Queensland Research Fellowship (Early-career) for her research on enhanced insect resistance in Pigeonpea.

Sunandana Mandal

Department of Chemistry, Moyna College (Affiliated to Vidyasagar University), India

Exploring the Biological Significance of Synthesized Silver Nanoparticles

Silver Nanoparticles (AgNPs) are minute particles of silver with sizes ranging from 1 to 100 nanometres. Due to their unique physical, chemical and biological properties, AgNPs have found a broad spectrum of applications in various fields that directly and indirectly impact human lives. Their significance is rooted in their nanoscale dimensions, high surface area and diverse functionalities, which enable them to provide innovative solutions to critical challenges in fieldslike healthcare and industry.

The present work deals with the synthesis of Silver Nanoparticles Sonochemically using Trisodium Citrate (acting both as capping agent as well a reducing agent) and Sodium Borohydride (acting as reducing agent only). Synthesized AgNPs were characterised by UV-Vis Spectroscopy, TEM (Transmission Electron Microscope) and SAED (Selective area electron diffraction) images.

AntifilarialEfficacy as well as mechanism of action were studied on filarial nematode Setariacervi. Antifilarial activity of these AgNPs were assessed by various techniques such as Relative Movability (RM), MTT assay, Dye Exclusion test, Propidium iodide (PI) staining and DNA Fragmentation assay. RM assessment confirms that all the nanoparticles show time-dependent Antifilarial Effect. Using MTT assay, the effects of silver nanoparticles on viability of Microfilariae were studied. Parasite viability was checked by Trypan Blue Dye Exclusion test, which dyes the dead oocytes selectively whereas live oocytes remained colourless. AgNP-treated oocytes were stained blue. Using PI staining, fragmented nuclear morphology resulted in AgNP treated oocytes, but no such fragmentation was observed in control oocytes (i.e. oocytes which are not treated by AgNP). It can thus be concluded that AgNPs possess strong macro- and micro-antifilarial activity against S. cervi.

The Antibacterial Activity of the synthesized nanoparticles was evaluated against Gram positive bacteria Staphylococcus aureus (S. aureus) and gram-negative bacteria Escherichia coli (E. coli) using Paper Disc Diffusion Method. AntibacterialStudy showed that the AgNPs are positive and have profound Antibacterial Activity and the nanoparticles were found to be effective against these two bacteria.

Biography

Dr. Sunandana Mandal isworking as an Assistant Professor in the department of Chemistry at Moyna College (Affiliated to Vidyasagar University), India. She completed her Ph.D. degree from Visva-Bharati in Soil Science and Agricultural Chemistry under the guidance of Prof. Goutam Kumar Ghosh. During her Ph.D. work, she received Rajiv Gandhi National Fellowship (RGNF) funded by UGC from 2015 to 2020.

She has published research papers in various prestigious journals (UGC approved, WoSand Scopus indexed, DOI). She acts as reviewer for several international journals. Till November 2024, there are several publications to her credit which are peer reviewed, UGC care list approved, Web of Science Indexed reputed Journals at National and International Levels.

She has delivered lectures and presented papers in various seminars and conferences at National as well as international level.

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ORAL SESSIONS 01

DAY 1

Rafal Kukawka*[1], Maciej Spychalski[2], Marcin Smiglak[1], Joanna Pulawska[2], Artur Mikicinski[2]

[1]Poznan Science and Technology Park, Adam Mickiewicz University Foundation, Poznan, Poland

[2]The National Institute of Horticultural Research, Poland

Environmentally Safe Plant Resistance Inducers as an Alternative to Pesticides

The increasing concerns over the environmental and human health impacts of pesticide use have driven the search for sustainable alternatives in plant protection. One of the most promising approaches is the use of plant resistance inducers, which activate the plant's natural defense mechanisms rather than directly targeting pathogens. These inducers stimulate systemic acquired resistance (SAR), providing broad-spectrum and long-lasting protection against various biotic stress factors. Our research focuses on the development of novel plant resistance inducers based on salicylic acid derivatives, which could serve as environmentally friendly alternatives to conventional pesticides in multiple crop species.

Salicylic acid (SA) is a well-known phytohormone involved in plant immunity, playing a crucial role in the activation of SAR. However, its direct application is often limited by low solubility, instability, and potential phytotoxicity at high concentrations. To overcome these limitations, we designed new SA derivatives in the form of ionic compounds, where the counterion is a naturally occurring, biodegradable ion with low toxicity. These newly synthesized compounds were evaluated for their ability to enhance plant defense responses against fungal and bacterial pathogens in multiple crop species, including wheat (*Triticum aestivum*), potato (*Solanum tuberosum*), and apple (*Malus domestica*).

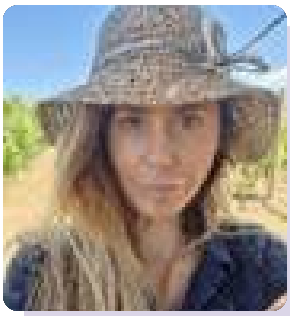
Our field and laboratory trials demonstrated that salicylates effectively reduced the incidence of economically important diseases such as powdery mildew (*Blumeria graminis*), septoria leaf blotch (*Zymoseptoria tritici*), and late blight (*Phytophthora infestans*) in wheat and potato crops. In apples, these compounds significantly suppressed infections caused by *Venturia inaequalis* (apple scab) and *Erwinia amylovora* (fire blight), achieving disease control levels comparable to conventional fungicides.

An important advantage of these novel resistance inducers is their compatibility with integrated pest management (IPM) strategies. Unlike traditional fungicides and bactericides, which exert selective pressure on pathogens and contribute to the development of resistance, SAR inducers promote plant resilience without directly affecting microbial populations. This makes them suitable for long-term use in sustainable agriculture. Additionally, their application has been associated with increased chlorophyll content, improved photosynthetic efficiency, and enhanced nutrient uptake, leading to measurable yield improvements. For instance, in wheat trials, yield increases of 10.6–11.6% were recorded, while in potato, tuber production rose by 21.6% following treatment with salicylate-based inducers.

The European Union's policies on pesticide reduction, including the Green Deal and the Farm to Fork strategy, further emphasize the need for alternatives that maintain agricultural productivity while minimizing environmental harm. Our findings suggest that tailored salicylates have the potential to become a key component of next-generation plant protection, helping to reduce pesticide dependency while ensuring effective disease control. The ability of these compounds to induce plant resistance across different crop species underscores their broad applicability and commercial potential.
In conclusion, plant resistance inducers based on modified salicylic acid derivatives present a promising alternative to conventional pesticides, offering effective, sustainable, and environmentally safe crop protection. By harnessing the plant's own defense mechanisms, these compounds contribute to more resilient agricultural systems and align with global efforts to reduce the ecological footprint of modern farming. Future research will focus on optimizing formulations, understanding the molecular mechanisms of action, and scaling up field applications to facilitate their adoption in commercial agriculture.
The "Searching for new chemical compounds inducing resistance of apple to diseases and determination of the molecular mechanism of their action" project is carriedout within the Sonata (UMO47/2022-/D/NZ02327/9)programme of the National Science Center, Poland.

Biography

Dr. Rafał Kukawka is a researcher at the Poznan Science and Technology Park of Adam Mickiewicz University Foundation. His work focuses on developing innovative plant protection strategies, particularly environmentally friendly resistance inducers as alternatives to pesticides and plant biostimulants. With expertise in chemistry and plant sciences, he specializes in designing novel bioactive compounds to enhance crop resilience and productivity. Dr. Kukawka collaborates with scientists, agricultural experts, and industry partners to bridge the gap between research and practical applications in sustainable agriculture.



Eleonora Cataldo* and Giovan Battista Mattii
DAGRI Department, University of Florence, Italy

End Results of Zeolite Application on Vitis Vinifera L., San Miniato and Montalcino Vineyards

Soil management is important in mitigating the effects of abiotic stress in vineyards. In addition, optimizing the composting method in closed-loop chains can effectively address the problem of pruning residues and grape marc in viticultural areas. This trial was created to improve the quality of berries and corroborate grapevine against abiotic stress such as water stress. To this aim, a new by-product was applied as a soil improver: ZeoWine (30 t/ha), deriving from the process of composting industrial wine and zeolite. In two companies, comparative treatments were applied (i.e., ZeoWine, Zeolite, Compost, and Control). Single-leaf gas exchange, midday leaf water potential, and chlorophyll fluorescence were measured. Moreover, the parameters of technological and phenolic maturity, anthocyanin fractionation, and quercetin content in the grapes were analyzed. The new by-product showed less negative water potential, higher photosynthesis, and lower leaf temperature. Finally, the interaction of the beneficial results of ZeoWine was highlighted by the reduction of quercetin in grapes and the closure of the production cycle of waste material from the viticultural supply chain.

Biography

Dr. Cataldo began her career as a Research Fellow at the University of Florence. As part of her teaching activity, she has been co-supervisor and supervisor of numerous degree theses. She has also carried out teaching activities at other institutes. She has collaborated on multiple research projects. She is the author of over 30 scientific publications and has participated in numerous national and international Conferences as oral presentations. She has acted as a Reviewer role of multiple manuscripts, Guest Editor, and is in Editorial Board Member of scientific Details of presenting author to be mentioned in certificate: journals.

Junpeng Niu*, Huizhen Bao, Bowen Duan, Sibo Jiao, Guodong Wang
College of Life Sciences, Shaanxi Normal University, China

Effects of Exogenous CLE26 Peptide on the Quality of Kiwifruit During Shelf Life

Peptide hormones are defined as small, secreted polypeptide-based intercellular communication signal molecules. These peptide hormones are encoded by nuclear genes, and often go through proteolytic processing of preproproteins and post-translational modifications, thereby functioning in numerous metabolisms of growth, development and stress response. However, their effects on postharvest shelf-life quality of fruits is rarely reported. Hence, CLAVATA3/EMBRYO SURROUNDING REIGON-related 26 (CLE26) peptide at different concentration was used to soak 'Xuxiang' kiwifruit (Actinidia deliciosa) fruits for 5 min, followed by a 15-day shelf life at 22℃, with samples taken every five days to observe changes in fruit quality and microstructure. The results showed that CLE26 significantly inhibited the decrease of firmness. However, they inhibited the synthesis of soluble solids and maintained the content of titratable acids. CLE26 also maintained fruit lightness and hue angle, and inhibited respiration rates and ethylene production. Moreover, E-nose and E-tongue analyses revealed that the flavor of CLE26 at different concentration was different from that of control. Correspondingly, the microstructure analysis showed that starch granules in the CLE26-treated pulp degraded slowly, and the cellular and subcellular structures were better than the control. Taken together, CLE26 can effectively maintain the quality and cellular and subcellular structure of kiwifruit during shelf life, which provides a new perspective for the application of peptides in fruit preservation.

Biography

Dr. Junpeng Niu is an Assistant Researcher at Shaanxi Normal University, China, specializing in fruit postharvest storage and preservation biotechnology, plant stress physiology, and seed dormancy and germination. His research primarily focuses on improving the quality and longevity of fruit during postharvest storage, uncovering the physiological and molecular mechanisms underlying seed dormancy and germination in horticultural crops, and enhancing stress tolerance in alfalfa. Dr. Niu has made significant contributions to these fields, authoring 36 papers in SCI-indexed journals as the first or corresponding author.

Natalia Togonidze*[1,2], Nani Goginashvili[1], Inga Martkoplishvili[3]
[1]Scientific-Research Centre of Agriculture, Tbilisi, Georgia
[2]Institute of Botany, Ilia State University, Tbilisi, Georgia
[3]Georgian National Museum, Tbilisi, Georgia

Determination of the Potential of Successional Stages of Natural Regeneration of Subalpine Birch Forests, Georgia, Central Greater Caucasus

Subalpine birch forest is asensitive ecosystem with a key role in the regulation of water resources andstability of the mountain slopes. During the last centurybirch forest area significantly decreased in the temperate zone worldwide. Significant changes have also occurred in our country. The northern slopes of the Central Caucasus Mountains in Kazbegi district of Georgia were covered by birch forest in the past. However, in the last century forest area has significantly decreased due to different types of anthropogenic effect e.g. fires and uncontrolled cutting of trees. Forestlarge areas transformed after degradation to subalpine secondary meadows as pastures and hay meadows. During the last decades, natural reforestation of the birch forest started in the Central Caucasus and diversity of vegetation has been changed. It is apparently in close relation with the global climate change, also the important factor is reduction of uncontrolled sheep grazing in Kazbegi district. The aim of our study was to observe the process of birch forest natural regeneration and to determine how to change successional stages.The process of natural regeneration of birch forests was started in subalpine meadows, this is a pioneering successional stage, which continues with logical successional stage, it is temporary forest, and the last stage of the process is the forest climax stage.The regeneration process of birch forest is changing plant diversity and size of trees and other plants.Pioneer stages of secondary succession were distinguished by the highest species richness (154 species) due to the mixing of two habitat types with subalpine meadow and birch forestand other associated plant species.Plant species diversity decreased in the following successional stages, in the logical successional stage 128 species and in the climax birch forest 86 species.Besides *B. litwinowii*, there are species which characteristic of all three research stages, such as: *Avenella flexuosa; Bettonica macrantha Cirsium obvallatum;Lapsana grandiflora; Pimpinella rhodantha Campanula collina; Cicerbita racemose; Geranium sylvaticum Polygonum carneum;Primula amoena; Sedum oppositifolium; Vaccinium myrtillus* etc.The research results shows that the process of forest natural regeneration starts on subalpine meadows, the first composition of species is formed by the seedlings of some tree species, and other elements of the forest understory that are associated with birch trees. In the second successional stage, some species are absent, generally dwarf shrubs. On the last stage, in the climax forest already have an established ecosystem of birch forest, with all its plant composition.

This work was implemented with the financial support of Shota Rustaveli National Science Foundation of Georgia (Grant # YS-24-2579).

Biography

Natalia Togonidze -PhD of philosophy in Life Sciences. PhD thesis - “Impact of forest degradation on plant species diversity: Determination of the potential of successional stages of natural regeneration of subalpine birch forest”. Working at the Scientific-Research Center of Agriculture and at the Institute of Botany of Ilia State University. She worked at the Centerof Allergy and studied allergens. In 2024 she received the Georgian National Foundation’s Young Scholar Grant to the project “Creation of a Predictive Model of Natural Restoration of Subalpine Birch Forest”. She is author of more than twenty publications and participated in the several international conferences and congresses.

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KEYNOTE SESSIONS 02

DAY 1

Shweta Rana*
Department of Physical and Natural Sciences, FLAME University, India

Advancing Sustainability in Agrifood Systems: Harnessing Modern Tools with Traditional Practices

Anthropogenic activities such as deforestation, unplanned construction, pollution, excessive and improper usage of environmental resources, exacerbated by the increased global temperature is leading to decreased cultivable land, water and food production. These are important issues of the Anthropocene epoch and addressing them requires vital and dynamic solutions. Also, achieving minimum dietary diversity by safely increasing food production is a new SDG indicator by FAO. Undoubtedly, naturogenic activities too are slowly adding to climate change and subsequent negative effects. In my humble contribution towards sustainable food production, I will talk about few efficient alternatives from my research studies that validate and provide solutions to this critical issue. I discuss successful marriage of traditional practices with modern tools to substantiate the theme of my presentation. I discuss the decrease in diversity of pollinators and subsequent deterioration of fruit quality and quantity in the mighty Himalayas due to the increased temperatures. A comprehensive study on fast growing hemp that needs less water, sequesters more carbon hence cleans air and soil as sustainable alternative for mitigating climate change. I explore modern tools like Nanomaterials which are an effective measure to maintain plant health. Nanoparticles applied as phytohormones and efficient pesticides successfully boost plant health, protect them from the pests and so provide sustainable alternatives to combat climate change and enhance overall agricultural, horticultural and hence environmental health. My studies are directly aligned with sustainable development goals: 2 (zero hunger); 3 (good health and wellbeing); 6 (clean water and sanitation); 12 (responsible consumption and production); 13 (climate action) and 15 (biodiversity).

Biography

Shweta Rana has over twenty-one years of experience in teaching and research in various academic institutes and universities of repute. Her areas of research interest are in the fields of Sustainable Food production, Environmental Health and Citizen Science. She has been associated with India's first Liberal Education University; FLAME University for the last 17 years where she has immensely contributed in developing academic programs, curricula, and teaching resources. She has initiated activities that resonate with the university's core value of Ecological Balance. She has Life time and Annual Memberships of prestigious scientific organisations. She has been awarded with the University's Best Researcher award for AY 2023-24. She has organised and participated in various Conferences, Global Summits, Symposia, and seminars.

Hossam E. Rushdi*[2], Tianliu Zhang[1], Tingting Wang[1], Yanhao Gao[1], Jiashun Sheng[1], Wentao Li[1], Yu Sun[1], Tong Fu[1], Feng Lin[1], Tengyun Gao[1], Shenhe Liu[1]

[1]College of Animal Science and Technology, Henan Agricultural University, Zhengzhou, China

[2]Department of Animal Production, Faculty of Agriculture, Cairo University, Egypt

Flavor, Lipid, and Transcriptomic Profiles of Chinese Wagyu Beef Cuts: Insights into Meat Quality Differences

This study aimed to investigate the flavor formation and meat quality differences among different beef cuts in Chinese Wagyu cattle. The metabolites and gene expression profiles of chuck, neck, rump, tenderloin, and longissimus lumborum cuts were analyzed. The results revealed that a total of 240 volatile organic compounds and 779 lipid molecules were detected among the beef cuts, with hydrocarbons (accounting for 29.71%) and triglycerides (representing 41.21%) emerging as the most prominent compounds, respectively. The sensory- directed analysis highlighted the significance of sweet and fruity aroma compounds, which contributed to the distinct aroma profiles among different beef cuts. Additionally, a total of 60 key lipid molecular markers, including FA(18:1), PC(40:5), TG(18:0_16:1_18:1), and TG(36:0_18:1), etc., were identified as playing crucial roles in the generation of essential lipid compounds across five different beef cuts. Integrative analysis of multi-omics data pinpointed a cluster of differentially expressed genes (e.g., DLD, ACADM, PCCA, SCD), which were involved in the regulation of valine, leucine, and isoleucine degradation pathways and lipid metabolism. Taken together, this study has identified key metabolites and candidate genes influencing meat quality across different beef cuts, providing a valuable resource for the molecular breeding of high-quality traits in beef cattle.

