magnus Group

9th Edition of Global Congress on

Plant Biology and Biotechnology

27-29 March, 2025
Singapore

Venue: Village Hotel Changi
1 Netheravon Rd, Singapore 508502

BOOK OF ABSTRACTS

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Welcome Message

Dear Conference Attendees,

Establishing food security in the world is a major goal of scientists around the world. Primary step for improving global food security is sustainable production of food crops. In spite of the vast efforts, more than 30% of food crops and products are lost to plant pests, poor technology and insufficient knowledge in handling crop yields and products. The losses are much higher in the developing countries than developed countries. Plant Biology and Biotechnology Conferences facilitate our meetings, either In-Person or virtually, to discuss the newest available methods and technology in the world for problem-solving in providing food to all people of the world. Let's work together to achieve a standing in the world where nobody will go to bed hungry or even malnourished.

Mohammad Babadoost
University of Illinois, United States

Welcome Message

Welcome to the 9th Global Congress on Plant Biology and Biotechnology March 27 - 29, 2025, Singapore.

I am pleased and honored to welcome each participant at the 9th Global Congress on Plant Biology and Biotechnology at the Village Hotel Changi, Singapore. As the human population expands at geometric proportions, the need for science-based solutions to agricultural production, product development, and utilization-related challenges is becoming increasingly apparent and important. This conference aims to provide a forum for the exchange of scientific ideas and research findings, stimulate the development of research-based solutions for efficient and innovative means of ensuring food safety and security, foster networking, and provide ambiance for researchers, scientists, students, and industry professionals to meet, interact and develop relationships. We will be discussing issues related to a myriad of topics including but not limited to agronomy, climate change effects, soils, micro and macro biomes, phytochemistry, genetics, biochemistry, biotechnology/molecular biology, postharvest processing/handling and manufacturing techniques. These topics are crucial in our collective efforts to improve the quality and standards of human life through plant biotechnological approaches.

I welcome you to participate, share, and interact with one another as we strive to ensure food safety and food security through a better understanding of plant biology and biotechnology. Together, we aim to push the frontiers of science further in our efforts to mitigate the burgeoning effects of climate change on food safety and security. On behalf of the organizers and program committee, I hope you will find this conference and venue most productive and enjoyable, and that you leave with a deeper understanding of our shared goals.

Srinivasa Rao Mentreddy

Alabama A&M University, United States

Welcome Message

Dear Conference Attendees,

It is an honor and great pleasure to write a few welcome notes for the 2025 conference. Agronomy and Agricultural Research covers many aspects of plant biotechnology, breeding, soil science and agroecology. As the world transitions from fossil fuels to more environmentally sensitive forms of fuel, we must consider the waste streams generated by the increasingly large urbanisation. We can improve our soil using waste streams at the same time breeding for resilience as changes in climate affect our agricultural systems. Caring for our soil and breeding for climate-effective agricultural crops must be an agricultural priority. It will be a great opportunity for the participants, including young and senior researchers, scientists, and academics to gain knowledge with the up-to-date research in our global agricultural systems.

Mary Cole
The University of Melbourne, Australia

Welcome Message

Dear Participants,

A very warm welcome to the 9th Edition of Global Congress on Plant Biology and Biotechnology going to be held in Singapore from March 27-29, 2025. It is an honour for me to deliver a Keynote speech for this conference. It is indeed a great opportunity for all of us to present and discuss our research on diverse aspects of plant biology and biotechnology which is crucial for solving our present and future problems related to the yield of different crops and other food products, medicinal plants as well as ornamental plants. Rice, maize, wheat, sorghum and barley are the major food crops which constitute the world's nutrient requirements. Although the overall yield of such cereals has been increasing, the growing population and adverse climatic changes pose huge challenges for their sustained production. Hence, we need to develop new breeding targets and agronomic traits for improving crop production. I hope the extensive scientific sessions of this conference would be beneficial for all of us in understanding and solving different aspects of biotechnology.

Dr. Bijayalaxmi Mohanty
National University of Singapore, Singapore

Welcome Message

Esteemed delegates of GPB 2025,

It's my privilege and honor to be part of the 9th Edition of Global Congress on Plant Biology and Biotechnology (GPB 2025). The theme of the conference, 'Frontiers in Plant Science: Exploring Innovations and Discoveries' is highly relevant, as we know, plants contribute significantly to human health and well-being. The fascinating diversity of phytochemicals are ultimately responsible for the wide applications of plant resources, and also have a significant role in understanding the plant life and ecological interactions. Recent developments in plant biology and especially plant biotechnology are based on an interdisciplinary approach, where the contribution of plant chemistry is significant. Life science research is going through an 'omics' era and the unprecedented progress in phytochemical techniques as in the case of hyphenated analytical techniques and ambient analytical techniques opened up new avenues for phytochemists to explore boarder areas such as chemical ecology, chemogenomics and metabolomics. The conference will definitely act as a platform to orient new directions to the contemporary research in plant science field.

Dr. Rameshkumar K B
KSCSTE-JNTBGRI, India

Welcome Message

Dear Conference Attendees,

It is an honor and great pleasure to write a few welcome notes for the session entitled “Environmental Pollution and Control in Biology and Biotechnology”. “Environmental health impact assessment “(EHIA) as the systematic identification and evaluation of the potential impacts (effects) of proposed projects, policies, plans, programs, or legislative actions relative to the physical-chemical, biological, cultural, and socioeconomic components of the total environment. Project planning and decision making should include the integrated consideration of the three Es (engineering or technical, economics, environmental, social, and other factors. Prior to the environmental crisis, technical and economic factors dominated the decision-making process. The terminologies in the process of complying environmental crisis for sustainable plant biology and biotechnology are environmental inventory, environmental health impact assessment and environmental impact statement. It will be a great opportunity for the Global Plant Biology and Biotechnology participants including young and senior researchers, scientists, consultants, and academicians to gain knowledge with the up-to-date research in biology and biotechnology.

Dr. Vijayan Gurumurthy Iyer
Bihar Institute of Public Administration &
Rural Development, India

ABOUT
MAGNUS GROUP

Magnus Group, a distinguished scientific event organizer, has been at the forefront of fostering knowledge exchange and collaboration since its inception in 2015. With a steadfast commitment to the ethos of Share, receive, grow, Magnus Group has successfully organized over 200 conferences spanning diverse fields, including Healthcare, Medical, Pharmaceutics, Chemistry, Nursing, Agriculture, and Plant Sciences.