Biography

To be Added.

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ORAL SESSIONS 02

DAY 1

Anna Pick Kiong Ling*[1], Jun Hong Eng[1], Jia Xian Ong[1], Wui Zhuan Lim[1], Rhun Yian Koh[1], Sobri Hussein[2], Faiz Ahmad[2]

[1]Division of Applied Biomedical Science and Biotechnology, School of Health Sciences, IMU University, Malaysia

[2]Agrotechnology and Biosciences Division, Malaysian Nuclear Agency, Malaysia

Biochemical and Transcriptomic Insights into Drought Tolerance-Related Genes in Reproductive Stage Rice Mutants

Malaysia's rice production has been inadequate for local consumption and thus requires imported rice from other countries. The growing population and increased demand for rice render the rice food security progressively declining. Additionally, the recent global climate change has led to droughts which further exacerbate rice productivity. The local rice industry lacks the new quality rice varieties that are high-yielding yet drought-resistant. In this regard, the Malaysian Nuclear Agency has generated promising rice mutant lines, ML125-2 and ML82-2. Hence, this study aims to determine the drought resistance of ML125-2 and ML82-2 from the perspective of biochemical and transcriptomic profiles. For biochemical analysis, specific activity of peroxidase and proline content were measured under non-stress (NS) and drought stress (DS) conditions, while the transcriptomic analysis focused on determining differentially expressed genes (DEGs) at false discovery rate ≤ 0.1, $P < 0.05$ and $\log_2$ fold change ≥ ±1. Gene ontology (GO) enrichment analysis was performed on the DEGs for functional annotation based on the database of Kyoto Encyclopaedia of Genes and Genomes (KEGG). The results obtained were subjected to statistical analysis to identify significant differences at $P<0.05$. For ML125-2, it manifested insignificant changes in specific activity of peroxidase and proline content between NS and DS conditions. The results for transcriptomic analysis of DEGs revealed stress-related genes were upregulated in ML125-2 during the DS treatment. The GO enrichment analysis further identified enhanced photosynthetic activity from the aspects of biological processes, cellular components and molecular function. As for ML82-2, it presented reduced proline content while with highly elevated peroxidase activity. The transcriptomic profiles and GO enrichment results revealed that, compared with its parents, ML82-2 presented the greatest number of genes whose expression was upregulated in response to drought stress. The results of both ML125-2 and ML82-2 under the DS treatment support the notion of their potent drought resistance. However, further advanced studies on its drought resistance are required, including more indicative biochemical parameters and comparing DS-relevant DEG expression levels with the established ones.

Biography

Prof. Dr. Anna Ling has more than 19 years of teaching experience in various medical biotechnology modules. Besides teaching, she is also actively involved in research and has successfully supervised numerous undergraduate and postgraduate students. Her major fields of research include neuroscience and edible plant vaccines production. As a consequence of her work in plant biotechnology since 1996, she has also expanded her research in plant mutation breeding. Together with her research team from the Malaysian Nuclear Agency, the rice mutation breeding project was awarded the Outstanding Achievement Award in Plant Mutation Breeding by the International Atomic Agency (IAEA) and the Food and Agriculture Organisation (FAO) as well as the Forum for Nuclear Cooperation in Asia (FNCA) Excellent Research Team Award.

Gayeon Kim*[1,2], Jeongho Choi[3], Ryeo Jin Kim[3], Eunkyoo Oh[4], Seung YongShin[1], Hyun-Soon Kim[1,5], Hye Sun Cho[1,5], Mi Chung Suh[3],Hyo-Jun Lee[1,2,]

[1]Plant Systems Engineering Research Center, Korea Research Institute of Bioscience and Biotechnology,Republic of Korea

[2]Department of Functional Genomics, KRIBB School of Bioscience, University of Science and Technology, Republic of Korea

[3]Department of Life Science, Sogang University, Republic of Korea

[4]Department of Life Sciences, Korea University, Republic of Korea

[5]Department of Biosystems and Bioengineering, KRIBB School of Biotechnology, University of Science and Technology, Republic of Korea

Feronia Defines Intact Tissue Boundaries Through Cuticle Development

Upon wounding, damaged plant tissues initiate healing processes such as callus formation at the wound site. However, the signaling molecules and mechanisms that mediate callus formation in the wound-proximal region remain poorly understood. Here, we show that wounding-induced cuticle defects stimulate NADPH oxidase-dependent production of reactive oxygen species (ROS), which act as wound signals to trigger callus formation. The malectin-like receptor-like kinase FERONIA (FER) senses wound-induced pectin modification and promotes de novo cuticle formation in mesophyll cells adjacent to the wound. This newly formed cuticle acts as a barrier that limits ROS propagation, thereby confining callus formation to the wound-proximal region and preventing disorganized proliferation. In addition, ROS restriction enables the activation of programmed cell death in cells immediately adjacent to the wound. These findings provide further understanding in the molecular mechanisms underlying cuticle formation required during leaf expansion and the restriction of highly oxidative signals to the wound site for preserving the integrity of undamaged regions.

Biography

Gayeon Kim is a Ph.D. student in Bioscience at the KRIBB School, University of Science and Technology, Korea, affiliated with the Department of Functional Genomics. She earned her master's degree in agriculture from Chungbuk National University, where her thesis focused on the physiological effects of flowering in Platycodon grandiflorus. She also holds a bachelor's degree in agriculture from the same university. Her current research focuses on plant tissue regeneration, including wound-induced callus formation, cell wall remodeling, ROS signaling, and cuticle formation. She is also interested in optimizing photosynthesis in crops such as potato, tomato, and Arabidopsis thaliana. She has presented her work at national and international conferences and aims to advance understanding of plant regeneration mechanisms.

Thais Gleice Martins Braga
GECTAM Research Group, Federal Rural University of the Amazon – UFRA, Belém, Pará, Brazil

Amazon Women Seal: Recognizing, Valuing, and Transforming Through an Innovative Policy in Regional Bioeconomy and Social Innovation in Light of the COP30 Commitments

The Amazon region, one of the world's richest biodiversity reserves, faces structural challenges in achieving gender equity within its emerging bioeconomy. The 'Amazon Women Seal' (Selo Amazônia Mulher) is an innovative research-based policy initiative designed to recognize, certify, and promote women-led sustainable enterprises and community actions that contribute to local and regional economic transformation. Coordinated by the GECTAM Research Group and funded by the Pará State Research Support Foundation (FAPESPA), this pioneering initiative bridges scientific knowledge and traditional wisdom to address gender disparities in environmental entrepreneurship.

Structured as a multidimensional program, the seal integrates scientific indicators, social innovation mechanisms, and institutional partnerships to build a robust framework for recognizing women's contributions to biodiversity conservation, sustainable production systems, and climate action. With its strategic alignment to the State Bioeconomy Plan (PlanBio) and the thematic goals of COP30, the project has mapped and empowered hundreds of women across diverse Amazonian biogeographic regions. Activities include the development of a digital platform, community mobilization, knowledge transfer workshops, and the construction of a transparent certification protocol based on socio-environmental criteria.

This presentation will showcase the methodologies, achievements, and governance model adopted by the project. It will highlight measurable impacts on economic independence, social recognition, and political engagement of women in sustainable value chains. By advancing regional equity and innovation, the 'Amazon Women Seal' represents a replicable model for other biodiverse regions globally, offering pathways toward more inclusive, resilient, and climate-aligned development strategies.

Biography

Dr. Thais Gleice Martins Braga is an Environmental and Renewable Energy Engineer, with a master's in environmental sciences and a PhD in Biodiversity and Biotechnology. She is an Associate Professor at UFRA (Brazil), where she coordinates the GECTAM Research Group. With over a decade of experience in environmental governance, climate justice, and technological innovation on the Amazon, Dr. Braga has led projects at the interface of bioeconomy, gender equity, and traditional knowledge systems. She is the creator and principal investigator of the 'Amazon Women Seal' initiative.

Michael Kaase Aondoakaa
Chairman, Miva Rice, and Former Attorney General of the Federation & Minister of Justice, Federal Republic of Nigeria

Mitigating Food Insecurity in The Central Regions of Nigeria: Exploring Gender Inclusive Agro Innovative Solutions

The Central regions of Nigeria, widely regarded as Nigeria's food basket, is increasingly afflicted by natural resource-based conflicts that have critically disrupted agricultural production and food systems. Conflicts over land, water, and grazing rights have severely undermined food security and exacerbated social divisions between farmers and herders. Between 2020 and 2025, displacement in Benue, Nasarawa, and Plateau States surged from 303,844 to 1,302,443, disproportionately impacting women and children and resulting in economic losses estimated at $150–$200 billion (UNDP, 2024). These statistics and findings highlight the urgent need for effective conflict resolution mechanisms, sustainable natural resource management practices, and policies that address the root causes of these conflicts. This study examines the potential of gender-inclusive agro-innovations to mitigate the multifaceted food insecurity challenges in this conflict-affected region.
Utilizing a mixed-methods approach—including participatory rural appraisals, policy analysis, and semi-structured interviews with displaced farmers, women's cooperatives, and local agricultural stakeholders—the research underscores the pivotal yet underrecognized contributions of women and youth in fostering grassroots agricultural innovations. It evaluates scalable interventions such as mobile-based market access platforms, regenerative agricultural practices, gender-sensitive early warning systems, and conflict-resilient cooperative farming models. These strategies demonstrate significant potential to restore disrupted food value chains, enhance livelihoods, and rebuild communal cohesion. The paper contends that achieving sustainable food security in the Central Region of Nigeria necessitates a paradigmatic shift from traditional aid paradigms toward gender-sensitive, conflict-aware innovation ecosystems. Policy recommendations are proposed for government bodies, NGOs, and development partners committed to advancing inclusive and sustainable agricultural resilience in fragile food systems.

Biography

A distinguished Senior Advocate of Nigeria and former Attorney General of the Federation and Minister of Justice, Mr. Michael Kaase Aondoakaa, is a formidable force in Nigeria's legal and entrepreneurial landscape. Renowned as "Mr. Rule of Law," his profound influence spans both public service and private enterprise, marking him as a champion of justice, governance, and nation-building.
As Chairman of Mikap Nigeria Limited, producers of the acclaimed Miva Rice, he is a visionary agro-entrepreneur dedicated to fostering food security and economic empowerment. Through building sustainable food and economic value chains, he strives to uplift indigent communities in Central Nigeria and across the nation, creating lasting opportunities and improving

livelihoods.
Michael Kaase Aondoakaa's enduring dedication to the rule of law, coupled with his passion for social justice and community development, cements his role as a beacon of excellence and leadership in Africa.

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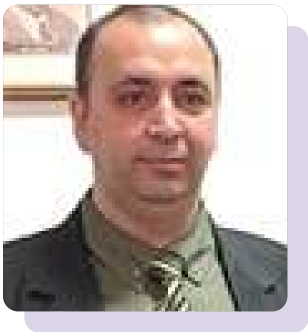
19-21 October 2025

POSTER SESSIONS | DAY 1



Marius Budeanu*, Emanuel Besliu, Ecaterina Nicoleta Apostol, Flaviu Popescu, Ioana Maria Pleșca
Department of Forest Genetics, National Institute for Research and Development in Forestry “Marin Drăcea”, Ilfov County, Romania

Phenotypic Variability and Climatic Resilience of Pinus Cembra in Provenance Trials of Romanian Carpathians

Swiss stone pine (Pinus cembra L.) may represent a viable option for afforestation at the upper altitudinal limit of forest ecosystems, due to the species’ adaptability to limiting climatic conditions. The goal is to replace vulnerable spruce monocultures (which are highly affected by windthrows) with mixed stands of spruce and Swiss stone pine.

This study aims to assess phenotypic variability, heritability, and juvenile–adult correlations in two common garden (comparative provenance trial) experiments established in distinct environmental conditions and in two separate branches of the Carpathians: the Cârlibaba trial (Eastern Carpathians) and the Cugir trial (Southern Carpathians). The objective is to inform forward selection strategies and determine the optimal age for selection. Twelve provenances were tested, seven from the Romanian Carpathians and five from the Alps (including one from France, one from Switzerland, and three from Austria). The trials were established in the autumn of 1997, using a 2.5 × 2.5 m planting design.

The strong influence of the testing site and the differing responses of the provenances highlight the need for caution when transferring forest reproductive material across regions. The low to moderate quantitative genetic differentiation (QST) among provenances suggests limited genetic diversity, supporting the recommendation to combine high-performing provenances identified in multiple studies for future afforestation programs. The average QST values for phenotypic traits (tree height and DBH) were approximately 50% lower than those for wood traits (ring width, earlywood, and latewood), indicating stronger genetic control over wood properties.

Among the tested provenances, Bluhnbach and Călimani (for the Southern Carpathians), Grächen–Wallis and Gemenele (for the Eastern Carpathians), along with Pietrele (highlighted in both trials and originating from the Southern Carpathians), emerged as promising candidates for forward selection.

In both trials, significant juvenile–adult correlations were observed for growth traits, suggesting that early selection could be effective, with age 17 identified as optimal for selection. Tree height was identified as the most critical trait for improvement, to enhance the competitiveness of this slow-growing species, particularly in the juvenile stage when facing competition from Norway spruce.

Notably, the Cârlibaba trial demonstrated superior resilience and resistance, as well as a strong recovery capacity across all provenances in both trials. However, the overall low resistance is observed, especially in the Cugir trials, in the context of climate change (Budeanu et al. 2025a, b).

Biography

Marius Budeanu, 45 years old, received his PhD in Forest Genetics from Transylvania University of Brasov, Romania, in 2012. His research interests include forest genetics, tree breeding, seed storage, and ecology, with over two decades of expertise. He coordinated 8 projects and collaborated on another 12 projects (Key person), disseminated in 71 publications (26 in WoS). Is an employee of the National Institute for Research and Development in Forestry (INCDS) "Marin Drăcea", member of the INCDS Scientific Council, president of the CACS Silvobiology commission, head of the seed testing laboratory and seed storage center, and former general manager of INCDCSZ.

Mohamed Abouleish*[1,2], Shaikha Alagroobi Alsuwaidi[1], Maha Almheiri[1]

[1]Department of Biology, Chemistry and Environmental Sciences, College of Arts and Sciences, American University of Sharjah, Sharjah, United Arab Emirates

[2]Sharjah Sustainable Agriculture (SSA), College of Arts and Sciences, American University of Sharjah, Sharjah, United Arab Emirates

Biological Function of the Ghaf Tree Assessed Metabolites

The Ghaf tree plays an important role in the environment as it improves soil fertility, stabilizes sand dunes, and promotes biodiversity. The Ghaf tree has several medicinal applications, such as anti-inflammatory, antioxidant, anticancer, antibacterial, and antifungal properties. Current research about the metabolic content of the Ghaf tree in the United Arab Emirates and the Middle East region is limited. Therefore, this research conducted a comprehensive assessment of the metabolites found in the different parts of the Ghaf tree and determined their biological function. This research reflected on the presence of 142 metabolites (out of which 37 metabolites were not reported before in the literature) with biological functions related to growth and development, protection from pathogens, drought tolerance, and odorant properties.

Biography

Mohamed Abouleish worked in the environmental industry at an instrumental company and taught chemistry and environmental science at several universities, including international universities. His areas of research and teaching interest are environmental protection and management; policies and regulations; water, wastewater, drinking water, and pharmaceutical water, solid waste and wastewater treatment; environmental trace analysis, environmental ethics, risk,social issues; and sustainability.

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ORAL SESSIONS 01 | DAY 2

Abdalrhaman M. Sal*[1,2], Nada M. Alattas[1], Abdulmoneem Alkhamees[1]

[1]National Research and Development Center for Sustainable Agriculture (Estidamah), Saudi Arabia

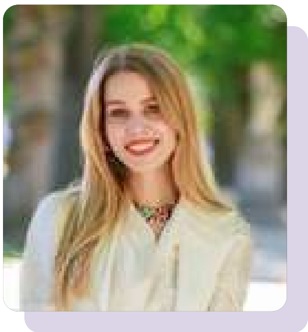
[2]Botany and Microbiology Department, College of Science, King Saud University, Saudi Arabia

Micropropagation of Elite Pomegranate (Punica granatum) Landrace in Saudi Arabia: Genetic Fidelity, Genome Size, and Biological Activity Evaluation

Pomegranate (*Punica granatum L.*), a small tree of the Punicaceae family, is native to Iran and widely distributed across northern India, China, the Middle East, and the Mediterranean. Traditionally, it is propagated via hardwood cuttings, a process that requires up to one year to establish new plants. Thus, alternative methods that accelerate propagation are crucial for conservation and large-scale production. In Saudi Arabia, particularly in the Al-Baha region, pomegranate cultivation plays a vital role in the local economy, yielding approximately 30,000 tons annually. Indigenous landraces such as Bidah are notable for their unique phytochemical composition and resilience to harsh environmental conditions, including salinity and drought traits that align with national priorities in sustainable agriculture and food security. This study presents the successful micropropagation of the Bidah pomegranate using both direct and indirect in vitro approaches. Genetic fidelity was assessed, genome size estimated, and biological activity of leaf fractions evaluated for potential anti-cancer properties. The in vitro propagation method offers significant advantages over conventional techniques, enabling efficient plant reproduction, genetic conservation, and mass production for diverse applications. Future directions include genetic enhancement through in vitro selection and CRISPR-Cas9 gene editing technologies.

Biography

To be Added.