The core philosophy of Magnus Group revolves around creating dynamic platforms that facilitate the exchange of cutting-edge research, insights, and innovations within the global scientific community. By bringing together experts, scholars, and professionals from various disciplines, Magnus Group cultivates an environment conducive to intellectual discourse, networking, and interdisciplinary collaboration.

Magnus Group's unwavering dedication to organizing impactful scientific events has positioned it as a key player in the global scientific community. By adhering to the motto of Share, receive, grow, Magnus Group continues to contribute significantly to the advancement of knowledge and the development of innovative solutions in various scientific domains.

ABOUT
GPB 2025

Welcome to the **9th Edition of Global Congress on Plant Biology and Biotechnology (GPB 2025)**, taking place in **Singapore**, and online from **March 27-29, 2025**. This year's conference, themed *"Frontiers in Plant Science: Exploring Innovations and Discoveries."* The conference offers a comprehensive program featuring keynote talks, oral and poster presentations, and interactive discussions.

As you explore this abstract book, you will find a collection of pioneering research and insights that capture the dynamic nature of this year's conference. Each abstract provides a glimpse into the significant advancements and innovative work driving progress in Plant Biology and Biotechnology. Whether you are participating in person or virtually, you will have the opportunity to connect with leading experts and peers, fostering discussions that will shape the future. We eagerly anticipate your engagement in this transformative event and the valuable contributions you will bring to the field.

ABOUT

CPD Accreditation

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Continuing Professional Development (CPD) credits are valuable for GPB 2025 attendees as they provide recognition and validation of their ongoing learning and professional development. The number of CPD credits that can be earned is typically based on the number of sessions attended. You have an opportunity to avail 1 CPD credit for each hour of Attendance.

Some benefits of CPD credits include:

Career advancement: CPD credits demonstrate a commitment to ongoing learning and professional development, which can enhance one's reputation and increase chances of career advancement.

Maintenance of professional credentials: Many professions require a minimum number of CPD credits to maintain their certification or license.

Increased knowledge: Attending GPB 2025 and earning CPD credits can help attendees stay current with the latest developments and advancements in their field.

Networking opportunities: GPB 2025 Conference provide opportunities for attendees to network with peers and experts, expanding their professional network and building relationships with potential collaborators.

Note: Each conference attendee will receive 25+ CPD credits.

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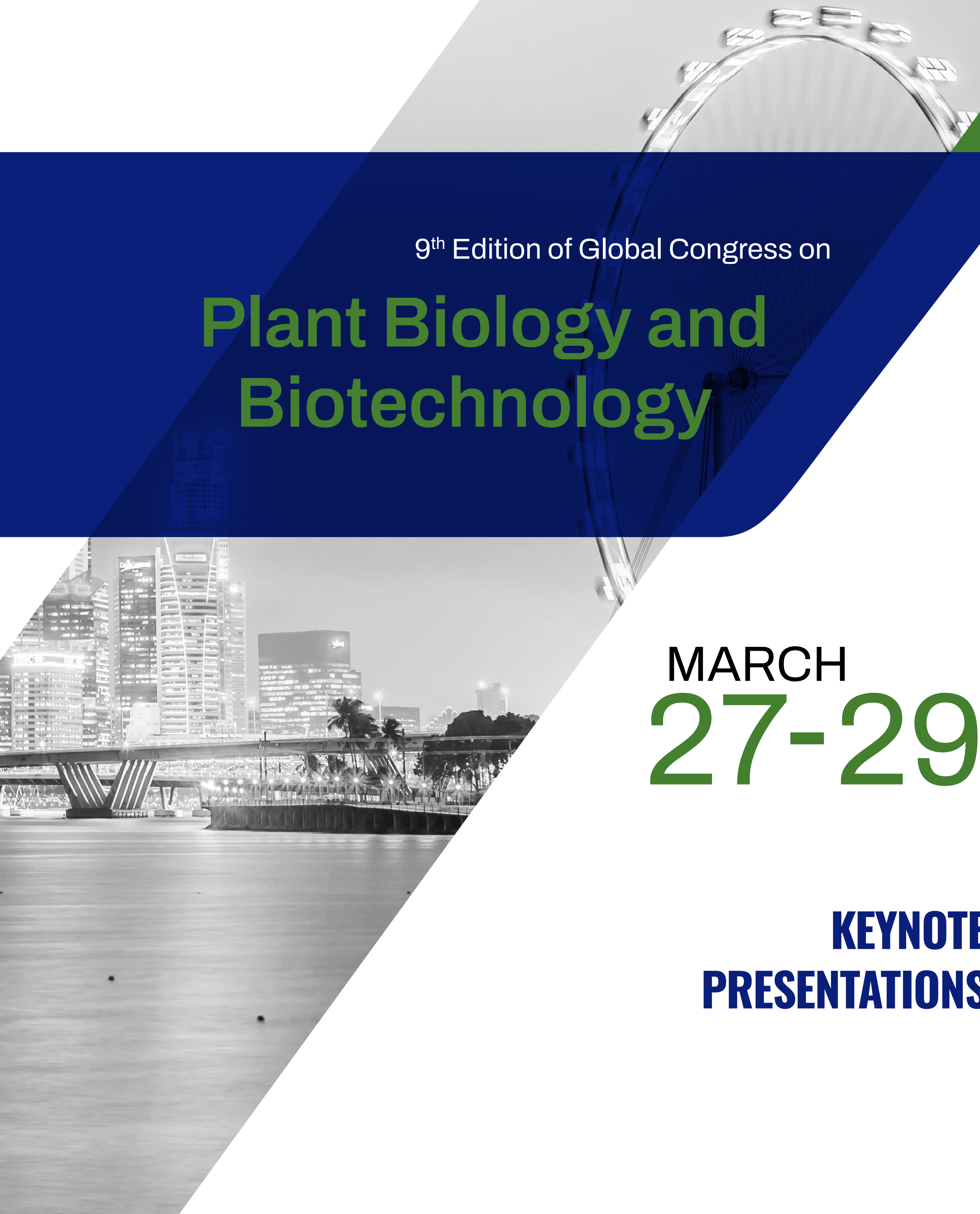

MARCH
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KEYNOTE PRESENTATIONS

Abdul Khalil Gardezi[1*], Leticia Manuela Inzunza Medina, Guillermo Carrillo Castañeda[1], Héctor Manuel Ortega Escobar[1], Oscar Raúl Mancilla Villa[2], Juan Enrique Rubiños Panta[1], Jorge Flores Velazquez[1], Nora Meraz Maldonado, Sergio Roberto Marquez Berber[3], Héctor Flores Magdaleno[1], Gabriel Haro-Aguilar[1]

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[3]Departamento de Fitotecnia, Universidad Autónoma Chapingo, Texcoco, Estado de México

Evaluation of three tomato varieties (*Solanum lycopersicum L.*) inoculated with bacteria under stress conditions induced by wastewater and copper sulfate

The objective of this study was to evaluate the responses of three tomato varieties (*Solanum lycopersicum L.*) inoculated with bacterial strains under stress conditions induced by wastewater and copper sulfate in a greenhouse environment at the Postgraduate Campus Montecillo, Texcoco, Mexico. A completely randomized block design with a factorial arrangement was employed, involving 108 experimental units (3 replications×2 copper sulfate levels×2 soil types×3 bacterial consortia×3 tomato varieties). Variance analysis and Tukey's mean comparison test ($P \le 0.05$) were used to analyze the data. The results demonstrated that bacterial inoculation

Biography

Dr. Abdul Khalil Gardezi is a distinguished scientist and academic member of the Hydro science Center, Postgraduate College in Agriculture Science in Mexico, since 1981. He has received distinctions for teaching, research and service from 1988 until 2024. He has been selected for the originality of his research, presented as the best paper and oral presentation from 2003 until 2024 in international congresses in USA, Dubai, France, Spain, England, Germany, Mexico, Nederlands, Switzerland, and Australia. He has published more than 200 papers internationally. He has been honored among 2000 outstanding intellectuals of the 21st century by the International Biographical Center Cambridge, England.

positively influenced the development of tomato plants grown for 120 days under copper stress and in soils historically irrigated with wastewater. In the R.G. 22 variety, Consortium 1 (Pseudomonas putida, Pseudomonas fluorescens, and strain A9) significantly enhanced plant development. For the R.G. 19 variety, Consortium 3 (strains A, D, A7) yielded the best results, while in the R.N. 22 variety, both Consortia 1 and 3 promoted seedling growth.

Across evaluations, Consortia 1 and 3 consistently showed positive effects on plant development. Specifically, Consortium 1 improved stem length and diameter, root length and volume, and aerial dry biomass compared to the control in R.G. 22. In R.G. 19, Consortium 3 increased stem and root length, aerial dry biomass, and leaf area. For R.N. 22, the use of both consortia enhanced the number of leaves, root length and biomass, and aerial dry biomass relative to the control.

Bijayalaxmi Mohanty

Environmental Research Institute, National University of Singapore, Singapore

Promoter architecture and transcriptional regulation of genes upregulated in germination and coleoptile elongation of diverse rice genotypes tolerant to submergence

Rice is unique in its ability to germinate and elongate its coleoptile in response to submergence stress compared to other crops that fail to germinate under such conditions. However, the rate of germination and coleoptile elongation varies from genotype to genotype. Therefore, to elucidate the unique transcriptional mechanism that regulates differences in coleoptile elongation, an ab initio approach was used to reveal the promoter architecture and possible transcriptional regulation of rice genotypes from diverse backgrounds which have different rates of coleoptile elongation to reach the surface of water for shoot and root initiation in response to submergence tolerance. The putative cis-elements and their associated transcription factors provide useful information on the crosstalk between transcription factors and phytohormones. The results suggest that the endogenous ABA level could be acting as an on-off switch regulating in a spatio-temporal manner to activate/repress other TFs and hormonal signaling pathways during germination and coleoptile elongation. Co-ordination of both auxin-BR responses could be regulating coleoptile elongation. TFs such as MYB3Rs, TSO1, TCX2/SOL2, TCX3/SOL1 and ASHR1 could potentially be involved in epigenetic regulation of coleoptile elongation. The information derived from the current in silico analysis can potentially guide in developing new emerging rice genotypes for direct seeding.

Biography

Bijayalaxmi Mohanty received her MSc and MPhil degree from Utkal University, Bhubaneswar, India in 1983 and 1985 respectively and PhD degree from the University of Cambridge, UK in 1991. She is currently a Visiting Research Scientist at the Environmental Research Institute, National University of Singapore, Singapore. Her main research interests focus on the abiotic stress tolerance in rice and other plants, plant genomics, metabolic and transcriptional regulation, integrative omics approaches to different abiotic stress conditions and plant modeling. She is the Associate Editor for Current Plant Biology, Plant Biophysics and Modeling, Frontiers in Plant Science, Crop Design and review Editor for 30 internationally referred journals.

Keywords: Rice Germination, Submergence, Promoter Cis-Elements, Transcription Factors, Gene Regulation.

Selenne Yuridia Márquez Guerrero[1], Manuel Fortis-Hernández[1], Pablo Preciado-Rangel[1], Betzabe E. López-Corona[2], Jesús Ortega García[2], Carmen Lizette Del Toro Sánchez[2], Jesús Sosa Castañeda[2], Susana Marlene Barrales Heredia[2], Edgar Omar Rueda Puente[2*]

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[2]Universidad de Sonora, Hermosillo, Sonora, México

Functional medicine and the agronomic engineer: What it is and how to influence in a society after a pandemic

Food production in the world is one of the greatest challenges to achieve various purposes, among which is the supply of foods of plant origin, under the principle of sustainability, health, quality and agri-food safety. In the agri-food field, the main agent is the Agricultural Engineer, who is the professional with knowledge and technique in agri-food systems. However, the economic interests involved in producing food most of the time lead to the failure to meet sustainability criteria, resulting in the production of foods with high pesticide content and poisoning the population that consumes them. We can see this same phenomenon in conventional human medicine, where the pharmaceutical sector, together with human medicine professionals, has worn out; That is, instead of having those opportunities that it gives you to connect with other individuals and do something for someone else, it has really and only been promoted more for economic interest and not the benefit of the patient. The alternative

Biography

Dr. Edgar O. Rueda Puente is a Level 3 researcher in the National System of Researchers in Mexico; knowledgeable about the needs of our American Continent, and absolutely consistent with the National Development Plan in the Mexican Republic (2017-2026). He has been awarded with the degree Doctor Honoris Causa by the International Organization for Inclusion and Educational Quality (OIICE). He is qualified to audit and implement institutional management systems, under the standards listed below; supported by the institution. He is accredited by the Mexican Accreditation Entity (EMA: ISO 9001:2015; ISO 14001:2015; ISO 21001:2018; ISO 50001; ec0217 Competence Standard – CONOCER. He is a Member of the Intersecretarial Commission on Biosafety of Genetically Organisms Modified in Mexico, a Founding Member of the World Seawater Organization (OMAR) and Scientific Committee, based in Madrid, Spain and Antioquia, Colombia.

to this condition that is experienced in both sectors (agriculture and human medicine), is to carry out pesticide reduction in agriculture, getting as close as possible to sustainable and organic agriculture. For its part, in human medicine, it is of utmost importance to carry out in our lives the principles of Functional Medicine, which is the process where the professional truly integrates with the patient; It is one that does not focus on the disease, but focuses on the individual, in such a way that it does not cure diseases but rather creates health and that by redirecting the way we produce food and take care of our health, we will be able to give better meaning to our lives. A conference with the Global Scientific Guild, and where science meets wisdom. It is a conference enriched with the principles of Dr. Alexander Krouham, a global expert in functional medicine.