Andrianna Martyniv
Founder and Managing Partner of MARTYNIV LAW FIRM and Invest UA: Western Cluster. Attorney-at-law Kyiv, Ukraine

Unlocking Ukraine's Agri Opportunities: From Soil to Digitalisation

Ukraine is no longer just a grain state. Our fields feed millions from Africa to Asia, but today we are transforming agriculture into an agri-food-tech economy. And this transformation is not only about Ukraine – it is about the future of global food security. Even under missile attacks, Ukrainian farmers keep harvesting. This resilience is the foundation for a sector that is ready to recover, modernise, and grow with international partners.

At the national level, three strategic priorities define Ukraine's agricultural recovery:

- Demining and post-demining activities,
- Irrigation and modernisation of water systems,
- Support for frontline regions (grants, concessional loans, matching grants).

For farmers, investors, and agriholdings, the agenda is much broader, but one element stands out: digitalisation. Ukraine demonstrates strength in state-driven digital transformation, with electronic services widely embraced by agricultural producers. The real challenge lies in integrating more advanced technologies, such as AI and enterprise systems, where costs, skills, and trust remain significant barriers to adoption. Yet even in this space, some of the most promising breakthroughs are already emerging, for example, in the use of AI for demining and land restoration.

- AI & Demining: AI is not only about detecting mines, but about rapidly identifying safe land that can be returned to agricultural use. Agricultural technologies themselves are becoming drivers of innovation in demining.
- Digital Services: The State Agrarian Registry integrates multiple services, from support programs to export facilitation, linked with other state systems. Legislatively established, it serves as a trusted source of high-quality enterprise data, encouraging compliance with European standards of quality and production transparency. By introducing unified rules for access to both state and international support, it ensures equal conditions for producers and strengthens accountability in the use of funds.
- E-trading & Land Auctions: Platforms such as Prozorro electronic auctions ensure transparency, compliance, and equal access for investors. The business community widely trusts them and has established them as a flagship of Ukraine's anti-corruption reforms.
- Land Monitoring: Digital tools now cover ownership, lease status, and productivity, providing reliable data for managing land banks, the sector's most valuable asset.
- E-government: From e-courts and e-documents to Diia, Ukraine's flagship app, where you can do

everything from filing taxes to booking mobilisation exemptions for your workers… and yes, even getting married or divorced, all from your smartphone. That's digital government at its boldest.

This digital environment is not incidental but supported by strong state policy, legal frameworks, and close cooperation with developers. In the UN E-Government Development Index, Ukraine ranked 5th globally in the Online Services Index 2024, earning recognition as a resilient and forward-looking digital leader.

War is devastating, it destroys assets, and far worse, it takes lives. But Ukraine stands resilient. This transformation opens concrete opportunities for investors, from digital tools and logistics to climate-smart irrigation systems. The choice is yours: to see Ukraine not only as a country in recovery, but as your partner in building the agri-food-tech future.

Biography

Founder and Managing Partner of Martyniv Law and Invest UA: Western Cluster. Attorney-at-law with 13 years of experience, I focus on bridging business, policy, and international partnerships to strengthen Ukraine's agribusiness and unlock its potential.

My practice covers land acquisitions exceeding 20,000 hectares, advising investors, exporters, and agroholdings, and 10 years as legal advisor to the largest Ukrainian association of medium-sized agricultural producers.

As a member of the CEPS Task Force on Ukraine's Agricultural Recovery in Brussels and by providing legal support to the EU's Ukraine Facility Audit Board, I contribute to Ukraine's recovery and integration into the EU and global economy.

Committed to pro bono projects for veterans and women's leadership. Master's in law and business, Bucerius Law School, Hamburg. Based in Kyiv, working globally.

Paulo Peres de Sá Peixoto Junior*[2], Luis Gustavo Lima Nascimento[1,2], Raiane Rodrigues da Silva[1], Davide Odelli [1], Amandine Descamps[2], Xavier Trivelli [3], Federico Casanova[4], Rodolphe Marie[4], Evandro Martins[1], Antônio Fernandes de Carvalho[1], Guillaume Delaplace[2]

[1]Departamento de Tecnologia de Alimentos, Universidade Federal de Viçosa (UFV), Minas Gerais, Brazil

[2]Lille, CNRS, INRAE, Centrale Lille, UMET - Unité Matériaux et Transformations, Équipe Processus aux Interfaces et Hygiène des Matériaux (PIHM), France

[3]Université de Lille, CNRS, INRA, Centrale Lille, ENSCL, Univ. Artois, IMEC - Institut Michel-Eugène Chevreul, France

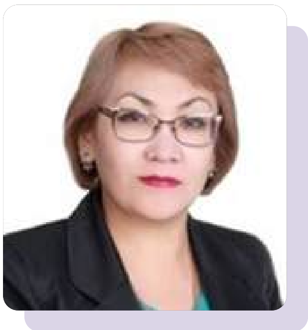
[4]Food Production Engineering, DTU Food, Technical University of Denmark, Denmark

Relationship Between Nanostructure and Techno-Functional Properties of Milk and Alternative Protein Hydrogels and Powders

For less than 30 years, the industry has increasingly invested in alternative proteins like plant-based and insect proteins, with markets projected for double-digit annual growth (Lurie-Luke, 2024). These proteins, particularly insect-based, are produced rapidly, using fewer resources and emitting less CO2 than vertebrate proteins. Plant proteins require 2–3 times fewer resources (Pimentel & Pimentel, 2003), while insect proteins use 5–10 times less (van Huis et al., 2013). Insect proteins' minimal land use via vertical farming is strategic for countries like France with limited arable land. However, scaling production faces challenges, as seen in Ynsect's financial difficulties with its Amiénois Yfarm facility. Issues in production, storage, and transport in an immature industry, combined with technical manufacturing hurdles, create universal obstacles. Although insect proteins resemble vertebrate muscle proteins (Queiroz et al., 2023), their extraction is complicated by nano-structuring and unwanted molecules like lipids and chitin. Extraction and purification, as with plant proteins, can denature proteins, impacting solubility, stability, and rigidity (Nascimento et al., 2023). Mastering nano-structuring of alternative protein dispersions, gels, and powders is critical, requiring tailored cultivation, extraction, and processing, though nano-structuring data remains scarce. Extensive research on cultivation and protocols, especially for insect proteins, has been published in top food science journals (Lurie-Luke, 2024) by institutions like Wageningen, Penn, UC Davis, Copenhagen, Nanyang, Illinois, Cornell, Waterloo, and Florida, with growing scientific interest (Queiroz et al., 2023; Lisboa et al., 2024). Proposed strategies include lactic enzymes to improve digestibility (Kim et al., 2024), ultrasound to solubilize aggregates (Nascimento et al., 2023), and blending with milk proteins to enhance rheological and organoleptic properties (Queiroz et al., 2023). However, findings often rely on intuitive or speculative cause-effect relationships based on chemical or micrometric data, leading to repeatability and scalability issues. Variations in culture composition cause inconsistent extraction properties, and scaling from lab to industrial levels complicates parameter consistency. Mechanistic insights into structural factors like density, porosity, and network branching provide clearer cause-effect relationships, enabling rational adjustments. Relying solely on functional correlations without quantitative mechanistic understanding is inefficient. To address this, we studied these complex systems using advanced techniques like TEM-TOMOCA and high-resolution NMR, rarely used in food science (Kefauver et al., 2024; Kretsch et al., 2025). These methods are so advanced that their use alone warrants publication in top journals in 2025. Combining techniques like SAXS, NMR, and TEM-TOMOCA is rare, even outside food science. We focused on effective treatments, such as milk and alternative protein blends (Nascimento et al., 2023), and proposed new parameters and treatments to elucidate mechanistic links between processing and properties, enhancing understanding and industrial applicability.

Biography

Dr. De Sa Peixoto, Studied Biophysics and Chemistry in Sorbonne University, Paris, and graduated in 2007. He joined the Laboratory of Chemistry of the Dense Matter in Paris and received PhD degree in 2010. After three years of postdoctoral fellowship, he obtained the position of Researcher in the Laboratory of Material and Transformations, affiliated to Lille university. He has published more than 33 articles in the best journals of the field (70% with an IF >5 and 30% with an IF>8). He is the inventor of two patents.



Dani Sarsekova*[1], Akmaral Perzadayeva[2]

[1]Doctor of Agricultural Sciences, Professor, Dean of the Faculty of Forestry and Land Resources, Kazakh National Agrarian Research University, Almaty, Kazakhstan

[2]Candidate of Technical Sciences, Associate Professor, "Ecology" Department, S.Seifullin Kazakh Agrotechnical Research University, Astana, Kazakhstan

Integrated Monitoring of Agricultural Lands of KazgerLLC

A forest taxation assessment of field protective plantings was carried out on the farmland of Kazger LLP together with a reconnaissance survey of the terrain, combining field research and GIS remote sensing technology. Geodetic and topographical survey was carried out to determine the lowest levels of the terrain, identifying the areas of optimal accumulation of drainage melt water, with a view to their further use for irrigating fields. Digital terrain models (DTM) were constructed, after which 3 potential storage ponds for drainage melt water were identified. Agrochemical studies of soils were carried out to a depth of 120 cm for the content of nitrate nitrogen, mobile phosphorus, exchangeable potassium, humus, pH and soil salinity. In all studied samples, low and very low content of nitrate nitrogen was recorded (0.4-9.4 mg/kg). In the upper soil layers (0-20 cm), the P2O5 content was average (16.3-24.6 mg/kg); in the lower soil horizons, however, a sharp decrease in the concentration of available phosphorus was detected. Agrochemical studies exhibited high and very high content of exchangeable potassium (>400 mg/kg) in the upper soil horizons. As the soil profile decreases, a gradual decrease in the content of exchangeable potassium was detected. The research results showed very low (<2%) and low (<4%) humus content in farmland soils. The pH values of soil samples ranged from slightly alkaline (pH 8.2) to alkaline (pH 9.6). It was revealed that the soils of the studied areas were non-saline.

A chemical analysis of drainage melt water was carried out to determine the oxygen conditions, organoleptic indicators, water mineralization, content of biogenic substances, heavy metals and toxicants. According to organoleptic indicators, total mineralization, total hardness, pH of the environment, content ofSO_4^{2-},NO_3^-, Cl^-, CO_3^{2-}, Ca^{2+}, Mg^{2+},∑Na+K, Pb^{2+}, Sr^{2+}, As_{total} all tested samples correspond to class 1 water quality, i.e. water from reservoirs of «very good quality». AccordingtotheCOD$_{dichr}$andBOD$_5$ indicators, all water bodies are characterized as «highly polluted», which corresponds to pollution class 5. TheCOD$_{dichr}$, BOD$_5$ indicators indicate severe pollution of water bodies with organic substances.Pollution of all water bodies with ions is observed: HCO_3^-, P_{total}, Al^{3+}, Zn^{2+}, Hg_{total}, ∑Fe^{2+}, Fe^{3+}. The most polluted is reservoir№ 1. For the contour-strip organization of agricultural lands using the Potapenko-Lukin-Zverev method in combination with technologies for accumulating drainage melt water, recommendations are given on the species composition of mixed, drought-resistant, salt-tolerant forest crops.

Biography

Professor Sarsekova Dani is the dean of the Faculty of Forestry and Land Resources at the Kazakh National Agrarian Research University (Almaty, Republic of Kazakhstan). She is a Doctor of Agricultural Sciences and a professor in forestry. Area of scientific research: forest plantations, renewable energy sources, carbon sequestration by forest plantations, mycorrhization of woody plant seedlings, and agroforestry.

Author of more than 250 publications, with an H-index of 5. She is also a scholarship holder of the “Bolashak” International Program and holder of the title “Best University Teacher” of the Ministry of Education and Science of the Republic of Kazakhstan (2013).

Md. Ekramul Hoque*, Chhanda Sarker, Mokaram Hanifa Koly, Tipu Sultan, Md. Ershed Ali

Department of Biotechnology, Sher-e-Bangla Agricultural University, Bangladesh

Innovation of a New Plant Tissue Culture Medium Without Utilizing Explosive Chemical Ammonium Nitrate (NH4 NO3)

The growth and development of explants is governed by the composition of culture medium. Ammonium nitrate (NH4NO3) as a major salt of stock solution-1 for the preparation of Murashige and Skoog (1962) medium. But it has several demerits on human civilization. It is used for the preparation of bombs and other destructive activities. A new chemical was identified as a substitute of ammonium nitrates. The concentrations of the other ingredients of major and minor salt were also modified from the MS medium (1962). The formulation of new medium is totally different from the MS (1962) nutrient composition. The MS (1962) medium was used as first check treatment and MS powder (Duchefa Biocheme, The Netherland) was used as second check treatment. The experiments were carried out at the Department of Biotechnology, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh. Two potato varieties, viz. Diamant and Asterix were used as experimental materials. The regeneration potentiality of potato onto new medium was best as compared with the two check treatments. The traits like-regeneration percentage, node number, leaf number, shoot length, root lengths were highest in new medium. The plantlets were healthy, robust and strong as compared to plantlets regenerated from check treatments-1. The regeneration and plantlet production potential of the new medium was validated with two other crops viz. sweet potato and Aloe vera. The new medium showed excellent performance in respect of all trials under studied. Hence, the innovation of the new medium can be utilized for regeneration and large-scale plantlet production of any other crop.

Biography

Md. Ekramul Hoque is a Professor of the Department of Biotechnology, Sher-E-Bangla Agricultural University, Dhaka.He completed his Ph.D in Molecular Genetics from Indian Agricultural Research Institute (IARI), New Delhi, India. He done Post-Doctoral Research from International Centre for Genetic Engineering & Biotechnology (ICGEB), New Delhi, India. He awarded Young Scientist Gold Medal from “Bangladesh Academy of Sciences”. He is a Co-Author of the Book “An Introduction to Plant Tissue Culture”. He innovated a new “Plant Tissue Culture Medium”. He has more than 32 years of research and teaching experience in the field of Tissue Culture and Biotechnology. He has 70 scientific papers published in different national and international Journal. At present he is working as a Consultant (Tissue Culture), Tissue Culture Laboratory cum Horticulture Centre Establishment and Development Project, Department of Agricultural Extension (DAE), Ministry of Agriculture, The People Republic of Bangladesh.

Wejden Brahmi*[1], Donatella Danzi[2], Michela Janni[3], Riadh Ilahy[1], Domenico Pignone[2], Ali Ltifi[1]

[1]Laboratory of Biotechnology Applied to Agriculture, National Institute of Agronomic Research of Tunisia (INRAT), University of Carthage, Tunisia

[2]Institute of Bioscience and Bioresources (IBBR), National Research Council (CNR), Italy

[3]Institute of Materials for Electronics and Magnetism (IMEM), National Research Council (CNR), Italy

High Throughput Phenotyping and Biochemical Tools: Promising Doubled Haploid Lines Tolerant to Water Stress

This study evaluated the agronomic characteristics and phytochemical composition of two double haploid barley lines (DH1, DH2) and their respective parents (P1 = Ardhaoui, P2 = Roho), under conditions of optimum moisture (100% field capacity) and water stress (50% field capacity), using a high-throughput imaging platform. Growth traits were significantly reduced under the applied water stress. The DH lines showed greater plant length (40.25 mm, 43.75 mm for DH1, DH2) and higher seed yield (NSS = 47.25, 48.25) compared with the parents. DH1 had the highest number of fertile tillers (NFT = 7). Under stress, proline (1.4 g kg^{-1} FW in DH1) and sugars (4.1 g kg^{-1} FW in DH2) increased, while DH lines showed high potassium concentrations as well as increased chlorophyll and protein levels under both treatments. This suggests that DH lines might efficiently cope with water stress. Non-destructive 3D High Throughput Phenotyping confirmed the superior performance and drought tolerance in DH lines. The superior performance of DH1 and DH2 under water stress conditions underscores their suitability for cultivation in drought-prone environments and their potential use in future breeding programs targeting climate resilience.

Biography

I am an agricultural engineer and currently a PhD candidate in Plant Production at the National Institute of Agricultural Research of Tunisia (INRAT). My research focuses on the selection of drought-tolerant barley and wheat lines using doubled haploid technology and high-throughput phenotyping tools. I am particularly interested in integrating field-based phenotyping platforms and data-driven approaches to improve genetic gains under water-limited conditions. With a strong background in crop physiology and breeding, I aim to contribute to the development of resilient cereal varieties adapted to Mediterranean environments and future climate scenarios.

Efraín Rodríguez Jiménez

Research Center on Protein Plants and Bio Natural Products (CIPB), Cuba

Cultivation of Moringa Oleifera as a Source of High Nutritional Value Foods

Moringa oleifera is a plant native to India, known for its balanced nutritional value and for its broad action in Ayurvedic medicine. It is considered a super-food that contains more than 90 important nutrients with synergistic effects and high bioavailability. Its leaves are rich in high-quality proteins with all the essential amino acids, and are also a source of fiber, vitamins, minerals, folic acid, polyphenols and antioxidants, with a high specific content of substances of interest such as quercetin. The polyphenols and flavonoids in the leaves have antioxidant activity and lipid peroxidation inhibition that protects them from oxidative damage. They also show anti-inflammatory activity and a lipid-lowering effect. Isoquercetin was identified as the active ingredient responsible for the biological effects manifested by the leaves of the plant, which provides a basis for considering this plant as a source of foods with high nutritional value. Moringa agrotechnology was established to maintain the level of active metabolites in the leaves and conditions that enable their adaptation with microbiological quality for human consumption. Products were made from fresh or dried Moringa leaves that demonstrate their use as a nutritional fortifier in foods while providing functional value due to their biological effects.

Biography

Dr Rodríguez-Jiménez studied at the Institute of Chemical Machinery Construction, Moscow and graduated as MS in 1986. Since 1987 started working at CIGB, Cuba in research projects related to industrial biotechnology. He received in 1998 a speciality in Biotechnology at the Hiroshima Agricultural University, Japan. In 2005 he defended the PhD in Biology, at Havana University. From 2012 he moved working at Inhem, Cuba, as Head of the GMF Laboratory. Since 2019 he is working as Research Director of Moringa Project, CIPB, Cuba. He is the author of several international patents and more than 60 research articles.

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KEYNOTE SESSIONS 02

DAY 2

Minshad Ansari

CEO and Founder of Bionema Group, United Kingdom

Biofilms: A Next-Generation Solution for Sustainable Agriculture

Modern agriculture faces the dual challenge of increasing food production while reducing environmental impact. Though essential for yield gains, synthetic fertilisers contribute significantly to soil degradation, greenhouse gas emissions, and declining soil biodiversity. As policymakers target a 20–30% reduction in fertiliser use by 2030, the need for scalable, biological alternatives has never been greater.
Microbial biofilm structured communities of beneficial microorganisms embedded in an extracellular matrix—offer a next-generation, nature-based solution to enhance plant and soil health. Unlike free-living microbes, biofilms provide a stable microenvironment that enables synergistic action among microbial species, improving nutrient delivery and stress tolerance.
Key mechanisms by which microbial biofilms support sustainable agriculture include:
Nitrogen fixation and phosphorus solubilisation, reducing reliance on synthetic inputs
Potash and micronutrient mobilisation for improved nutrient availability
Production of plant growth-promoting hormones (e.g., auxins, gibberellins) enhancing root architecture and nutrient uptake
Soil aggregation and organic carbon enhancement, leading to improved structure, moisture retention, and microbial diversity
Field trials conducted by Bionema Group, with support from Innovate UK and DEFRA, demonstrate that biofilm-based biofertilisers can:
Reduce synthetic fertiliser use by up to 50%
Increase crop yields by 20–30%
Restore long-term soil fertility and ecosystem function
This presentation will explore biofilm formulation strategies, microbial interactions, field performance, and commercial pathways. As agriculture transitions toward climate- smart practices, microbial biofilms represent a powerful tool to regenerate soils, reduce inputs, and secure resilient food systems globally.

Biography

Dr. Minshad Ansari is a globally recognised innovator and the CEO & Founder of Bionema Group, a UK-based biotech company pioneering biological solutions for sustainable crop protection and plant health management. With over 25 years of expertise, published 100s research and trade articles on biopesticides, biostimulants, and biofertilizers, Dr. Ansari has developed technologies that reduce synthetic pesticide and fertiliser inputs, restore soil health, and enhance global food security. He is also the Founder of the World BioProtection Forum (WBF), an international platform that bridges the gap between academia and industry to accelerate innovation and commercialisation of biological solutions. He received the prestigious UK King's Award for Enterprise in Innovation (2024) for his contributions. Dr. Ansari is a respected scientific leader and entrepreneur committed to advancing nature-based alternatives for resilient, climate-smart agriculture worldwide.

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ORAL SESSIONS 02

DAY 2

Zhiyong Li
State Key Lab of Rice Biology, China National Rice Research Institute, China

Sugar-Inducible Rice NAC Transcription Factors Regulates Carbon Partitioning and Grain Yield

Tre6P (trehalose-6-phosphate) senses carbon availability to maintain sugar homeostasis in plants, which underpins crop yield and resilience. However, how Tre6P responds to fluctuations in sugar levels and utilizes sugars for growth remains to be addressed. Here, we report that the sugar-inducible rice transcription factor OsNAC23 directly represses the transcription of the Tre6P phosphatase gene *TPP1* to simultaneously elevate Tre6P and repress trehalose levels, thus facilitating carbon partitioning from source to sink organs. Meanwhile, OsNAC23 and Tre6P suppress the transcription and enzyme activity of SnRK1a, a low-carbon sensor and antagonist of OsNAC23, to prevent the SnRK1a-mediated phosphorylation and degradation of OsNAC23. Thus, OsNAC23-Tre6P-SnRK1a forms a feed-forward loop to sense sugar and maintain sugar homeostasis by transporting sugars to sink organs. Importantly, plants over-expressing *OsNAC23* (to optimize the source-sink interaction) showed an elevated photosynthetic rate, sugar transport, and sink organ size, which consistently increased rice yields by 13-17% in multiple elite variety backgrounds, locations, and years, showing great potential for the genetic improvement of crops. These findings enhance our understanding of Tre6P-mediated sugar signaling and homeostasis and provide a new strategy for the genetic improvement of crops.

Biography

Associate Professor of China National Rice Research Institute, Associate Editor of*Plant Signaling&Behavior* (Q2) and *Frontiers in Plant Science (Q1)*. Youth Committee Member of the National Society of Agricultural Biochemistry and Molecular Biology.

Michael Handford*, Diego Villalón, Paulo Retamales, Ligia Campos, María Paz Covarrubias, Felipe Uribe

Department of Biology, Faculty of Sciences, Universidad de Chile, Santiago, Chile

Unravelling the Interplay Between Ripening, Senescence and Lipoylation in Plants

Reactive oxygen species (ROS) are generated as by-products of fundamental metabolic processes such as photosynthesis and cellular respiration, and their accumulation increases underabioticstressconditionsandduringleafsenescence.Lipoicacid(LA)isamultifunctional antioxidantthatneutralizesROS,regeneratesotherantioxidants,andactsasacofactorofkey enzymes in energy metabolism. On the other hand, ethylene is a phytohormone that regulates processes such as senescence and fruit ripening. Both molecules share S- adenosylmethionine (SAM) as a biosynthetic precursor, suggesting a potential competition for this metabolite and a cross-regulation between their metabolic pathways.

We investigated the interaction between the biosynthetic pathways of LA and ethylene Unravelling the Interplay Between Ripening, Senescence and Lipoylation in Plants, and the use of inhibitors of ethylene biosynthesis (aminoethoxyvinylglycine, AVG) and perception (1-methylcyclo propene, 1-MCP) in MicroTom tomato (*Solanum lycopersicum*) plants.

LA application promoted the expression of antioxidant and ethylene-related genes, enhancing antioxidant capacity and ethylene production in senescent leaves and ripening fruits. Transgenic lines also exhibited transcriptional induction, although without significant increases in antioxidant capacity. On the other hand, inhibition of ethylene biosynthesis by AVG led to an increase in lipoylated proteins, an effect not observed with 1-MCP. This supports the hypothesis that ethylene biosynthesis, rather than perception, modulates this metabolic competition. These findings open new perspectives for the development of biotechnological strategies aimed at optimizing key processes such as fruit ripening and leaf senescence through the coordinated manipulation of LA and ethylene metabolism.

Biography

Michael Handford is a Full Professor in the Biology Department of the Faculty of Sciences in the Universidad de Chile. Since completing his PhD and postdoctoral fellowships in the University of Cambridge, he has focused his research on various aspects of plant metabolism, such as cell wall synthesis, and more recently on the metabolic changes that plants undergo in order to withstand abiotic stress conditions, including antioxidants and sugar alcohol metabolism. He also carries out multiple teaching (undergraduate and postgraduate) and administrative commitments in the University, and in Chilean organizations.

Jie Huang*[1], Ze-Yu Qiu[1], Jun He[1], Hao-Sen Xu[1], Kan Wang[1], Hua-Ying Du[1], Dong Gao[1], Wei-Ning Zhao[1], Quan-Guang Sun[1], Yong-Sheng Wang[1], Pei-Zheng Wen[1], Qi Li[1], Xiao-Ou Dong[1], Xian-Zhi Xie[3], Ling Jiang[1], Haiyang Wang[2], Yu-Qiang Liu[1], Jian-Min Wan[1,2]

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[2]National Key Facility for Crop Gene Resources and Genetic Improvement, Institute of Crop Science, Chinese Academy of Agricultural Sciences, China

[3]Shandong Rice Research Institute, Shandong Academy of Agricultural Sciences, China

OsphyB Mediates Dim-light Reduced insect Resistance by Promoting Ethylene Biosynthesis and Signaling in Rice

Increasing planting density is one of the most effective ways to improve crop yield. However, one major factor that limits crop plant density is the weakened immunity of plants to pathogens and insects caused by dim light (DL) under shade conditions. The molecular mechanism underlying how DL compromises plant immunity remains unclear. Here, we report that DL reduces rice resistance against brown planthopper (BPH) by elevating ethylene (ET) biosynthesis and signaling in an *OsPHYB*-dependent manner. The DL-reduced BPH resistance is relieved in *osphyB*mutants but aggravated in *OsPHYB* overexpressing plants. Further, we found that DL reduces the nuclear accumulation of OsphyB, thus alleviating the degradation of OsPIL14,consequently leading to the up-regulation of *OsACO1* and an increase in ET level. In addition, we found that nuclear OsphyB stabilizes OsEIL2 by competitively interacting with OsEBF1 to enhance ET signaling in rice, which contrasts with previous findings that phyB blocks ET signaling by facilitating the degradation of EIN3 in other plant species. Thus, enhanced ET biosynthesis and signaling reduces the BPH resistance under DL conditions. Our findings provide new insights into the molecular mechanism of light regulating ET pathway and host-insect interactions and potential strategies for sustainable insect management.

What will audience learn from your presentation?

(Try to list 3-5 specific items)

- Why are crops susceptible to pests and diseases under shade conditions?
- How does light affect brown planthopper resistance in rice?
- How does phyB affect rice brown planthopper resistance by regulating ethylene synthesis and ethylene signaling
- The audience will learn how to identify rice resistance to brown planthopper under the influence of environmental factors.

Biography

Dr. Jie Huang studied Horticulture at the Shenyang Agricultural University, Shenyang China and graduated as MS in 2013. He then joined the research group of Prof. Jianmin Wan at the Institute of State Key Laboratory of Crop Genetics and Germplasm Enhancement, Province and Ministry Co-sponsored Collaborative Innovation Center for Modern Crop Production, Nanjing Agricultural University, Nanjing, China. He received his PhD degree in 2022 at the same institution. He then joined Zhang Jianresearch team at the China National Rice Research Institute as an assistant researcher.He has published more than 70 research articles in SCI(E) journals.

Neamt Radu*[1], Dragomir Neculai[1], Neciu Florin[1], Saplacan Gheorghe[1], Mihali Ciprian[1], Mizeranschi Alexandru[1], Anton Andreea[1], Cziszter Ludovic[1,2]

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[2]Department of Animal Production Engineering, University of Life Sciences "King Michael of Romania" fromTimisoara, Romania

Research Regarding the Carbon Balance in Agricultural Farms

The aim of this study was to assess the carbon balance in an agricultural farm, with the aim of establishing the share of returned carbon to the atmosphere. Often accused of being responsible for pollution, agriculture was placed in second place with a weight of 24-30% of total carbon emissions. However, agricultural activity by its specificity has the ability to capture a large part of the carbon produced (both directly and indirectly), compared to other domains such as transport, construction or the energy sector (based on fossil consumables) which do not have this capacity, the entire amount of carbon generated being eliminated in the atmosphere.

In this respect, 9 fodder crops were investigated, which constitute the fodder base for an average herd of 800 Simmental dairy cows. The amounts of raw carbon fixed by photosynthesis above and below ground, the amounts of raw carbon eliminated in the atmosphere by the physiological processes of plants, as well as the net amounts of carbon fixed by plants were evaluated.

The average proportion of net carbon fixed by plants was 75.6% (19460 kg CO2 eq/ha), only 24.4% (6306 kg CO2 eq/ha) of the total amount of carbon was removed as a carbon footprint. Of the total of 75.6% of net fixed carbon, 37% (7200 kg CO2 eq/ha) was fixed underground, without a determining role in establishing the carbon footprint. The study highlighted that the straw plants release into the atmosphere between 13.7% (3455 kg CO2 eq/ha) for the wheat crop and 21% (4531 kg CO2 eq/ha) for the barley crop of the total fixed raw carbon. By comparison, the corn crop, according to its destination, released 19% (2236 kg CO2 eq/ha) for the grain crop and 21.6% (2404 kg CO2 eq/ha) for the silage crop. Alfalfa release 26% (13015 kg CO2 eq/ha) of the total carbon, but it should be mentioned that due to the developed root system 65% (8459 kg CO2 eq/ha) of the total carbon is fixed above ground and therefore immobilized. Perennial grass removes the largest share of carbon, 28% (10464 kg CO2 eq/ha), a fact for which the reduction of this percentage can be done through mixed cultivation with alfalfa. The studies highlighted a significant reduction ($p \leq 0.05$) in terms of the amount of carbon eliminated up to the threshold of 23% (9940 kg CO2 eq/ha).

The amount of net sequestered C in the soil exerts a significant role on the efficiency of the farm's

activity, given that each ton of sequestered carbon represents a carbon credit, at a current average price of 65 euros/credit.

In conclusion, agriculture allows the release into the atmosphere of an average percentage of 24% of the total amount of associated carbon, a condition in which it cannot be considered a real threat compared to domains such as transport or construction or some branches of industry.

Biography

Graduate of the University of Life Sciences from Timisoara, Romania, specialized in Animal Rearing since 2001, with 24 years of experience in the field of agricultural research, actually senior researcher. I have participated, as director or member of research teams in numerous projects aimed animal welfare, nutrition, genetic improvement, genomics, and improvement of the feeding ratio, environmental and agro-zootechnical resources protection. Currently, as a project director, I am studying the possibilities of reducing the carbon footprint of the specific activity in mixed, agricultural and animal farms.

Yu Cheng
State Key Laboratory of Rice Biology and Breeding, China National Rice Research Institute, Hangzhou, Zhejiang, China

Gossypium Purpurascens Genome Provides Insight into the Origin and Domestication of Upland Cotton

The wild race of allotetraploid upland cotton (*Gossypium hirsutum* L.), native to Central America, was domesticated in the southern United States and spread worldwide and widely cultivated after the mid-18th century. However, as early as 3,000 years ago, the Li ancestors on Hainan Island had already begun spinning cotton fibers for weaving. A unique Hainan Island native cotton (HIC) was likely used in the long textile history of Hainan Island. However, the HIC's origin and the evolutionary relationship between HIC and American cottons are still unclear. Here, one HIC plant (named as HPF17) collected in Sanya (anciently known as Yazhou), Hainan province, was used as the material to *de novo* assemble a high-quality genome. Using the *Gossypium* genomes and resequencing data, comparative genomic and phylogenetic analyses revealed that the HIC belongs to *G. purpurascens*, and *G. purpurascens* is best classified as one of the most ancestral races of *G. hirsutum*, second only to *G. hirsutum* race *yucatanense*. It was inferred that *purpurascens* probably dispersed to Hainan by floating on ocean currents based on its high saltwater tolerance and the highly consistent distribution of Pacific currents with the geographic range of wild tetraploid cottons on the Pacific islands. Divergence time estimation also indicated that *purpurascens* differentiated from American upland cottons ~200,000 years ago. Considering together with historical materials, *G.hirsutum* race *purpurascens* may have been partly domesticated, planted successfully in small cultivations on Hainan Island much earlier than the Pre-Columbian period, and was likely used for "Yazhou cloth" weaving. Thus, modern upland cotton may stem from diverse origins and different domestication events, and China may be one of the earliest countries to domesticate and cultivate tetraploid cotton. This study also identified 69 QTLs associated with 11 yield and fiber quality traits, 2,489 domestication regions between wild races and cultivated varieties (lines) of upland cotton. They are the main loci for domestication and improvement of upland cotton. Through whole-genome comparison of 12 cotton genomes, 47,774,023 short variations and 805,397 structural variations (SVs) covering 2.93 Gbp of genome sequences were detected. Among all types of SV, the coverage rate of domestication region within inversions reached 55.5%, which was much higher (by >31.0%) than that of other types of SV. Haplotyping and association analysis revealed that eight large-scale inversions (lengths ranging from 4.9 to 32.4 Mbp) have experienced artificial selection in the early stage of upland cotton domestication and improvement, and are significantly associated with "domestication syndrome"-related agronomic traits such as lint percentage. These

results indicated that SV, especially inversion, plays an important role in the domestication and improvement of upland cotton.

Biography

Dr. Yu Cheng is an Associate Researcher at the State Key Laboratory of Rice Biology and Breeding, China National Rice Research Institute in Hangzhou, China. He earned his Ph.D. in Agriculture from Zhejiang University and holds a B.Sc. in Agriculture from Zhejiang University. His research expertise spans plant genomics and molecular biology, with a current focus on comparative genomics and population genomics of rice for understanding its evolutionary and domestication history and identifying functional genes.

Michelle M. Cortez
De La Salle University, Manila, Philippines
Bulacan Agricultural State College, Bulacan, Philippines

Forecasting and Pattern Analysis of Philippine Regions Palay and Corn Production

Inadequate food production has been an immediate concern that the country is trying to address, where farmers use fertilizers in their farms to increase their agricultural production. However, if fertilizer application is poorly managed, it will result in the opposite instead of increasing production. Therefore, the efficient use of fertilizer is critical and dramatically impacts crop production. Thus, this study aims to show the Philippines' crop production pattern, specifically in rainfed and irrigated palay, white, and yellow corn. Moreover, this also indicates which fertilizer will maximize crop production and seek the most applicable model for forecasting future crop production. Three predictive techniques were used: canopy clustering, Apriori association rule mining, and time series forecasting models. Results reveal that all regions produce a low volume of rainfed rice. The canopy clustering shows the pattern leading to Region III's high production of irrigated rice. Also, Region II, Region X, and Region XII have a high volume of yellow corn production. Lastly, clustering results on white corn show Region VII has a Mid area harvested but shows a low production volume. In contrast, Region X has a low area harvested and managed to have a Mid-production volume. The association of fertilizers to the volume of production shows that low Ammophos leads to a lower volume of production, and low Ammosul is not associated with a low volume of production; hence, a combination of low Ammosul and low Ammophos leads to a low volume of production. The forecasting methods' linear regression, Gaussian processes, and SMOreg are all applicable in predicting the regions' production volume, whereas the SMOreg has the least MAE of 8.90% for Region VI.

Biography

A dedicated IT professional who gives her students with high-quality, adaptive and innovative teaching and learning experiences. She is also a researcher and extensionist involved in various projects aimed at supporting Bulacan Agricultural State College (BASC) and the surrounding community. Currently, she serves as a full-time IT professor at BASC and is the Dean of the Institute of Computer Studies.