Biography

Dr. Mary Cole studied at Monash University, Melbourne, Australia. She is an internationally recognised academic, plant pathologist and soil microbiologist for 45 years specializing in biological and regenerative agriculture farming emphasizing understanding of the role of soil biota in plant health. She demonstrates the damage synthetic chemicals have on soil and plant health. Mary supports farmers around the world in future-proofing their enterprises against climate change and ever-increasing cost of production.

Mary Cole

Agpath Pty Ltd and University of Melbourne, Melbourne, Victoria, Australia

Mineralisation of urban waste through composting in agriculture in a circular economy

Australians are looking to recycle organic streams by composting to keep these valuable materials away from landfill.

Worldwide, communities are addressing recycling of solids and green organics as cities increase in size and landfill sites become less available. The alkaline nature of many recyclable organics makes them an alternative to lime application on agricultural land while increasing organic matter in the soil and increasing microbial activity (Goswami & Sarma, 2008).

Cole (2021) demonstrated the positive impact of compost tea made from high quality thermal aerobic composted green material on improved soil structure, microbial balance and weed management showing it reduced disease pressure in vineyards which led to removal of herbicides and most fungicides from the annual management program both in the vineyards and the grazing property.

Yan et al (2013) determined that the major compounds attributing to odour gases in food waste were trimethylamine and ethyl thioether. Ethylbenzene and citric acid were also present at the standard threshold as tested by gas chromatography-mass spectrometry and chemical methods.

As the world transitions from coal and oil-based products, agricultural inputs based on organic raw materials become more in demand. This invites an ever-expanding market for trade in renewable, composted amendments for agriculture globally. Composting organics could provide a revenue stream for councils if they chose to compost on site. The large commercial operators have capacity to improve the quality of products coming from raw organics. Value-added products made specifically fit-for-purpose for different agricultural sectors would attract a premium in best practice agriculture.

Mohammad Babadoost*, Khanal S

Department of Crop Sciences, University of Illinois, Urbana, Illinois 61801, United States

Techniques for identification and managing bacterial and fungal diseases of tomatoes

Illinois is an important state in producing fresh-market tomatoes in the United States. In this state, tomatoes are produced in open-fields and indoors (greenhouses and high tunnels). Weather conditions in Illinois are conducive for developing biotic and abiotic diseases. Several bacterial and fungal diseases occur in both open-fields and indoor tomato production in Illinois. Bacterial diseases, which develop only in open-field productions, are bacterial canker (*Clavibacter michiganensis subsp. michiganensis*), bacterial speck (*Pseudomonas syringae pv. tomato*), and bacterial spot (Xanthomonas spp.). In the past nine years, bacterial spot disease occurred in all Illinois commercial tomato fields. A study was conducted to assess the occurrence of bacterial spot disease in commercial tomato fields, identify the causal species, and develop effective management of the disease. Field surveys were conducted for three years, and severity of foliage and fruit infection was recorded. Severity of symptomatic foliage ranged from 0% to 91% (mean 36.7%) and incidence of symptomatic fruit ranged from 0% to 30% (mean 10.8%). During the surveys, 266 *Xanthomonas* isolates were collected and identified as *Xanthomonas gardneri* and *X. perforans*, using Xanthomonas-specific hrp primers. Eighty-six percent of the isolates from northern Illinois were identified as X. gardneri, whereas 73% of the isolates from southern Illinois were *X. perforans.* Isolates from central Illinois were identified as *X. perforans* and *X. gardneri,* 53% and 47%, respectively. At present, foliage blight caused *by Xanthomonas spp.* is widespread, and fruit infection occurs mainly in northern Illinois. Major fungal

Biography

Mohammad Babadoost completed his Ph.D. in plant pathology at North Carolina State University. In 1999, he joined the faculty of the University of Illinois at Urbana-Champaign, where he is now a Professor of Plant Pathology and Extension Specialist. Mohammad conducts research and extension programs on the biology and management of vegetable and fruit crops diseases, and teaches "Plant Disease Diagnosis and Management." In the past 25 years, Dr. Babadoost has been involved in various teaching, research, and extension programs in 43 countries and has developed a profound commitment to establishing food security in the world. He has more than 600 publications.

diseases in commercial open-field productions are early-blight (*Alternaria solani*), Septoria leaf spot (*Septoria lycopersici*), anthracnose (Colletotrichum coccodes), and southern blight (Sclerotium rolfsii). In indoor production, major fungal diseases are leaf mold (Fulvia fulva) Verticillium wilt (*Verticillium spp.*), and Sclerotinia blight (*Sclerotinia sclerotiorum*). Multi-year open-field testing on ‘Red Duce’ and ‘Mt. Fresh’ tomatoes have shown that the lowest disease severity was in the plots with weekly spray-applications of copper hydroxide (Kocide-3000 46.1DF) plus mancozeb (Manzate Pro-Stick), Kocide-3000 46.1DF plus chlerothalonil (Bravo Weather Stik 6F), and Regalia. Applications of these compounds not only prevent or significantly reduce occurrence of bacterial spot disease (*Xanthomonas spp.*), but also are effective in managing other bacterial and fungal diseases in open-field production.

Biography

Dr. P.E. Rajasekharan, former Principal Scientist at ICAR-IIHR, Bengaluru, and currently an advisor to the CEO of the Chhattisgarh Medicinal Plants Board, has over 38 years of research experience in horticultural genetic resources, conservation, and IPR. A top ranker in M.Sc. (Botany) and ARS, he holds a Ph.D. from Bangalore University. Dr. Rajasekharan has published over 200 research papers, edited four volumes for Springer, and his achievements in pollen cryopreservation are globally recognized, with a record in the Limca Book of Records. He has received multiple fellowships and actively mentors students and professionals.

P E Rajasekharan

Formerly Division of Flower and medicinal crops, ICAR-Indian Institute of Horticultural Research, India

Securing the future of horticulture: Cryobanking pollen for biodiversity and breeding

Cryopreservation is an essential method for conserving the genetic resources of crop species addressing challenges like flowering asynchrony, limited pollen availability, and complex breeding cycles in perennial species. By preserving pollen in cryobanks, breeders can ensure a consistent supply of viable pollen, overcoming seasonal and geographical constraints, and enabling hybridization across diverse species and genera. Pollen cryopreservation is straightforward and effective, with protocols that avoid the need for cryoprotectants, making it suitable for routine use in germplasm conservation. Pollen cryobanking enhances cross-country pollen transport due to minimal quarantine requirements and the pollen's resilience, owing to its low water content and robust exine. Key steps include collecting dry, viable pollen, storing it in airtight pouches within cryogenic canisters, and conducting viability tests post-thaw for effective field pollination. The development of standardized methods for different pollen types, including desiccation-tolerant and non-desiccation-tolerant varieties, is critical for establishing pollen conservation in genebanks. This presentation will discuss the advantages of pollen cryopreservation in horticultural crop breeding, highlighting its utility as a complementary resource for breeders and researchers.

Keywords: Pollen Cryopreservation, Plant Breeding, Horticultural Crops, Pollen Viability.

Rameshkumar K B

Phytochemistry and Phytopharmacology Division
Jawaharlal Nehru Tropical Botanic Garden and Research Institute (KSCSTE-JNTBGRI) Palode, Thiruvananthapuram-695562, Kerala, India

Phytochemical diversity in the flora of the Western Ghats - An investigation through hyphenated mass spectrometric techniques

The plant kingdom represents an extraordinary reservoir of molecules, synthesized from the fascinating laboratory of plants, and Phytochemistry deals with the diversity of such compounds. The Western Ghats, one among the 36 global biodiversity hotspots, harbor nearly 7500 flowering plants, of which 1250 are endemic to the region. The present study reports the phytochemical diversity of selected plants of the Western Ghats through hyphenated mass spectrometry techniques GC-MS and LC-MS. The volatile chemicals of plants were generally analysed through GC-MS of essential oils or head space, while the non-volatile compounds were analysed through LC-MS of various solvent extracts. LC-MS studies of 13 Garcinia species revealed distribution of bioactive constituents such as biflavonoids, xanthones and acids, while GC-MS studies reported the genus as rich source of volatile terpenoids and aliphatic compounds. Distribution of piperamides, phenolics and terpenoids in the fruits and leaves of ten Piper species were studied by various LC-MS methods. Direct analysis in real time Mass Spectrometry (DART-MS) has been found as a rapid and reliable tool for demarcation of the medicinal herbs Piper nigrum, P. longum and P. chaba. Also the chemotaxonomic marker compounds were determined for Piper species based on leaf volatile chemical studies through GC-MS. Several new natural sources of aroma compounds such as camphor, safrol and linalool were discovered through the

Biography

Dr. Rameshkumar K.B., PhD from the University of Kerala, Thiruvananthapuram, has more than 25 years of research experience in the field of Phytochemistry at KSCSTE-JNTBGRI, Kerala, India. He had several new molecules, new plant species, more than 70 research papers, produced 6 Ph.Ds, received several awards including the prestigious 'Young Scientist' award by Govt. of Kerala and FAS by Kerala Academy of Sciences. He has organised International Seminars on Phytochemistry, and several workshops and training programmes in phytochemistry. He is currently working as Principal Scientist in the Phytochemistry and Phytopharmacology Division of KSCSTE-JNTBGRI, and also the Scientist i/c of Central Instrumentation Facility-JNTBGRI.

GC-MS studies of Cinnamomum species from the Western Ghats. The hepatotoxic phenyl propanoid coumarin in cinnamon samples (C. verum) were found within the tolerable daily intake limit by UHPLC-ESI-Qqq-LIT-MS method. HPLC-QTOF-MS studies on the distribution of phorbol esters in Euphorbia species revealed that the toxic phorbol ester TPA was absent, while the cytotoxic ester prostatin was present in the all the 13 Euphorbia species studied. The floral head space volatiles of around 100 species have also been investigated through HS GC-MS analyses. The presentation discusses the application of the chemical profiling in chemical ecology, atmospheric chemistry, integrated pest management, food quality and chemotaxonomy. More than 80% of the endemic flowering plants of the Western Ghats region are hitherto uninvestigated for their chemical constituents and the present study highlights the application of various hyphenated MS techniques in chemical profiling of the unexplored flora.

Srinivasa Rao Mentreddy[1*], Trang Pham[1], Sravan Kumar Sanathanam[1], Lam Duong[2], Charles L. Cantrell[3], Mei Wang[3], Ambika Poudel[4], William N. Setzer[4], Prabodh Satyal[5]

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[3]USDA-ARS, Natural Products Utilization Research Unit, MS

[4]Department of Chemistry, UAH, AL

[5]Aromatic Plant Research Center, UT, USA

Development of turmeric (*Curcuma spp.*) from a little-known crop to high value medicinal crop in Southern USA

Turmeric (*Curcuma spp.*), used in Indian medicine for over 4000 years, is now gaining popularity in the US as a health supplement to combat inflammatory diseases, memory loss, and immune deficiency, among many others. A lack of high curcumin turmeric varieties adapted to the Southeastern US and production technology are a major limitation to its production in the US. Therefore, field trials were conducted between 2007 and 2022 at Alabama A&M University to develop turmeric crop for commercial production. A wide range of turmeric genotypes obtained from Vietnam and other sources were evaluated for identifying genotypes best suited for commercial production. In the first phase (2007-2012), 15 genotypes were evaluated for adaptation, yield, and curcumin content; in the second phase (2015-2019), 52 varieties of Vietnamese origin were assessed at university research stations and 12 farms across Alabama for developing high curcumin turmeric varieties to cater to the

Biography

Dr. Srinivasa Rao Mentreddy, an Indian-born American citizen, is a Professor of crop science at Alabama A&M University, Alabama, USA. His research focuses on developing cover crop-based sustainable crop production practices for vegetable and medicinal herbs in the open field and agroforestry systems, evaluating low-temperature plasma for ensuring food safety and improving crop productivity, and climate-smart agricultural practices using cover crops and alley cropping. Dr. Mentreddy earned a BS and MS in Agriculture from the Andhra Pradesh Agricultural University, India, and a Ph.D. in Agronomy from the University of Tasmania, Australia. Dr. Mentreddy is well-published, with about 48 peer-reviewed journal articles, five book chapters, and more than 196 conference proceedings abstracts.