Do Mai Nguyen*, Nguyen Van Hop, Nguyen Le My Linh, Vo Chau Ngoc Anh, Tran Thanh Tam Toan

Chemistry Department, University of Sciences, Hue University, Hue City, Viet Nam

Valorization of Agricultural Biomass: A Novel Electrochemical Sensing Platform Based on Rice Straw-Derived Carbon Dots for Food Safety Assurance

A significant global challenge is presented by the accumulation of agricultural byproducts, demanding innovative strategies for their valorization within a circular bioeconomy. This investigation is centered on the transformation of rice straw, a pervasive lignocellulosic waste, into a high-performance nanomaterial for advanced applications. A novel electrochemical sensor was developed using a composite of iron oxide (Fe_2O_3) and rice straw-based carbon dots (RSCD) for the simultaneous detection of dopamine (DPM) and the banned growth promoter, salbutamol (SBT).

The green synthesis of RSCDs was achieved through a facile hydrothermal method utilizing locally collected rice straw. A nanocomposite was then fabricated by integrating these RSCDs with Fe_2O_3 nanoparticles. The synergistic effects of the composite were systematically characterized, revealing that the excellent electrocatalytic activity of Fe_2O_3 was significantly enhanced by the high conductivity and large active surface area of the RSCDs. By modifying a glassy carbon electrode (GCE) with this composite, a robust sensing platform was created.

Exceptional analytical performance was demonstrated using differential pulse voltammetry (DPV). The critical challenge of resolving overlapping oxidation peaks of DPM and SBT was successfully overcome, enabling highly sensitive and selective simultaneous detection. Impressive detection limits of 0.02 µM for DPM and 0.03 µM for SBT were achieved, with a broad linear range extending from 0.1 to 92 µM. The method's robustness was validated through comprehensive interference studies and successful application in real-world animal urine samples, with recovery rates ranging from 96% to 105%.

This work is positioned at the intersection of plant science, materials engineering, and analytical chemistry. It showcases a scalable and cost-effective pathway to convert plant-based waste into a sophisticated technological tool, directly addressing global needs for sustainable agriculture and food safety monitoring.

Biography

Do Mai Nguyen is a researcher at the University of Sciences, Hue University, whose work is focused on creating green nanomaterials from agricultural byproducts for sensing applications. In the past five years, a prolific portfolio of 39 scientific works has been published. The quality of this research is underscored by its placement in high-impact venues: 21 publications are indexed in premier SCIE (Q1) journals, with three featured in journals possessing an Impact Factor of 8.9. A majority of the remaining articles also appear in journals with an Impact Factor above 3.

Yerlan Dutbayev*[1], Alma Kokhmetova[2], Ardak Bolatbekova[1,2], Aidana Kharipzhanova[1], Madina Kumarbayeva[3]
[1]Kazakh National Agrarian Research University, Kazakhstan
[2]Institute of Plant Biology and Biotechnology, Kazakhstan

Evaluation of Spring Wheat Resistance to Common Root Rot in Kazakhstan in 2024

In 2024, a field study evaluated 30 spring wheat varieties and breeding lines for resistance to common root rot (Bipolaris sorokiniana) across two contrasting agroecological zones in Kazakhstan - the Kazakh Research Institute of Agriculture in the Almaty region and Aktobe Agricultural Experimental Station. The experiment compared three treatment conditions: fungicide application, artificial inoculation with B. sorokiniana, and natural infection. Comprehensive assessments included measurements of stem length (77.07-84.24 cm), ear length, spikelet number (up to 14.27 per ear), grain yield (9.67-16.96 g per 50 plants), and 1000-seed weight, along with disease severity evaluation using a 4-point scale. Results demonstrated that genotypes carrying Sb1 and Sb2 resistance genes, particularly line #512 (Sb2) with stable stem length (83.17 cm) and grain yield (14.35 g), and line #575 (Sb1+Sb2) with optimal spikelet number (14.27) and grain weight (9.67 g), showed superior performance under disease pressure. Fungicide treatment proved most effective, yielding plants with maximum stem length (84.24 cm) and grain production (16.96 g). Notable regional variations emerged, with the Aktobe site exhibiting higher tillering capacity (2.32) but shorter stems (77.07 cm), while the Almaty location produced taller plants (81.29 cm) with improved ear structure. These findings underscore the critical interplay between genetic resistance, agronomic practices, and environmental factors in wheat productivity, providing valuable insights for developing region-specific, disease-resistant wheat cultivars in Kazakhstan through integrated breeding approaches that combine genetic improvement with optimized crop management strategies.

Biography

To be Added

Joint Event on

2nd Edition Of Plant Science and Molecular Biology World Conference & Agriculture, Forestry, and Horticulture World Conference

19-21 October 2025

KEYNOTE SESSIONS 01

DAY 3

Aparna Gunjal*, Shraddha Kulkarni, Shital Jadhav, Vishakha Suryawanshi

Department of Microbiology, Dr. D. Y. Patil, Arts, Commerce & Science College, India

Biological Approach in Agriculture for the Growth of Plants

The use of chemical fertilizers for the growth of plants and other crops is harmful to the environment, causes pollution, time-consuming and is costly. The use of biological method to increase the yield of crops and plants is the best solution for this. The plant growth promoting rhizobacteria found near the rhizosphere region of the plants are able to increase the growth of plants by direct and indirect ways. The work here mentions the plant growth promoting rhizobacteria isolated from the rhizosphere region of wheat, sugarcane and maize. The isolated plant growth promoting rhizobacteria were checked for their ability for production of Indole-3-acetic acid, solubilization of potassium and zinc. The pot experiments were also carried to check the effect of plant growth promoting rhizobacteria on the growth of *Sorghumbicolor* and *Zeamays* plants. By studying the morphological characteristics and biochemical tests and comparing with Bergey's Manual of Determinative Bacteriology, the isolates were identified to belong to the genus *Alcaligenes*, *Gluconobacter* and *Saccharococcus* and *Acinetobacter* sp. It is found out of eight prominent isolates, five isolates were able to produce Indole-3-acetic acid and three of the isolates were able to solubilize zinc and potassium. The isolates were found to increase the root and shoot length and also the percentage of seed germination was increased when compared with the control. The work is significant as this is biological approach for the growth of plants and crops and also it will be eco-friendly, economical, fast and having sustainable approach.

Biography

Dr. Aparna Gunjal completed her B.Sc. in Industrial Microbiology in 2003 from Annasaheb Magar Mahavidyalaya, Hadapasar, Pune. Currently, she is working as an assistant professor in the Department of Microbiology, Dr. D. Y. Patil, Arts, Commerce & Science College, Pimpri, Pune. She has 9 and 13 years of teaching and research experience, respectively. Her areas of expertise are bioremediation, composting, plant growth-promoting rhizobacteria, solid-state fermentation, and waste management. She has 190 publications to her credit, including Research Papers in National and International Journals, Research Papers in National and International Proceedings, Review articles, Books, Book Chapters, Magazines, Newsletters, and Sequences submitted to the databases. She has one German patent granted. She has received 12 National and International Awards. Some of them are: a) Award of Recognition as "Environmentalist" in 2019 by Scire Science in the International Conference of SciCon Series on In Sync – With Next Generation Biosciences held at Goa, India; b) Appreciation Award for contribution to Environmental Conservation in 2019-2020; c) Best Article of the Month Award in May 2020 from Vigyan Varta- an International e-magazine for Science Enthusiasts; d) The Outstanding Scientist of the Year Award in 2020 from Vigyan Varta- an International e-magazine for Science Enthusiasts for outstanding contribution in the field of Microbiology and Environmental Sciences; e) Most Impactful Article of the Month Award in January 2021 from Vigyan Varta- an International e-magazine for Science Enthusiasts; f) Senior Scientist Award in 2023 from Microbiologists Society India; g) Award of Recognition of ISTEAMIar from Rollascripting Nigeria country in 2023 for working on project related to free education to the children. She is also selected as a Mentor by the American Society for Microbiology (ASM) for mentoring students with aspects of research and teaching in Microbiology. She is also appointed as a Trainer by the Australian Institute of Water Science (AIWS), Australia, to train the students of Microbiology and Environmental Sciences in wastewater treatment subject and research aspects.

Joint Event on

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19-21 October 2025

ORAL SESSIONS 01

DAY 3

Farhahna Allie*, Antzel Theron, Gerrit Koorsen
Department of Biochemistry, University of Johannesburg, Auckland Park, South Africa

Differential Gene Expression Patterns Distinguish Resistant and Susceptible Tomato Responses to ToCSV Infection

This study investigated the molecular mechanisms underlying tomato responses to Tomato Curly Stunt Virus (ToCSV) infection by comparing transcriptional profiles between susceptible (RooiKhaki) and resistant (ESTY) cultivars. RNA-Seq analysis was performed on leaf samples collected at 15- and 35-days post-infection, with paired-end Illumina sequencing and alignment to the tomato reference genome (SL3.1).Differential gene expression analysis using DESeq2 revealed markedly different response strategies between the two cultivars. The susceptible RooiKhaki exhibited extensive transcriptional disruption, particularly at 35 days post-infection, with 1,470 differentially expressed genes (DEGs) showing significant upregulation of stress-responsive and photosynthesis-related genes. This response pattern indicated progressive cellular perturbation and metabolic disruption following viral infection. In contrast, the resistant ESTY cultivar demonstrated a more controlled and effective defense strategy. This cultivar was characterized by early activation of defense-related genes at 15 days post-infection, followed by maintained cellular homeostasis at the later time point. This early response appears to be crucial for preventing viral establishment and limiting subsequent cellular damage.KEGG pathway analysis in RooiKhaki revealed escalating cellular disruption over time, with involvement increasing from 196 DEGs mapping to 12 pathways at 15 days post-infection to 698 DEGs mapping to 20 pathways at 35 days post-infection. Expression validation was successfully performed on 12 significantly expressed genes with statistical significance ($p<0.05$, >2-fold change).These findings provide valuable insights into host-pathogen interactions and reveal that early defense gene activation is the key determinant of ToCSV resistance in tomato. The identification of specific temporal response patterns and defense-related gene regulation offers new molecular targets for breeding virus-resistant tomato cultivars and developing improved strategies against Geminivirus infections. This research contributes important molecular markers for resistance breeding programs in economically significant crops.

Biography

Dr. Farhahna Allie is a Lecturer in the Department of Biochemistry at the University of Johannesburg. Dr. Allie has a strong research focus on host-pathogen interactions in plant-virus pathosystems, specifically studying plant-virus interactions in the areas of epigenetics and gene expression. Her current research focuses on geminivirus infection in tomato crops, particularly exploring how the Tomato curly stunt virus (ToCSV) hijacks and reprograms the host's cellular machinery. Leading the Molecular-Plant Virology group, Dr. Allie is dedicated to exploring innovative strategies for sustainable plant virus control and advancing understanding of the complex interactions between plants and viruses.

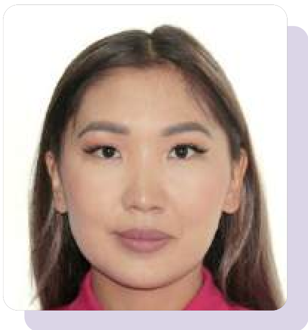
Tan Suat Cheng*, Farah Amna Othman, Asmaa Mohd Satar
School of Health Sciences, Health Campus, University Sains Malaysia

Acute Oral Toxicity and Subacute Neurotoxicity Risk Assessments of Flavonoid-Enriched Fractions from Natural Plants

Oroxylum indicum is a medicinal herb that garnered enormous attention in drug discovery for human diseases such as neurodegenerative, cardiovascular, arthritis and hepatitis diseases. Pharmacokinetic study confirmed that the pharmacological actions of this herb are associated with its prominent flavonoid bioactive components. Here, the data set of liquid chromatography-mass spectroscopy (LC-MS), neurological functions, relative organ weight (ROW), hematological, biochemical and histopathological parameters of flavonoid-enriched fraction (FEF)-treated Sprague Dawley (SD) rats were presented. The data set was generated from three study groups namely: Sighting Study, Acute Toxicity Study and Subacute Neurotoxicity Study with study duration of 14 days (for Sighting Study and Acute Toxicity Study) and 28 days (for Subacute Neurotoxicity Study) by strictly following the procedures set in Organisation for Economic Co-operation and Development (OECD) Guidelines 420 and 424 in vivo. Rats in sighting study were treated with dosage of 5, 50, 30 0 and 20 0 0 mg/kg FEF (n = 1/dosage/gender), respectively, and were observed for mortality, toxicity signs and behavioural changes. The highest dosage at which none of the animal showed sign of mortality in the sighting study was selected as the test dosage for subsequent acute toxicity study (n = 5/dosage/gender). Meanwhile, for subacute neurotoxicity study, SD rats (n = 5/dosage/gender) were treated with repeated dosage of 50 mg/kg for 28 days. Neurological behaviours of treated rats were observed daily, while their body weight were measured weekly. Whole blood was collected at the end of the study via cardiac puncture into ethylenediaminetetraacetic acid (EDTA) tubes for haematological evaluation that included the measurements of red blood cells (RBC), hemoglobin (Hb), packed cell volumes (PCV), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), platelet, white blood cells (WBC) count and WBC differentials. Meanwhile, blood serum were collected into slow sand filter (SST) tubes for biochemical evaluation that included measurements of total protein (TP), albumin, bilirubin, alkaline phosphatase (ALP), aspartate aminotransferase (AST) and alanine aminotransferase (ALT). Vital organs such as brain, liver, kidneys, heart, lungs and reproductive organs also were collected, sliced and stained with hematoxylin and eosin (H&E) at the end of the study for histopathological assessments.

Biography

Dr. Tan obtained her B. Sc. (honours) in Biotechnology at School of Science and Technology, Universiti Malaysia Sabah with First Class Honour and was selected as the only recipient of Royal Academic Award (non-indigenous category) of the year 2007. In 2008, she obtained full scholarship from Ministry of Higher Education, Malaysia to pursue her PhD at Department of Physiology, Anatomy and Genetic (DPAG), University of Oxford. Upon graduation in 2011, she was appointed as Senior Lecturer of Biomedicine in University Sains Malaysia. Dr. Tan received several academic recognitions/awards including appointed as the Exco Member of Young Scientist Network (YSN) by Academic Science of Malaysia (ASM) which represent the young scientists in Malaysia; selected as Malaysian Young Scientist Representative for 68th Lindau Nobel Laureate Meetings in Lindau, Germany; selected as Malaysian Fellow for 47th Asia Pacific Advanced Network Meeting in Daejoen, South Korea; Travel award from International Society of Heart Research in 2010; Student award from Green Templeton College, University of Oxford in 2010; Competitive bursary from both British Society for Cardiovascular Research and Oxford Stem Cell Institute in 2011 and so on. Further, she also obtained seven research grants from Universiti Sains Malaysia and Ministry of Higher Education between years 2012 to 2023. Currently, she is pioneering a Neural Stem Cell Research Group in School of Health Sciences, Universiti Sains Malaysia. Her current research focuses on developing a reliable natural product and stem cell-based therapeutic technique to treat human neurological diseases such as brain cancer and stroke.



Aidana Kharipzhanova*[1,3], Yerlan Dutbayev[1], Gulzada Abisheva[2], Madina Kumarbayeva[3], Nadira Sultanova[4]

[1]Department of Horticulture, Plant Protection and Quarantine, Kazakh National Agrarian Research University, Kazakhstan

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[4]Kazakh Research Institute of Plant Protection and Quarantine, Kazakhstan

Effect of Fungicide Treatment and Genotype on the Development of Foliar Diseases in Wheat in Southeastern Kazakhstan

In 2024, field trials at the Kazakh Research Institute of Agriculture and Plant Growing (Almalybak) assessed 36 spring wheat genotypes (17 Triticum aestivum L. and 19 T. durum Desf.) for resistance to key foliar diseases. Genotypes #513 and #545 exhibited outstanding resistance to leaf rust (0.2–1.1%), yellow rust (0–0.25%), and spot blotch (0.7–3.0%), combined with high productivity traits: spike length (8.2–8.5 cm), grains per spike (32–35), and grain weight (1.8–2.0 g/spike).

Treatment with the systemic fungicide Kolosal PRO (0.5 L/ha) was highly effective against Puccinia striiformis, suppressing disease development 13.4-fold. It also significantly enhanced yield components, increasing spike length by 11.7%, grain weight by 24.8%, and the number of productive tillers by 16.8% compared to untreated controls.

The integration of resistant genotypes with fungicide application reduced disease variability by 35–45% and improved yield stability by 20–25%. Correlation analysis revealed statistically significant associations between agronomic traits ($p < 0.05$), with the strongest correlation observed between tiller number and grain weight ($r = 0.47$), emphasizing their combined contribution to yield.

These results underscore the value of combining host genetic resistance with optimized chemical control to sustainably manage foliar diseases in wheat under the agro-climatic conditions of Southeastern Kazakhstan. Furthermore, the study lays a foundation for future molecular research, including the identification of resistance-associated markers and the development of predictive models to explore “genotype–pathogen–fungicide” interactions.

This integrative approach supports both short-term disease mitigation and long-term breeding strategies aimed at enhancing wheat resilience and productivity in the face of changing disease pressures and environmental conditions.

Biography

Dr. Aidana Kharipzhanova is a dedicated plant pathologist from Kazakhstan, specializing in the study of cereal root rot diseases caused by Bipolaris sorokiniana and Fusarium spp. She earned her Ph.D. through collaborative research with CIMMYT and Bolu Abant Izzet Baysal University (Türkiye), combining molecular diagnostics with field-based disease assessments. In 2025, she completed the prestigious Wheat Improvement Course at CIMMYT, Mexico.

Dr. Kharipzhanova also teaches plant pathology and crop protection in English to international undergraduates. Her research, publications, and global collaborations reflect her commitment to sustainable agriculture, food security, and the development of disease-resistant wheat varieties.

Sonia Vivona*[1], Alessandra Patitucci[1], Paola Sdao[2], Alessandro Colonnese[3], Angela Magariello[1]

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Social Agriculture for Life Quality and Environmental Sustainability: A Case Study

The experience in Social Farms is an opportunity for aggregation and improvementof life quality and psychophysical well-being, according to the WHO's definition of active aging as a "process of optimizing health opportunities, participation and safety to improve people's quality of life". Social Agriculture (SA) is part of a welfare model in which environmental protection, enhancement, as well as people well-being and socialintegration, can find their maximum expression.