medicinal plants industry; and in the third phase (2019–2022) season extension methods (high tunnel, cold plasma, hot water, and heat pad treatments) were evaluated to extend the turmeric growing season to enable higher rhizome yields and curcumin accumulation. Five genotypes were planted in single-row plots arranged in a randomized block design with four replications. Three plants from the middle row of each plot were harvested to determine fresh & dry rhizome yields and their curcumin (HPLC) and Essential Oil (EO) components (by hydrodistillation and analyzed by gas chromatographic techniques). In phase 1 trials, the fresh rhizome yield ranged from 9 for CL9 to 28 MT/ha for CL7, and the genotypic differences were significant. The curcumin content varied from 0% in C. zedoaria genotypes to 2.5% in C. Longa genotype (CL6). The yield of Vietnamese genotypes ranged from 0 MT/ha (VN 21,23,24) to 18.1 MT/ha (VN 27). The total curcumin content varied between 0 for all black and white turmeric and 6.8% for red turmeric varieties. Rhizomes subjected to cold plasma, hot water, or heat mats sprouted a week to 4 weeks earlier and produced higher rhizome yields than the control. Production in high tunnels extended the growing season by 4 to 6 weeks, resulting in 8 to 26% higher yield and curcumin content compared to those grown in open fields. The essential oil content varied between 0.204% (CL10) and 0.695% (CL9).

The major components in the essential oils were ∝-phellandrene (3.7-11.8%), 1,8-cineole (2.6-11.7%), ∝-zingiberene (0.8-12.5%), β-sesquiphellandrene (0.7-8.0%), ar-turmerone (6.8-32.5%), ∝-turmerone (13.6-31.5%), and β-turmerone (4.8-18.4%). In another study, the dominant EO components were curzerone (14.7-18.6%), germacrene (10.7-14.7%), 1,8-cineole (5.2-11.7%), ar-turmerone (8.3-36.1%), ∝-turmerone (12.7-15.2%), β-turmerone (5.0-15.4%), ∝-zingiberene (4.6-13.9%), and β-sesquiphellandrene (4.6-10.0%). Turmeric has commercial production potential in Alabama and perhaps the Southeastern US. The distinctly different oil components in turmeric varieties studied could be potent against different diseases, particularly cancers.

Susmita Shukla

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Plant biotechnology: A touchstone for transforming global agriculture

Transforming Agriculture is the major concerned area to be taken care of which is possible through reshaping food production, supply chains, and sustainability practices as only these will help to suffice the need of food supply to the growing population and to mitigate the climatic change. Therefore, there is urgent need to create sustainable and tech-driven farming models which will not only be able to feed the growing global population but also will reduce the environmental impact caused due to climatic changes. Plant Biotechnology has emerged as an important tool for transforming global agriculture resulting in enhancement of crop productivity, developing disease free plants, raising abiotic and biotic resistant plant species. Plant biotechnology has potential to address the challenges such as food security, climate change, and sustainability. It also fulfils some of the thrust areas of the SDGs goals which will cadre to food supply, clean environment, employment generation, healthy lifestyle etc Plant Tissue culture, Genetic engineering, CRISPR and gene editing, Synthetic biology in plants, RNA interference technology is some of the important tools used to enhance desirable plant traits. Agriculture has taken a new turn integrating biotechnology along with the available technologies to optimize farming such as precision agriculture, vertical farming, hydroponics, smart irrigation system, AI and Robotics in agriculture etc. It's also important to understand the consumer's preferences

Biography

Dr. Shukla is PhD and M.Sc in Biotechnology and more than 23 years of teaching and research experience. She is currently working as Professor in Amity Institute of Biotechnology, Amity University Noida, UP, India. She has received prestigious award as DBT travel grant for presenting research work in International conference at Singapore, IASc-INSA-NASI Summer Research Fellowship Award, Career Advancement Award from DBT, Best Young Scientist Award and Scientist of the Year Award for presenting research work presented in an International conference. She has run successfully 4 Minor Projects and two projects sanctioned by DBT (Department of Biotechnology, Govt. of India) under Bio-CARe scheme and DBT Twinning. She has published research papers in reputed National and International journals. She presented her research work in National and International conference. She has also filed and granted patent of commercial use. Organized National & International seminars and four Indo- African Training Program for African Professionals.

as it has now seen that there is drastic changes in their choice which they are targeting for healthy diet and for healthy life style. There is huge demand of plant-based diets, plant-based nutraceuticals, Phyto-medicines and natural cosmetics products too. Thus, the only solution is to incorporate biotech innovations with sustainable farming practices which ensures food security and have capabilities to meet global food demands while protecting the environment, mitigating climatic changes and fulfilling industrial demands. The key note speech will highlight the major interventions that has been implemented to transform agriculture in order to mitigate global food and plant based raw material supply chain.

Valasia Iakovoglou

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Educating on environmental sustainability

Mediterranean ecosystems are highly valuable mainly due to their increased biodiversity levels. Safeguarding those ecosystems under the increased challenges of climate change is not easy. Educating people is one of the powerful tools to further enhance environmental sustainability. When properly inform on the structure and function of ecosystems this will results in well-informed students and well-trained professional that can detect potential environmental threats and suggest solutions to problems. Reduced regeneration success and problems associated to increased invasiveness are a few examples that Mediterranean ecosystems face, mainly due to increased disturbances associated with abrupt climatic variation as well as mismanagement. A characteristic example at Nestos River protected area in Greece is the problematic regeneration of the historic species of Quercus robur mainly associated with invasive problems. Further actions should be taken to protect the biodiversity levels of those valuable ecosystems and enhance regeneration success. Education is a key factor for long-term sustainable management.

Keywords: Biodiversity, Conservation, Ecology, Endangered species, Restoration.

Biography

Dr. Valasia Iakovoglou is a distinct graduate of Iowa State University, USA. She has more than 25-yrs of national/international research and teaching experience as an Ecophysiologist/Silviculture expert in seedling production and Restoration/Conservation of Ecosystems with emphasis on Biodiversity under the challenges of Climate Change. She has received numerous scholarships, awards and recognitions. She is an editor of more than ten international journals and a reviewer in more than fifteen, as well as a reviewer at the Intergovernmental Panel on Climate Change (IPCC). She has more than 100 publications (books/ book chapters, peer-reviewed scientific articles) and more than 20 international projects. She is active in many scientific societies such as the Mediterranean Experts of Climate and environmental Change (MedECC) and the International Network of Bioresource Management (INBM). She holds leading positions such as: Director of Ecotourism Sector of the UNESCO chair Con-E-Ect; Executive Board of Directors of Climate Smart Agriculture Youth Network Global (GCSAYN) in Africa; “General Secretary” of associations such as the “Association of Inter-Balkan Woman’s Cooperation Societies (AIWCS)” of UNESCO Center for the peace in the Balkan area; International Council of World Tourism Forum Institute; Country Chair of Greece of the G100 Women of the World serving as for Farming and AgriTourism.