A preliminary desk analysis to sizenumber,sectors of specialization andrecipients of companies operating in SA in Italy was conducted. Therefore, a case study was conductedon a sample of 19 companies located in Calabria and Sicilia (Italy) to analyse their activities and the psychophysical well-being parameters linked to the stay in natural environments by the over65 people attending them on regular basis / residential mode.

The case study confirms the importance of the Green Care sector and services related to the natural environment, especially for the people most socially vulnerable. The environment quality in SA farms, frequented not only for potential nutritional purposes (horticultural therapy) but also as a provider of ecosystem services related to health (e.g.,air quality) or as an aesthetic-spiritual landscape element, is confirmed as element of psycho-physical-cognitive well-being by the subjects interviewed, along with a Mediterranean Diet and healthy lifestyle and social activities.

SA can lead to a welfare model in which environmental protection andenhancement, well-being, and social integration can find their full expression within an ethical commitment to sustainable development and healthy lifestyles, with a positive response to loneliness and degenerative diseases affecting older adults. This will help public policy decisions toward new models that foster increasingly participatory and inclusive active aging processes.

Biography

Sonia Vivona is a Technologist at the National Research Council of Italy, Institute for Mediterranean Agricultural and Forestry Systems (ISAFOM), Rende (CS), Italy. For more than 30 years, her activities have been focused on the management of several national and European project and Technology Transfer processes. Her research activities focus regards the social and economic aspect of sustainable development, and particularly the wellbeing, green-care and nature-based solutions in the frame of ecosystem services analysis to optimize the use of natural resources. She is the scientific responsible of the CNR Nutrage Project – sub task
5.3.2 related to Social Agriculture for Life Quality and Environmental Sustainability.

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Structural Rearrangements in CNBD-Ankyrin-Bridge is Important for the Activity of Guard-Cell Outward-Rectifying K+ Channel Gork

The outward-rectifying potassium channel GORK in Arabidopsis thaliana plays a pivotal role in stomatal closure by mediating K^+ efflux from guard cells, thereby regulating turgor pressure. However, the structural basis for the regulatory control of GORK's gating has remained obscure. Here, we report high-resolution cryo-EM structures (3.16–3.27 Å) of GORK in five distinct conformational states, revealing key rearrangements in its cytoplasmic domains between the cyclic nucleotide binding domain (CNBD) and ankyrin repeat (ANK) domain, called "CNBD-Ankyrin bridge". These structures show that the CNBD-Ankyrin bridge undergoes secondary-structure transitions, forming an α-helix in the "pre-open" state but adopting non-helical conformations in more distal closed states. The C-linker motions modulate the interactions between cytosolic domains and transmembrane voltage sensor elements (S4/S5), thereby determining whether closed conformations are closer to pre-open or deeply closed states. Functional validation by glycine scanning and mutagenesis of key residues (residues D511-D519, H523 etc.) reveals that the structure of the CNBD-Ankyrin bridge is critical for K+ transport activity. These findings support a multi-step gating mechanism, in which dynamic cytosolic rearrangements act as regulatory inputs. Our results provide new mechanistic insight into how cytosolic signals may regulate GORK activity during stomatal closure and identify potential targets for engineering stomata to optimize water use efficiency and stress tolerance in plants.

Biography

I am a PhD candidate at Tohoku University, Japan. My research focuses on how plants respond to environmental changes through the regulation of potassium transporters, with particular emphasis on mechanisms underlying water use and stress adaptation. I have been exploring the molecular and physiological basis of stomatal regulation and its contribution to plant resilience under fluctuating humidity conditions. Recently, I developed a strong interest in circadian biology, and I am currently conducting research in the United Kingdom to investigate how circadian rhythms shape plant responses to the environment. My long-term goal is to connect molecular insights with sustainable crop improvement.

Ivano Forgione*[1], Domenico Lorenzo Iaria[1], Fabrizio Carbone[1], Amelia Salimonti[1]

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SSNP Markers Linked to Drought Tolerance in Olive (*Olea Europaea L.*): Insights from Contrasting Genotypes

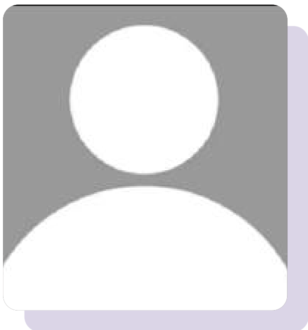
Global climate change has an impact on temperatures and water availability, leading to intense and prolonged rainfall phenomena, but also more severe drought that often compromise crop production. Although olive is a woody plant with a good adaptation to drought conditions, also this species is affected by alteration of precipitation cycles. Some olive cultivars with a greater tolerance to water stress were already selected, however the pathways involved in the tolerance response are currently still little known. To this purpose, the wide olive germplasm could help to link haplotypes cultivar-specific to characteristic of tolerance, by association the genetic variation to phenotypic variation. A SPET (Single Primer Enrichment Technology) panel of 70k target SNPs, preliminarily developed for the screening of molecular variants, produced sequencing data employed for selecting 32 genotypes obtained by propagation from cuttings and subjected to further physiological analyses.

A phenotyping protocol in a controlled environment, developed in previous study, was applied on the selected genotypes to monitor numerous parameters related to the drought stress in olive, such as Relative Water Content (RWC), chlorophyll content, gas exchange and photosynthetic efficiency.

Both WGS and SPET panel of 70k target were used to perform the association analysis by combining the genotypic dataset and the collected phenotypic parameters to detect the genomic regions associated with traits contributing to drought tolerance in olive. Variant calling allowed us to identify approximately 2.700.000 SNPs and 65.000 SNPs in WGS and SPET dataset, respectively, using as reference the genome assembly of ‘Leccino’. GWAS identified 85 significant SNPs associated with five phenotypic parameters. Notably, four SNPs showed associations with more than one monitored photosynthetic parameter, indicating a potential shared genetic basis for these traits. In particular, one of them, is located within the coding region of the gene PTEN2A which acts as both a lipid and protein phosphatase, and whose accumulation in response to salt and osmotic stresses suggests a role in the plant’s response to water stress conditions.

Biography

Ivano Forgione received a master's degree in biology in May 2012, and a PhD in Life Science, curriculum plant biology, at the University of Calabria (Rende, CS, ITALY) in June 2017. Fifteen months of the PhD project were spent at the Plant System Biology of Ghent University in Belgium. From February 2019, I had a two-year postdoc position at the Council for Agricultural Research and Economics (CREA-OFA) Research Centre for Olive, Fruit and Citrus Crops. From April 2021 I was an Assistant Professor (in tenure-track) at the University of Tuscia. From July 2023 to date, I have had a Fixed-Term Researcher position at CREA-OFA.



Nancy Taéra Ibraim Samamad
Mozambique Agriculture Research Institute, Mozambique

Molecular Identification of Coconut Lethal Yellowing Disease (CLYD) In Commercial Varieties in Zambézia, Mozambique

CLYD is a disease caused by a phytoplasm found in the phloem of infected plants, which blocks the vessels, preventing the transport of leaf sap to the hole plant. The phytoplasm transmission is carried out by vectors such as Myndus crudus (Van Duzee). It is recognized as one of the main threats to coconut production worldwide. In 1980 the pest was responsible for the death of more than 7 million palm trees in Jamaica. In Africa, the disease has been identified in countries such as Benin, Cameroon, Ghana, Kenya, Mozambique, Nigeria, Tanzania and others. Mozambique has a high diversity of phytoplasm species associated with CLYD, namely: 'Candidatus Phytoplasm palmicola' 16SrXXII-A, Tanzanian lethal disease (LD) phytoplasm 16SrIV-C and a novel strain closely related to 'Ca. Phytoplasm pini' 16SrXXI-A, among others. In 2011 Mozambique had approximately 160,000 ha under coconut production, mainly in the provinces of Zambezia, Inhambane, Nampula and Cabo Delgado. Zambezia province had the highest acreage of coconut with approximately 70% of the total area under the crop. From the total area of production, 80% of the crop was lost in the last 30 years. The aim of this study was to use molecular tools for identification of CLYD in commercial varieties of the biggest coconut producing regions in Zambezia province in Mozambique. Samples from stem and flowers were collected visually from symptomatic and asymptomatic plants in the regions of Mugaua, Gobene (Maganja da Costa), Murroa (Mugodoma), Tapata, Hode-tele (Mugela-Pebane) and Nangoela. For the purpose of the study, symptomatic plants were those who presented yellow-orange leaves, which begun in older leaves, progressing to the younger ones, and finally to the crown, with the possibility of total discoloration or necrosis in the inflorescences not yet emerging as well as fruit drop. The samples were sent to the laboratory, were after catalogued, the DNA was extracted according modified CTAB Method. After the extraction, DNA quantification and molecular detection of the organism was applied by Polymerase Chain Reaction (PCR), using specific primers Phyto 14R/F that detect the CLYD strains circulating in Zambezia province. As a result, the plants in Mugaua, Gobene and part of Murroa plantations were positive for the pathogen causing the disease, even in the samples that visually was healthy being the predominant coconut varieties the Duarf green, Hybrid and Sri lanka Tall Green and Red, considered

susceptible. While areas of Murroa, Tapata and Hode-Tele, did not detect the presence of the pathogen, including samples that showed symptoms with predominant coconut varieties are the Mozambican Tall (MZT) Bronze and Green. Nangoela region variety made up of coconut hybrids showed the absence of pathogen, although considered susceptible. Therefore it can be concluded that molecular identification is a reliable method for CLYD identification, although more research is needed for varieties molecular characterization and provide more information on the tolerant and resistant genes for CLYD.

Biography

To be Added.

Tshegofatso Dikobe* and C. Sithole, R.R Sinthumule, J.L Gaorongwe, O. Ruzvidzo
Unit for Environmental Sciences and Management, Department of Botany, North-West University, South Africa

Exploring The Dynamic Response Mechanisms of Pennisetum Glaucum: Enhancing Resilience to Dual Drought and Salt Stress

Agriculture is pivotal in sustaining the world's growing population through extensive food production. However, crop plants face numerous challenges in their natural environment, including abiotic stresses such as drought and salt stress. Plants have developed complex survival mechanisms. Understanding pearl millet's response mechanisms to these stresses is vital for improving resilience in water-deficit and saline environments. Our study subjected pearl millet to separate and combined drought and salt stress for 25 days. The results showed significant reductions in morphological traits, such as plant height, fresh weights and lengths of both shoots and roots, and the number of leaves observed. Furthermore, key physiological parameters, including chlorophyll content, stomatal conductance, photosynthesis, and transpiration rates notably declined, indicating a complex interaction between stress factors and water regulation mechanisms. Proteomic analysis revealed altered protein expression in response to stress, suggesting potential upregulation or downregulation of proteins. Gene ontology analysis identified various unclassified proteins involved in essential biological processes, molecular functions, and cellular components. This study provides a comprehensive understanding of the detrimental effects of drought and salinity on pearl millet at the morphological, physiological, and proteomic levels, uncovering previously unexplored proteomic responses. It also offers valuable insights for researchers and agricultural experts studying stress responses in pearl millet and related crops, serving as a reference tool for understanding drought and salt stress pathways.

Biography

Tshegofatso Dikobe is an associate professor at the North-West University in the department of Botany, South Africa. My research focuses in understanding how crops, particularly cereals, respond and adapt to a range of abiotic and biotic stresses such as water stress, high soil salinity, high temperature, plant pathogens (bacterial & fungal) and pests. This line of research is motivated by the need to develop crops that produce maximally under harsh environmental conditions and plant pathogen response and thus enhance food security.

Zennouhi Omar*, Ouadjane Youssef, Ibijbijen Jamal, Nassiri Laila
Environment and Development of Microbial and Plant Resources, Faculty of Science, Moulay Ismail University, Morocco

Evaluation of the Fertilization Potential of Three Rhizobia Isolated from Adenocarpus Boudyi Roots for Use as Biofertilizers in the Restoration of Sylvopastoral Land

This research aimed to evaluate the biofertilizer potential of indigenous Rhizobium strains isolated from *Adenocarpusboudyi*, a wild leguminous shrub native to the High Atlas, to improve the productivity of *Bituminariabituminosa*, a forage species of interest, and to contribute to the restoration and rehabilitation of degraded agro-sylvo-pastoral ecosystems in Morocco, which are particularly vulnerable to soil degradation and climate change.
Among the ten initial isolates tested, three strains *Rhizobium pusense(R. pusense)*, *Rhizobium radiobacter (R. radiobacter)*, and *Rhizobium sp*. demonstrated remarkable functional capacities. On solid NBRIP medium, phosphate solubilization indices ranged from 2.9 (*Rhizobiumsp*.) to 3.9 (*R.pusense*), while in liquid medium, *R. pusense* solubilized the highest amount of phosphorus (118.34 µg/mL), followed by 111.35 µg/mL and 109.40 µg/mL for the other strains. A progressive acidification of the culture medium was observed, with pH decreasing to as low as 2.88 in *R. radiobacter* cultures.
All three strains produced indole-3-acetic acid, with maximum concentrations of 151.2 µg/mL *R. pusense*, 141.2 µg/mL *R. radiobacter*, and 46.4 µg/mL *Rhizobium sp*. Siderophore production was confirmed qualitatively for all isolates on Chrome Azurol S medium. Genotypic characterization revealed 100% similarity of isolate 36 to *R. pusense*, 99.72% similarity of isolate 39 to *R. radiobacter*, and 94% similarity of isolate 27 to *Rhizobiumsp*.
In inoculation trials on *B. bituminosa*, clear differences in infectivity and effectiveness were observed. *R. pusense* formed an average of more than 25 nodules per plant, with a fresh nodule weight of 0.5 g, significantly outperforming *R. radiobacter*, which formed only 2.4 nodules with a weight of 0.028 g. *Rhizobium sp*. did not induce any nodulation. Statistical analyses confirmed highly significant differences between treatments ($p<0.05$).
Inoculation also significantly enhanced plant growth. Fresh shoot biomass increased by 12.2 g (+448%) with *R. pusense*, 10.51 g with *R. radiobacter*, and 9.1 g with *Rhizobium sp*., compared to uninoculated controls. Dry shoot biomass gains were also notable (5.51 g with *R. pusense*), as were improvements in root dry weight, which was highest with *R. pusense* and Rhizobium sp. The nitrogen content of aerial parts reached 0.082 g/plant in *R. pusense*inoculated plants, with 98% of nitrogen derived from atmospheric fixation, versus 0.015 g and 86% fixation for *R. radiobacter*.
Overall, the efficiency, expressed as the percentage increase in dry biomass relative to controls, ranged from 319% *R. radiobacter*to 448% *R. pusense*. A strong correlation was observed between the number

of nodules and plant productivity, underscoring the superior infectivity and effectiveness of *R. pusense.* These results demonstrate that the combined capacity of these locally adapted rhizobia to fix nitrogen, solubilize phosphorus, and produce phytohormones and siderophores represents a comprehensive biotechnological tool to sustainably improve the productivity of agro-sylvo-pastoral systems and restore degraded soils. The outstanding performance of *R. pusense* suggests that this strain should be further developed as a specific inoculant for forage crops in arid and semi-arid agro-sylvo-pastoral areas. Field studies will be essential to confirm these promising results and to establish large-scale application protocols to support sustainable, resilient, and ecosystem-restorative agriculture in Morocco.

Biography

I am Omar ZENNOUHI, a Moroccan researcher with a PhD in Biology, specializing in Plant Ecology and Biotechnologies, awarded in 2021 from Moulay Ismail University in Meknes. My doctoral research focused on the potential of bituminous clover (*Bituminariabituminosa*) for the rehabilitation of silvopastoral lands. I also hold a specialized master's degree in Ecology Engineering and Biodiversity Management.

I have published several scientific articles in international journals in the fields of ecology, microbial biotechnology, and the restoration of degraded ecosystems. I have actively participated in numerous national and international conferences as a speaker and presenter.

Lisbet Pérez Bonachea*
BIOPLANT CENTER Máximo Gómez Báez University of Ciego de Ávila, Cuba

Transgenic Pineapple in T3 and T4: A Turning Point for Sustainable Agriculture? Comprehensive Data from the Field

Pineapple(*Ananascomosus*(L.)Merr.var.comosus)is the most economically important species of the Bromeliaceae family. However, its production is significantly affected by biotic and abiotic factors. Therefore, there is a need to develop improved cultivars that are safe and biologically similar to commercial cultivars. This research focused on the characterization of transgenic pineapple plants in the third and fourth generations of field growth. Plants of the cultivar 'Cayena Lisa Serrana' were used: (1) control plants from conventional vegetative propagation, (2) micropropagated control plants,and (3) transgenicplants carrying the *chitinase*,*Ap24*,and *bar* genes(line90).Physiological and biochemical indicators of the phenotype corresponding to the third and fourth vegetative generations were evaluated,and the presence of the bar gene was confirmed by PCR. Of the 160 traits evaluated, significant differences were observed between the transgenic plants and conventionally vegetatively propagated plants in 88, while differences were observed between the transgenic plants and the micropropagated plants in 70. In the other tests performed, the transgenic plants did not show significant differences compared to their controls. Overall, the phenotype of the transgenic plants matched the phenotype of the controlplants.These data are consistent and useful for characterizing the modified plants, which maintain the integration of the *bar* gene into their genome after four generations of field growth.Therefore, the methodology allows for the detection of events with the fewest changes compared to commercial plants.

Biography

Lisbet Pérez Bonachea holds a degree in Biology from the Martha Abreu Central University of Las Villas, a Master's degree in Agrobiotechnology, and a PhD in Agricultural Sciences. She is a researcher at the Máximo Gómez Báez Center for Bioplants at the University of Ciego de Ávila. She has eight years of work experience, where she has acquired most of her practical knowledge and scientific break throughs. She has been involved in research on several projects in the areas of plant-microorganism interaction and genetic improvement. Combining both themes, her leading research has been the generational monitoring of transgenic pineapple plants, which has given her experience in the areas of molecular biology, plant tissue culture, and biochemical determinations. Throughout her training, she has given seminars, classes, and talks, and participated in national and international scientific events. She is the author of 11 publications. In 2021, she was chosen as the Best Young Researcher at the center level. Her research: Fourth vegetative generation of transgenic pineapple plants(2022), and in 2023, for her research: Genetically Modified Organisms and Biosafety in Pineapple Cultivation. For her contributions to the development ofscience inthe country, she was awarded the National Seal of Forgers of the Future in January 2022. She was awarded the ACTAF Young Reward Award (2022) and in 2024 she was chosen as an outstanding worker for her results ofthe year. She obtained a SEGIB scholarship through which she carried out a research stay in the laboratories of the TecNM Tuxtla Gutiérrez campus, under the supervision of Dr. Valdiviezo. Additionally, as part of a BMBF Cuba-Germany collaboration project, she carried out a research stay at the Institute of Botany, Leibniz University Hannover. She is currently the coordinator of the Master's degree in Agrobiotechnology taught at the Bioplant Center and collaborates on the following research projects: Sectoral project: Strategies for the management of *Phytophthora nicotianae*var. parasitica and wilt in pineapple crops (*Ananas comosus* L. Merr) (she is responsible for the research line ontransgenic pineapple plants). VLIR Project: Mass *in vitro* productionof"biotized"plants: keyto promoting sustainable food security in Cuba and three territorial projects: Aquatic and marsh plants in the municipality of Ciego de Ávila. Alternatives fortheir useand management. Project: Obtaining sugarcane mutants with potential tolerance to environmental stress and Project: Application of precision agriculture in fruit production in Ciego de Ávila.

Lisbet aims to continue researching, deepening, and applying innovative technologies,as wellas forming alliances to develop, contribute, and obtainalternatives and solutions to underlying problems associated with food security and its implications in the near and medium term.

Joint Event on

2nd Edition Of Plant Science and Molecular Biology World Conference & Agriculture, Forestry, and Horticulture World Conference

19-21 October 2025

KEYNOTE SESSIONS 02

DAY 3

Shumaila Shahid

Division of Plant Pathology, ICAR-Indian Agricultural Research Institute, India

Role Of Nanoparticles in The Management of FusariumWiltDisease Of Cucurbits

Nanoparticles have great potential in controlling economically important plant diseases including Fusarium wilt of cucurbits. Nowadays, plant pathogenic fungi can be managed by using agrochemical products, but they pose serious hazard to the environment. Nanotechnology can help in contributing towards minimizing the chemical load in agriculture posing positive environmental impacts.In the recent era, more focus has been given to the green synthesis of nanoparticles which lead to the formation of stable, biocompatible, cost-effective, and eco-friendly nanoparticles. Biosynthesized nanoparticles serve as environmentally friendly as well as efficient alternatives to fungicides. Fusarium wilt caused by *Fusarium oxysporum*is one of the most destructive disease of cucurbits and causes huge losses to the crop worldwide, hence it is necessary to manage the disease to prevent the crop losses. Currently, numerous types of nanomaterials have been explored against Fusarium wilt of cucurbits. However, in particular, metal oxide nanoparticles such as oxides of iron, zinc, gold, silver, titanium, copper, etc. are considered to be an efficient and eco-friendly alternative for controlling Fusarium wilt of cucurbits. Since, keeping in view the eco-friendliness as well as efficacy of metal oxide nanoparticles, iron oxide nanoparticles have been synthesized from the mung bean plants through green synthesis approach and the antifungal efficacy of the green synthesized iron oxide nanoparticles was checked at different concentrations against *Fusarium oxysporum*, the wilt pathogen of Fusariumwilt of cucurbits. Iron oxide nanoparticles were found to be highly effective against *Fusarium oxysporum* and it caused great inhibition of the wilt pathogen. Maximum suppression (76%) of thewilt pathogen was recorded at 100 ppm concentration of iron oxide nanoparticles, followed by 80 ppm concentration (64%) which proved its efficacy in the management of *Fusarium* wilt pathogen in cucurbits. Hence, biosynthesized iron oxide nanoparticles proved its potential that it could be a novel and environmental friendly alternative of future new generation fungicide for controlling Fusarium wilt of cucurbits.

Biography

Dr. Shumaila Shahid received her Ph.D. in Plant Pathology from Aligarh Muslim University, Aligarh in 2018, respectively. She is currently working as Scientist (ARS- Agricultural Research Service) in the Division of Plant Pathology, ICAR-Indian Agricultural Research Institute, New Delhi, India. She is Co-Principal Investigator of six ongoing major research projects at IARI and has also successfully completed three major research projects. She has 13 years of experience in research and teaching (Ph.D. and M.Sc.). She has published many research papers in peer-reviewed International and National Journals, edited books and also published several book chapters. She has been honoured with various prestigious awards such as Scientist of the Year 2023 Award, Young Woman Scientist Award 2023, Dr. Rajendra Prasad Excellence Scientist Award 2022,Young Scientist Award in Plant Pathology 2021, Research Excellence Award 2019 etc. She is a life member of many renowned societies.

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ORAL SESSIONS 02

DAY 3

Lata Shukla*, Anshika Sinha, Manish Solanki
Department of Biotechnology, School of Life Sciences, Pondicherry University, India

Scutellum Derived Rice Calli from Indica Rice Varieties for Synthetic Biology

The improvement of rice crop through genetic engineering could be performed expeditiously by having reproducible regeneration protocols for different varieties. We have developed procedures for high throughput identification of embryogenic calli and developed strategies for regeneration using a recalcitrant local variety such as ASD16 (suitable for aerobic cultivation), CR1009 (drought resistance) and Navara (medicinal properties) were selected. The regeneration efficiency was monitored and compared using different regeneration media namely, RI, RII, RIII, RIV, RIV', RV, RVI and RVII. Histological evidence and scanning electron microscopy for the growing embyogenic and regenratingcalli.
The scutellum derived calli of varieties CR1009(non recalicitrant) and Navaran (moderately recalcitrant) and ASD16(recalcitrant) were transferred to regeneration media RII (MS basal supplemented with 2.5 mg/l proline, 1 mg/l NAA (naphthalene acetic acid), 3 mg/l BAP (6-Benzyladenine). The variety ASD16 showed regeneration capacity by partial desiccation treatment of 24hr. Selective improvement in regeneration in ASD16 by ~30%, Navara by 23% but none for CR1009 varieties. Desiccation treatment for different time interval prior to regeneration showed desired effect prolonged period ie, 24hr and 48hr desiccation is efficient for ASD16. The regeneration and callus were subjected to SEM, and microscopic examination of the calli. This is first report based on systemic varietal plasticity and its detailed time kinetics. This is first step to bring the recalcitrant scutellum derived calli derived from indica varieties on the same media with efficient regeneration capacity.

Biography

I am a chemist by training and did my master's in chemistry from Roorkee a premier Indian Insitute of Technology. Later did plant tissue culture, molecular biology and radiation biophysics, chlorophyll biosynthesis at Jawaharlal Nehru University, NIPGR and International Centre for Genetic Engg and Biotech, New Delhi. I have more than three decades of research experience and have won awards and research grants from various national and international agencies. I have served as Research Associate (NIH projects) at Oakland University Rochester Michigan in Chemistry, Biochem and Mol Biology. Later as BOYSCAST-GOI fellow visited Oklahoma State University Stillwater USA. I have served Pondicherry University in various capacities since 2005 and have trained four PhD scholars. Manish and Anshika played pivotal role in this study and a patent on rice calli assessment for embryogenecity, is recently awarded. We are looking at post-transcriptional regulation in regeneration capacities of embryogenic scutellum derived calli.

Olivia Naliaka Simiyu*

Founder, Functioly Sustainable Farms, Faddville Estate, Nairobi, Kenya

Revolutionizing Nutrition and Sustainability: The Role of Technology in Insect Farming and Food Security

As the global population grows and environmental concerns intensify, alternative protein sources are crucial for sustainable food systems. Insect farming presents an innovative, eco-friendly solution that addresses protein deficiencies while reducing the ecological footprint of traditional livestock farming.
This presentation explores the viability of insect protein for urban households, focusing on affordability, nutritional benefits (high protein, collagen, and micronutrients), as well consumer acceptance in Nairobi.
We highlight our tech-led insect farming structures and its effectiveness in large scale insect production, focusing on the African continent's needs, strategies for integrating insect-based foods into mainstream diets, overcoming market resistance, and leveraging sustainable farming practices. By redefining protein consumption, insect farming can contribute to food security, climate resilience, and economic empowerment in Africa.

Biography

Olivia Simiyu is the founder of Functioly Sustainable Farms and an experienced agronomist with eight years of expertise in insect production and market analysis across Africa. Passionate about food security and sustainable nutrition, she is dedicated to promoting insect-based protein as an affordable, eco-friendly solution for urban households. As a Kenyan youth entrepreneur, Olivia is committed to transforming perceptions of alternative proteins and driving innovation in Africa's agricultural sector.

Anirudh Kumar*[2],Aadil Mansoori[1], Sharad Kumar Dubey[1]
[1]Department of Botany, Indira Gandhi National Tribal University (IGNTU), India
[2]Department of Botany, Central Tribal University of Andhra Pradesh (CTUAP), India

Lantana Camara L.: Assessment of Antioxidant and Antimicrobial Properties

Numerous phytochemicals found in plants have remarkable antibacterial and antioxidant properties that can effectively combat diseases in humans, animals, and plants. The initial stages towards assessing the potential use of these new chemicals in agriculture and medicine involve their identification and characterisation from plant species. Since chemical pesticides have been shown to have lasting negative effects, plant-based products acting as antimicrobial agents could play a crucial role in an integrated disease management (IDM) strategy. The current work aimed to characterise the antibacterial and antioxidant capabilities of a crude extract of the invasive plant Lantana camara L. The antioxidant, antibacterial, polyphenolic, and enzymatic properties of both the leaf extract (LE) and the flower extract (FE) were assessed. Both LE and FE demonstrated superior antioxidant and free radical activities; however, FE's activities were higher than LE's. Furthermore, FTIR and GC-MS analyses were conducted for both FE and LE in order to reveal the chemical characteristics of the extracts. The existence of multiple functional groups, including N-H, C-H, OH, and C=O, was confirmed by FT-IR spectrum analysis. The presence of these functional groups in extracts suggests the existence of different metabolites in the extracts. Altogether, 99 bioactive chemicals were found by GC-MS analysis, of which at least 19 were found to have phrenologically significant properties, such as anti-inflammatory, anti-androgenic, anti-tumour, and antibacterial properties. Additionally, the antimicrobial qualities of both extracts were evaluated against agriculturally significant pathogen such as *Xanthomonas axonopodis* pv. *glycines* (*Xag*), *Magnaporthe oryzae* (*M. oryzae*), and *Xanthomonas oryzae* pv. *oryzae* (*Xoo*), and these tests revealed the antimicrobial capabilities of the extracts. The Mitogen-Activated Protein Kinase (MAPK1) of *M. oryzae*, Peptide deformylase (PDF) of *Xoo*, and sucrose hydrolase (SUH) of *Xag* like enzymes could be preferentially targeted by certain compounds, such as Loliolide, Salicylic Acid Methyl Ester, Eicosapentaenoic acid, and Phytol, according to a molecular docking study. This could limit the growth of the aforementioned pathogens. Therefore, we think that L. camara could be the part of IDM to reduce phytopathogens after extensive examination.

Biography

Dr. Anirudh Kumar is currently working as Associate Professor in the Department of Botany, Central Tribal University of Andhra Pradesh (CTUAP), Vizianagaram, AP, India. He has research experience of more than 12 years in the area of plant molecular biology and plant pathology. He has received M.Sc. and Ph.D. degree from University of Hyderabad (India's Institution of Eminence), and Postdoc from CCCM, Hyderabad, India and ARO, Israel. His current research interests span from antioxidants studies of medicinal plants to plant pathology. He is author and co-author of several papers on different aspects of plant biology. He also teaches courses for B.Sc., M. Sc. and Ph.D. degree. For the past few years, his research group is trying to study phytochemical profiles of native plants, antimicrobial properties, and innate immunity of rice against pathogens such as *Xoo*.

Mei Yang
School of Forestry, Guangxi University; Nanning, Guangxi, China

Impacts of the Relationship of Species-Environmentand Fertilization on the Sustainable Agroforestryin Subtropical Area of China

Global climate change, land resource constraints, and rural revitalization strategies are driving subtropical regions to adopt innovative agroforestry models that integrate ecosystem conservation with income diversification. We carried out some studies the models of subtropical agroforestry in China by combining extensive regional surveys and multi-fertilization comparisons, pot experiments, rhizobox assessments of nitrogen-fixation potential. Results revealed that integrated application of compound fertilizers and microbial inoculants significantly enhanced the growth of agroforestry medicinal and economic crops, reduced chemical fertilizer inputs, and bolstered soil vitality. Rhizobox trials further affirmed the nitrogen-fixing capabilities of leguminous medicinal tree species. However, despite these advancements, large-scale agroforestry implementation may encounter hurdles related to species-environment matching and management measures. Consequently, our research aims to elucidate: (1) species selection aligned with environmental factors, such as soil and light; (2) chemical interactions among plants; and (3) precision nutrient management in agroforestry. These investigations could provide the theoretical groundwork and practical directives for sustainable forestry, ecosystem restoration, and income augmentation in subtropical regions and similar global regions.

Biography

My research focuses on forest management and the impacts of management practices on tree growth and stand development. I assess physiological adaptations of trees and forest micro-environmental conditions in natural forests, in forest restoration and plantation forest settings as well as in urban forestry. At present, I am investigating the changes in forest environment and how much changes may affect forest growth and structure. One of the main objectives of my research is to find new and efficient ways of producing multifunctional and ecologically sustainable forests by introducing the tree species or medical plants into the monoculture plantations. It is interesting to explore the relationship between afforestation, forest ecology and climate change. My teaching concentrates on silviculture and agroforestry, with a particular emphasis on plantation forestry and reforestation of forest stands in the subtropical and tropical areas of South China.

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Assessment of Genetic Diversity in Moroccan Pomegranate (Punica Granatum l.) Collection Using Physicochemical Approaches and Study of Effect of Age Trees

Like other fruit trees, pomegranate (Punica granatum L.) shows significant variations in pomological and chemical characteristics depending on harvest year and tree age. However, the combined effect of these factors on fruit quality remains little explored, particularly in the context of ex-situ collections over several years. Gaining a deeper understanding of these variations is essential for guiding breeding programs and optimizing fruit quality management.

Comme pour d'autres arbres fruitiers, les propriétés pomologiques et chimiques de la grenade (Punica granatum L.) peuvent varier d'une année à l'autre et en fonction de l'âge de l'arbre.

Pomologiques et chimiques peuvent varier d'une année à l'autre et en fonction de l'âge des arbres. Like other fruit trees, for the pomegranate (Punica granatum L.), the pomological and chemical properties can vary between years and depending on the age of the trees. Physicochemical screening of 19 pomegranate cultivars belonging to an ex-situ Moroccan collection, for fruits harvested from three different years, showed highly or very highly significant variations for most traits. Indeed, fruit weight, diameter and height were relatively higher in 2017, exceeding the values recorded in 2018 by 22.8%, 13.5% and 4%, respectively. In addition, the weight and length of the aril and some chemical properties, pH, total soluble solids brix degrees, and maturity index, presented higher values in 2017, exceeding those recorded in 2018 by 3%, 7%, 3%, 14% and 80%, respectively. For the average of the three harvest years, the Chelfi cultivar has the lowest weight, while the Khikhou has the highest value. The weight and yield of the arils vary respectively between 266 mg (OunH) and 670 mg (Khik); and 50.65 (Khik) and 73.34 (Gord). For chemical parameters, total soluble solids ranged from 14.52 (Grenade_Jaune) to 17.81 (Sefri 2) °Brix. The maximum value of titratable acidity has been found for 'Negro_Monsteriosa' (2.87%) and the minimum for 'Grenade_Rouge' (0.37%). The PCA analysis shows the distribution in groups according to the year of harvest which shows the annual variance of the traits. The hierarchical analysis shows the presence of gene pools without an obvious geographical structure. Thus, the results obtained constitute a basis for the breeding programs of the species.

Biography

I hold a PhD in Plant Biology and Biochemistry. My doctoral research focused on the "Pomological and chemical diversity of the pomegranate tree cultivated in Morocco and the effect of water deficit on fruit quality". This degree was awarded by the Faculty of Science and Technology at Sultan Moulay Slimane University in Beni Mellal, Morocco. During my doctoral thesis, my practical work was conducted at the national agronomic research institute in Meknes for 3 years.