Vijayan Gurumurthy Iyer

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Unsafe chromium pollution and control for the environmental plant biology and biotechnological development

The environmental and social problems including human health issues caused by injudicious use of chromium in Tamil Nadu, India are investigated. The chrome (a heavy metal) has been used in tanning skin in chrome tanning leather industries. During the process of leather manufacturing by chrome tanning process, the hides/skins are treated with Basic Chromium Sulphate (BCS) powder. Chrome tanned leather can also be called as wet blue leather. Research investigations are conducted in Chrompe, Pallavaram, Chengalpattu, and Chennai areas for prediction and assessment of the environmental and social damages due to the small and large chromium -based tanneries that have impacted considerably to the natural environment or the bio-physical environment and the cultural and socioeconomic or the manmade environment. The purpose of tanneries is to manufacture usable leather from chromium-based tanneries. Chrome tanned leather production or tanning skin by two- bath process for leather production to grow into a major industry. Green chemistry can be defined as the design and development of chemical products and processes that reduce or eliminate the use or generation of hazardous substances and green chemistry applies across the life cycle of products and processes including design, manufacture, use and ultimate disposal. It is concluded that Environmental Health Impact Assessment (EHIA) process should be conducted for certain plant biology and biotechnological projects, plans, programs, legislative

Biography

Dr. Vijayan Gurumurthy Iyer studied Environmental Science and Engineering at the Indian School of Mines, (ISM) Dhanbad, Bihar, India and graduated as Master of Technology in 1998. He then joined the Ph.D. (Environmental Science and Engineering). He received his PhD degree in 2003 at the same institution. After ten years postdoctoral fellowship he obtained the position of Professor (Environmental Science and Engineering) at the Institute of Technology, Haramaya University, Ethiopia in 2004. He has published more than 480 research articles in SCI(E) journals and conference proceedings with 5000 citations. He has been managing environmental stewardship projects including Unsafe Chromium Pollution and Control for the Environmental Plant Biology and Biotechnological Development.

actions, policies in the project planning and decision-making process. Lack of organizational focus is observed that should mitigate adverse environmental health impacts on climate change and minimize the impact of air pollution, water pollution, soil and sanitation impact and land pollution eutrophication effect (or impact) as well as forest and wildlife conservation.

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ORAL PRESENTATIONS

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Study of the effects of growth regulators on the growth and rooting of grape apical meristem in-vitro

Apical meristem is a set of cells that divide rapidly and thus cause faster growth. Apical meristem cells at the shoot and roots, are used to grow plants faster that generate stem during the shoot ontogeny. These cells currently deserve high attention to develop uninfected plants. The growth from apical meristem requires suitable nutrient medium containing plant growth regulating hormones. N6-Benzyladenine (BA) and 2,4-Dichlorophenoxyacetic Acid (2,4-D) were reported efficient to produce axillary and adventitious shoots in seedlings. The best combination of these phytohormones was found among different options. The tandem of 6-Benzylamino Purine (BAP) and 5-Naphthalene Acetic Acid (NAA) was demonstrated as another efficient choice with Murashige and Skoog (MS) basal medium. The most efficient concentration of these chemicals for shoot multiplication was found among different options. That's why we were tested more different growth regulators and mediums in our experiments. So the addition of meta-topolin, naphthaleneacetic acid, and supramolecular complex in 0.5:1:0.17 mg/L doses, respectively, increased the assimilation of ammonium nitrate in WPM nutrient media and enabled to reduce of its quantity in the medium four-fold. But the addition of 10 mg of sucrose was required for the revealed efficiency of the modified MS nutrient medium. These differences in WPM nutrient media were even greater. The addition of 0.17mg/L supramolecular complex of glycyrrhizic and salicylic acids and 0.25 mg/L of benzylaminopurine resulted in several-fold effects with the twice-lower quantity of all used ingredients. The highest effects of the modified nutrient media were observed with those explants taken in May and April. The ones, taken in August and September, did not reveal efficiency with both MS and WPM nutrient media. In December, January and February, the plants growing in nutrient media stopped the growing, and the appearance of new shooting started in March and April. The effects of the complex on the number and length of roots of four grape varieties, widely grown in Uzbekistan, showed its potential as a root growth regulator. The complex in 0.15 and 0.17mg/L doses together with benzylaminopurine in MS medium or with meta-topolin and naphthalene acetic acid in WPN culture media led to several-fold increases in root growth in all grape varieties in vitro. The effects of the complex at 0.15mg/L dose resulted in at least twice longer root length of all selected grape varieties compared to control of both culture media. A higher 0.17mg/L dose led to several-fold increases in root length. Besides, significant increases were observed in root numbers in explants, grown in a culture medium holding 0.17mg/L of the complex.

In this work, we reported the effectiveness of 0.17mg/L of the supramolecular complex of glycyrrhizic and salicylic acids with 0.25mg/L BAP in MS medium, and with 0.48mg/L meta-topolin and 0.1mg/L naphthaleneacetic acid in WPM nutrient media. Further improvement in this discipline will enable the enhancement of the cost-efficiency of the modified nutrient media.

Biography

Adkham N. Abdullaev graduated with a bachelor's degree in Plant Protection from the University of Agriculture in 2014-2018. He completed his master's degree in agrobiotechnology from 2018 to 2020. From 2020 to 2024, He worked as a junior researcher, and he is currently a doctoral student at the center.

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The ameliorating effects of cinnamic acid-based nanocomposite against salt stress in peppermint

Nanoparticles (NPs) are important in regulating plant tolerance to salt stress. Peppermint is one of the most widely used aromatic plants, with a high sensitivity to salt stress. The present study investigated physiological and biochemical factors to understand better the behavior of Cinnamic Acid (CA) and cinnamic acid nanocomposite in salinity control in peppermint plants. The first factor was salt stress with different salt concentrations, including 0, 50, 100, and 150 mg/L, the second factor was 50 µM CA, and the third factor was 50 µM CA nanocomposite based on carboxymethyl cellulose (CMC-CA NC). Results showed that stress markers increased with increasing salinity levels. On the contrary, plants treated with salinity showed a decrease in physiological and photosynthetic parameters, while the application of CA and CMC CA NC increased these critical parameters. Under salinity, compared to the control, malondialdehyde and hydrogen peroxide contents decreased by 11.3% and 70.4%, respectively. Furthermore, CA and CMC-CA NC enhanced peppermint tolerance to salinity by increasing compatible solute content such as proline, free amino acids, protein content, and soluble carbohydrates, increasing antioxidant enzymes, and decreasing stress markers in plant tissues. Compared to the control, chlorophyll fluorescence and proline content increased by 1.1% and 172.1%, respectively. Salinity stress negatively affected all physiological and biochemical parameters, but CA and CMC-CA NC treatments improved them. We concluded that the nanocomposite, a biostimulant, significantly enhances mint tolerance under salinity conditions.