Tong Wu*, Mei Yang
College of Forestry, Guangxi University, Nanning, China

N-Fixing Species Enhance Accelerate N Cycling in Subtropical Mixed Eucalyptus Forests via Microbial Pathways

Eucalypts, widely cultivated for their rapid growth, exhibit high nitrogen (N) consumption, which can negatively impact environmental sustainability. Mixed forests are recognized as effective ecosystems for enhancing soil N cycling efficiency, yet the underlying mechanisms governing the synergistic regulation of soil physicochemical properties, microbial communities, and enzymatic processes in Eucalyptus-dominated mixed forests remain poorly understood. We established a pure Eucalyptus Forest (PF) and three Eucalyptus-broadleaf mixed forests, Eucalyptus × Michelia macclurei (MF1), Eucalyptus × Alnus formosana (MF2), and Eucalyptus × Erythrophleumfordii (MF3), in suburban Nanning, Guangxi. After seven years of growth, comprehensive soil analyses (0-20 cm and 20-40 cm depths) revealed that mixed forests significantly elevated microbial biomass nitrogen (MBN) compared to the pure stand, indicating intensified microbial immobilization and turnover. Across all experimental treatments, a nitrification-dominated transformation pathway consistently emerged within a semi-closed N cycle. Notably, mixed stands containing N-fixing species (MF2 and MF3) exhibited enhanced total nitrogen (TN), ammonium-N (NH_4^+-N), and nitrate-N (NO_3^--N) concentrations, alongside a higher NO_3^--N/NH_4^+-N ratio and reduced soluble organic nitrogen (SON), which collectively suggest accelerated organic N mineralization and microbial assimilation. Furthermore, MF2 and MF3 exhibited elevated activities of urease (UE), protease (PRO), and β-glucosidase (NAG), coupled with increased microbial diversity and shifts in key N-transforming taxa, such as increased Bradyrhizobium and Nitrospira and reduced Bacillus, Pseudomonas, and Ralstonia. Comprehensive analysis identified microbial diversity (Chao1, Bacillus), PRO, NAG, and available phosphorus (AP) as key predictors of NH_4^+-N and NO_3^--N availability. The PLS-PM analysis further revealed two primary regulatory pathways: NH_4^+-N directly stimulated nitrification, while AP indirectly promoted NO_3^--N accumulation via microbial diversity and enzyme activity. These findings clarify the interactions driving N transformation in mixed Eucalyptus forests, providing theoretical insights for optimizing plantation management strategies to enhance soil N availability and ecosystem sustainability.

Biography

Tong Wu is a Ph.D. candidate at the College of Forestry, Guangxi University. His research focuses on soil ecology and microbe-driven nutrient cycling in plantation forests. In recent years, he has concentrated on nitrogen and phosphorus transformation processes in mixed-species forests, as well as the screening and application of key functional microorganisms. His work aims to uncover the interactions between soil microbes and nutrient dynamics, providing both theoretical insights and practical support for the sustainable management of plantation ecosystems.

Márcia Figueira*, Isabel de Sousa, António Guerreiro de Brito
LEAF—Linking Landscape, Environment, Agriculture and Food Research Center, Associated Laboratory TERRA, Instituto Superior de Agronomia, Universidade de Lisboa, Portugal.

Farmer's Field Books and the Multi-Level Social-Ecological-Technical Systems (MLSETS) Framework: Green Finance, LCA, and a Bioregional Understanding of Portuguese Rice

Green-finance instruments such as the EU Environmental Taxonomy are becoming central to agricultural investment, yet their strict thresholds risk oversimplifying farming realities and excluding farmers from support. To address this, we introduce the Multi-Level Social-Ecological-Technical Systems (ML-SETS) framework as a conceptual lens that integrates Social-Ecological Systems and the Multi-Level Perspective, while opening pathways to link them with sustainability metrics such as Life Cycle Assessment (LCA) and green-finance mechanisms. ML-SETS provides a structured way to interpret farm-level and regional dynamics without neglecting ecological feedback, technical practices, climatic variability, or the social conditions of farmers.

In a case study, we apply ML-SETS to 12 rice farmers in Portugal's Sado Delta, cultivating under three techniques (8 conventional, 2 direct seeding, 2 no till), using a three-year dataset of farmer field books—mandatory notebooks required for EU integrated crop production and subsidy access. These records provide time-stamped data on operations, fertilizers, pesticides, herbicides, machinery use, and pest or disease incidence. In Portugal, between 120,000 and 160,000 farmers file these field books each year. For this study, we focus on a coverage of ~590 ha of rice cultivation, with annual production ranging from 2,400 to 3,600 tonnes. We **extracted, normalized, and analyzed** this dataset by: (i) grouping operations and input intensities, (ii) tracing fertilizer and pesticide applications across crop stages, (iii) comparing yields across years and techniques using ANOVA and Kruskal–Wallis tests, and (iv) applying exploratory clustering methods, including Data Envelopment Analysis (DEA), to evaluate performance profiles. Regressions will also be explored to identify causal relationships between inputs, timing, and outcomes.

The results were then mobilized for multiple purposes, which in this plenary are presented through two guiding questions:

Green finance and LCA: How can nutrient-balance indicators required by the EU Taxonomy (e.g. farm-gate nitrogen balance, Nitrogen Use Efficiency) be aligned with LCA results covering fertilizers, crop-protection inputs, irrigation, and machinery?

Bioregional dynamics, climate, and governance: What information on pest and disease incidence can be extracted from this 590-ha dataset, and how can it be combined with climate signals (e.g. weather extremes, North Atlantic Oscillation phases) to inform governance of ecological risks and the timing of

activities to support resilience? And how can this analysis serve as a first step toward larger bioregional assessments?

By integrating finance, ecology, climatic dynamics, and farmer networks, ML-SETS enables analysis at both farmer and bioregional levels. Using farmer field books—a governance tool required for EU integrated crop production and subsidy access—we repurpose top-down data structures to calculate bottom-up constraints and farming realities. Building from this application with 12 farmers, the approach not only exposes, and provides a lens to address, the exclusions that rigid conventional and emergent green-finance criteria can produce, but also demonstrates how farmer-level data can be mobilized to generate more grounded assessments and open pathways for more adaptive, just, and regionally attuned agricultural transitions.

Biography

Márcia Figueira is a PhD researcher at the LEAF Research Centre, Universidade de Lisboa (Instituto Superior de Agronomia), supported by an FCT PhD grant (UI/BD/153706/2022). Trained as an agronomist and environmental engineer, her research focuses on sustainability transitions in agriculture, with a particular emphasis on Portuguese rice systems. She works with farmer field book records, Life Cycle Assessment, Data Envelopment Analysis, and climate-risk assessments to evaluate farming practices and environmental performance. Her broader interests include the governance of agri-food systems, the role of green-finance instruments, and the design of adaptive and socially just pathways for agricultural regions under ecological and climatic stress.

Nirmali Gogoi*, Subham C. Mondal
Department of Environmental Science, Tezpur University, India.

Influence of Drought Stress on Grain Quality of Lathyrus Sativus

The study was conducted to assess the grain quality of *Lathyrus sativus* under drought stress. The experiment was set up in a greenhouse with 1m2 blocks together arranged in randomized block design. Water withdrawal was done for 15 days in either vegetative or reproductive stage of the crop to simulate drought conditions. Plant physiological parameters were recorded, and biochemical estimation of plant samples were done on the harvested grains. The results showed a decline in grain crude and true protein content of *Lathyrus sativus* by 13% and 10% due to drought at vegetative and reproductive stages, respectively. In-vitro grain protein digestibility decreased up to 46% due to drought. However, it was observed that drought could significantly reduce (22%) the anti-nutritional factor, i.e., phytic acid content in *Lathyrus sativus*. The study revealed that to counter the anti-nutritional factor in the grains of Lathyrus sativus, and to optimize the benefits for the consumer, the imposition of terminal drought at vegetative stage of the crop is advantageous. However, further study is required o protein profiling.

Biography

Márcia Figueira is a PhD researcher at the LEAF Research Centre, Universidade de Lisboa (Instituto Superior de Agronomia), supported by an FCT PhD grant (UI/BD/153706/2022). Trained as an agronomist and environmental engineer, her research focuses on sustainability transitions in agriculture, with a particular emphasis on Portuguese rice systems. She works with farmer field book records, Life Cycle Assessment, Data Envelopment Analysis, and climate-risk assessments to evaluate farming practices and environmental performance. Her broader interests include the governance of agri-food systems, the role of green-finance instruments, and the design of adaptive and socially just pathways for agricultural regions under ecological and climatic stress.

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INRAT, Laboratory of Animal and Forage Production
INRGREF, National Institute of Research in Rural Engineering, Water and Forests
Faculty of Sciences of Bizerte, Department of Life Sciences, University of CARTHAGE

Biochemical characterization of Pancratium Maritimum L.

Pancratium maritimum L. or sea lily is a bulb perennial plant from Amaryllidaceae family growing wild in the sandy coasts of the Mediterranean regions.
It has broad leaves and white fragrant flower trumpets. Composed of several fleshy layers usually known as scales, the bulb is covered with an outer papery brown skin named tunic
Nowadays, due to coastal urbanization, P. maritimum is a neglected and endangered species.
Therefore, the objective of the present research aims to characterised biochemecally this plant from the northern Tunisian coast using leaves, seeds and bulbs at different stage. This work showed that leaves are richer in total phenol while seeds are richer in fiber (NDF: 48,7% ADF: 20,1% et ADL: 3,5%) , fat (15,4%) and crude protein (20,8%) than roots and bulbs.
Our data showed that the maximum values are generally observed in the mature stage for biochemical parameters, while statistical analyses showed that the “growth stage” effect highly significantly affects the parameters studied.
In conclusion, and given the richness of the seeds and leaves in MAT, Pancratium maritimum seems to be a promising alternative for animal nutrition and pharmaceuticals properties, further work is needed to confirm this.

Biography

Nasri Saida, Chief Engineer and Doctor in the Animal and Fodder Production Laboratory of the National Institute of Agronomic Research of Tunisia

Ayushi Gupta*[1,2] and Suresh Nair[1]

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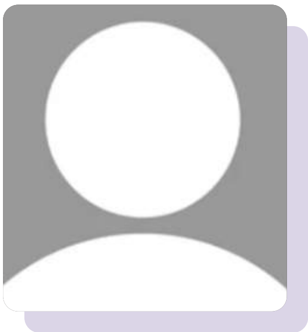
Microbiome-Epigenome Interplay Underlies Stress Tolerance in Insects

The gut microbiota and epigenetic processes have been recognized as key factors in the survival of the brown planthopper (BPH) ¬– a major pest of rice. In our study, we explored the interplay between gut microflora and epigenome and how it governs adaptive responses in insects. We studied the interaction between epigenetic mechanisms and the gut microbiome, while assessing its influence on BPH survivability. Our findings, for the first time, suggested that microbiome and epigenome work together to regulate the host response(s) to environmental signals, providing adaptive advantages to insects. We found that disruption of the gut microbiome led to significant changes in the host's epigenome, and similarly, alterations in the epigenome affected bacterial populations in the host. This suggests that epigenetics may play a role in maintaining microbial symbiosis in BPH. Additionally, we demonstrated that epigenetic mechanisms regulate and sustain microbial symbionts by modulating the insect’s immune system. Overall, our findings point to a crosstalk between the epigenome and microbiome that impacts gene regulation and microbe-mediated control of shared metabolic pathways in insects. These results offer new insights and directions for future research into the molecular mechanisms that govern these shared pathways, which are critical for symbiont-enabled herbivory. Furthermore, our study highlights the importance of investigating the interplay between gut microbiota and epigenetic mechanisms and understanding how these processes evolve and affect insect-plant interactions. Moreover, understanding how key traits and environmental drivers interact to shape the insect’s fitness in a changing environment is crucial for predicting their responses to climate change. Novel leads obtained herein have implications for the sustainable management of BPH and other pests.

Biography

I was born and raised in India. I obtained my Bachelor's and Master's degree in Botany from the University of Delhi, India. Subsequently, I joined Dr Nair's lab at the International Centre for Genetic Engineering and Biotechnology, Delhi for my PhD. During my doctorate, I worked on deciphering the molecular mechanisms underlying the rapid adaptive nature of insect pests. In addition, I also studied the role of the gut microbiome in insects' survival. Thereafter, I worked with Dr Annis Richardson as British Council Women in STEM Post-Doctoral fellow at the University of Edinburgh, where my research aimed at understanding gene regulatory networks and boundary specifications in maize. Currently, I am working as INSPIRE Faculty at the National Institute for Plant Biotechnology, Delhi. Here, my research focuses on unravelling the epigenetic dynamics of insect-pathogen interactions.



Da Ye Kim
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An Integrated Framework for Evaluating Water Resource Social Services in Agricultural Watersheds

Rural regions in Korea are increasingly confronted with complex challenges in water resources management due to climate change, groundwater depletion, river intermittency, and demographic shifts such as population decline and aging. Agricultural water availability is expected to decrease, while demands from other sectors continue to rise, emphasizing the need for a systematic framework to evaluate water-related social services. This study develops an integrated evaluation framework that combines geospatial analysis and multivariate statistical methods to assess sustainability, equity, and resilience in rural water systems. Data from 19 sub-watersheds of the Daecheong Lake basin (2013–2022), along with nationwide datasets from 507 standard watersheds, were analyzed. Indicators were established for four core domains: water utilization, water safety, carbon neutrality, and hydrophilic environment. Watershed boundaries were delineated using GIS, and water supply and sewage statistics were obtained from WAMIS. Data normalization and standardization were performed, and weights were derived through principal component analysis (PCA) and entropy methods, with PCA selected for its robustness. Results revealed significant spatial disparities. Sub-watersheds such as Boeuncheon and Mujunamdaecheon demonstrated strong performance in water welfare and management, whereas Hotancheon and Hyeonnaecheon exhibited low resilience and equity. At the national scale, the framework effectively identified vulnerable watersheds, providing an evidence-based basis for prioritizing interventions. The proposed framework supports continuous monitoring, targeted improvements, and tailored strategies for rural water governance. These findings offer a scientific foundation for enhancing drought resilience, ensuring stable agricultural water supply, and advancing sustainable water resource management in rural landscapes.

Biography

Daye Kim is a Postdoctoral Researcher in the Department of Regional Construction Engineering at Chungbuk National University, Republic of Korea. Her research interests include agricultural hydrology, water governance, and sustainable water resource management. She has participated in several national and international projects related to rural water management and has published papers on design flood estimation, reservoir operation, and agricultural water demand analysis. Her recent work focuses on developing evaluation frameworks and decision-support tools that enhance resilience and sustainability in agricultural water systems.

ZinThuZar Maung*, Emily C. Kraus

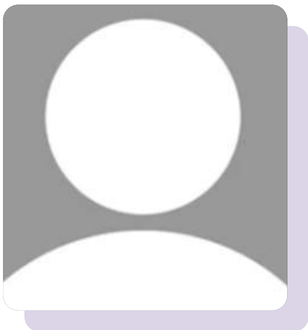
Small Farms and Specialty Crops Program, University of California Agriculture and Natural Resources, Fresno, California, United States

Addressing Barriers for Historically Underserved Producers in California's San Joaquin Valley to Implement Combined Soil Health Practices Through Participatory Planning and Evaluation on Diversified Farms

California's San Joaquin Valley is the backbone of the state's agricultural sector and a home to producers of diverse ethnic groups including African Americans, Japanese Americans, Latino and Southeast Asians, who engage mostly in small-scale and diversified farming. Although these producers have the awareness and knowledge of benefits from soil health practices, there are burdens to adapt these practices on their own due to socioeconomic disparities such as economic barriers, lack of access to farm machinery and equipment, language barriers, and environmental challenges. Thus, our team developed a project to provide materials such as cover crop seeds, compost, mulch, hedgerow and windbreak plants, equipment needed to utilize these resources, technical and educational assistance in multiple languages (English, Hmong, Spanish), and incentive payments made directly to the producers. The goal of the project is to reduce these barriers for small-scale producers, so they are able to adapt these practices to their own operations and to assess combined practices to determine the best combination and fit for their individual situations. From 2022, small-scale producers in San Joaquin Valley (approximately 10 farmers) practicing diversified vegetables crop production were recruited and on-farm trials were conducted. These trials included providing the materials and services mentioned above as well as collecting soil and plant tissues samples for analysis of soil health improvements, if any, during the implementation of soil health practices. Additionally, the project included conducting outreach trainings and farm tours, creating soil health conservation multilingual fact sheets and peer-to-peer videos. The latter were distributed as educational resources. At the end of the project, feedback and discussion from participating producers, soil health analysis data as well as economic data will be analysed and interpreted. Research-based recommendations and lessons learned will be shared with the wider audience of California's small-scale producers to determine if this is an effective means of reducing barriers and enhancing adoption of combined soil health practices.

Biography

Dr. Maung was born and raised in Myanmar where she obtained a bachelor's degree of Agricultural Sciences, then attained master's degree in Nematology at Ghent University, and a doctoral degree in bioscience engineering at K.U. Leuven, in Belgium with VLIR-UOS scholarship. As a staff research associate in the University of California, Agriculture and Natural Resources, Dr. Maung is currently working for the small-scale and diversified farmers of California's San Joaquin Valley, by applying her research and academic expertise in the field of integrated pest management (IPM) as well as implementing soil health conservation innovation practices both in perennials and annuals.



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Investigating the Mechanisms Through Which Astragalus Membranaceus Mitigates Heat Stress and Weaning Stress in Calves, as well as its Role in Reducing the Incidence of Pneumonia

Introduction:

In recent years, the importance of the healthy growth of calves and their role as replacement heifers in the development of the livestock industry has garnered widespread attention.

Heat stress and weaning stress are the main causes of calf health status and survival.

HuangQi has been widely used in human drug discovery and livestock production, especially for alleviating various types of stress, but its complex mechanism of action is unknown.

This Study Explores the potential and mechanisms by which HuangQi alleviates heat stress and weaning stress in calves, based on network pharmacology and molecular docking techniques.

Methods:

Utilize network pharmacology databases to obtain active components and target genes of HuangQi.

Utilize disease databases to obtain target genes for heat stress and weaning stress in calves.

Use the String database to screen core target genes for alleviating dual stress in calves through the active components of HuangQi.

Integrate the results of target gene enrichment to construct the HuangQi-signal pathway-dual stress network.

The correlation between active ingredients and targets was verified by using molecular docking technology.

The correlation between GAPDH and the incidence of pneumonia was explored using
Mendelian randomization.

Conclusion:

This study demonstrates that the active constituents of HuangQi possess the biological potential to alleviate heat stress and weaning stress in calves. Additionally, GAPDH may contribute to reducing the incidence of pneumonia before and after weaning through mechanisms involving immune regulation and energy metabolism. The findings provide a theoretical basis for the application of HuangQi as a feed additive to mitigate stress in calves under summer grazing conditions.

Biography

To be Added

PMBWC & AFHWC 2025

Upcoming Conferences

PMBWC 2026 Conferences
In July 2026 @ Singapore

AFHWC 2026 Conferences
In July 2026 @ Singapore

Precision Global Conferences
601 King St Ste 200 #853 Alexandria, VA 22314
United States