Biography

Dr. Ahlam studied Physiology Plant at the King Saud University, Saudia Arabia and graduated as MS in 2014. She worked as a lecturer at King Khalid University, and obtained a PhD in Molecular Plant Physiology 2019 from King Saud University. In 2019, she became an assistant professor and in 2023, she became an associate professor at King Khalid University, Department of Life Sciences, Plant Physiology specialization. She has published more than 45 research articles in SCI (ISI) journals.

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Harnessing foxtail millet landraces as a source of novel alleles for yield and nutritional traits

Foxtail millet (*Setaria italica L.*), a small-grained C4 Panicoid cereal of the Poaceae family, has a compact genome of approximately 515 Mb. It serves as a staple food in the arid and semi-arid regions of Asia and Africa. Despite its exceptional nutritional value and stress tolerance, the rise of Green Revolution crops led to a decline in its cultivation. However, growing concerns about reduced arable land, freshwater scarcity, nutritional needs, and unpredictable environmental stresses have renewed interest in millets as a sustainable solution for global food and nutritional security. Landraces, traditional farmer-maintained varieties, are particularly prized for their adaptability to harsh environments and superior nutritional profiles. Our laboratory studies have uncovered significant genetic polymorphism among landraces compared to elite or released varieties, including variations in drought tolerance and seed micronutrient content. Building on this knowledge, we developed Recombinant Inbred Line (RIL) mapping populations through biparental crosses. True F1 hybrids were selected and advanced to the F7 generation, with genotyping performed via ddRAD sequencing on the HiSeq2500 Next-Generation Sequencing platform. A total of 1,264 highly segregating Single Nucleotide Polymorphism (SNP) markers were confidently mapped to chromosomes, achieving a density of 90–235 SNPs per chromosome and an average marker interval of 4.08 cM. These genomic resources have been leveraged to identify Quantitative Trait Loci (QTLs) associated with agronomic and nutritional traits in foxtail millet. This study underscores the potential of foxtail millet as a resilient crop for enhancing global food security.

Biography

Prof. Akila Chandra Sekhar studied Plant Sciences at the University of Hyderabad, Hyderabad in 1999 and Joined for his PhD., in the same University with Prof. Arjula R. Reddy and received his Doctorate in 2006. Later he joined the Generation Challenge Program Project in the same Versity and left to the University of Bologna, Italy as IAS Fellow to work with Prof. Roberto Tuberosa. He obtained the position in Yogi Vemana University, as an Assistant Professor in the Department of Biotechnology in 2007. His area of research is Molecular Genetics and Functional Genomics, with emphasis on millet and freshwater algae.

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Defense priming in rice: An innovative approach to enhance bacterial blight resistance in rice (*Oryza sativa L.*)

Many of the metabolites that plants produce offer defense against phytopathogens. The environment is harmed when synthetic bactericides are used excessively to control plant disease. Therefore, sustainable agriculture requires a promising and environmentally friendly method. Here, we show that rice becomes resistant to *Xanthomonas oryzae pv. oryzae* (Xoo) when foliar-sprayed with leaf extracts of *Argemone mexicana*, *Eucalyptus globulus*, *Bassia scoparia, Mallotus philippensis*, and *Shorea robusta*. From the 3rd to the 12th day of observation, the Xoo invasion was much lessened by extract treatment. Additionally, increased chlorophyll A fluorescence was noted which indicate the photosystem's defense against Xoo damage in treated leaves. Antioxidant enzymes like guaiacol peroxidase, catalase, superoxidase dismutase, glutathione reductase, and total protein content were measured on the 3rd, 6th, and 9th days following extract application in order to assess the resistance that had evolved. Particularly on the 6th and 9th days following treatment, treated leaves had higher amounts of antioxidant enzymes and protein than the control. Subsequently, Malondialdehyde, a marker of stress-induced damage, was noted to decrease in the leaves that received treatment by the 9th day. Furthermore, an increase in the concentration of phenols, tannins, and flavonoids in the plant extract confirmed the existence of phytochemicals that could potentially activate resistance mechanisms. Comparable outcomes were observed in their antioxidant properties. Finally, FT-IR analysis validated the presence of various functional groups, indicating unique metabolites within the plant samples. Therefore, the improved resistance to bacterial blight in rice leaves treated with plant extracts can be linked to the effects that trigger resistance.

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Finding of novel EST marker associated with grain filling duration and tillering traits in wheat (*Triticum aestivum l.*) under terminal heat stress

Terminal heat stress is a significant abiotic factor affecting wheat production, causing substantial yield loss despite the plant's ability to develop heat tolerance mechanisms. Expressed Sequence Tags (ESTs) are valuable tools for studying these mechanisms, as they represent genes involved in the plant's response to heat stress. By utilizing ESTs, we can identify genes that are crucial for triggering the plant's reaction to terminal heat stress.

In this study, we conducted In-silico design of EST markers using existing wheat endosperm tissue sequences from NCBI. Bioinformatics tools were employed to design markers with specific parameters, such as higher GC content. The study was carried out in the Krishi Vigyan Kendra, Banasthali Vidyapith, Tonk, Rajasthan; India over three crop seasons (2022-2024), with wheat genotypes sown under two conditions: timely sowing (mid-November) and late sowing (mid-December). This setup exposed the plants to varying temperature, simulating terminal heat stress.

We recorded grain filling duration and reduction percentage of tillers (timely and late sown) to assess the impact of heat stress on wheat. To further analyze the relationship between the in-silico designed EST markers and the observed traits, we calculated the Heat Susceptibility Index (HSI) for each genotype. The HSI helped us classify genotypes based on their heat tolerance, with genotypes like DBW90 (0.69), DBW107 (0.93), and DBW222 (0.3) showing heat tolerance, while HD2177 (1.04), GW190 (1.26), and HD2501 (1.06) were identified as heat- sensitive based on their tillering response.

The co-relation of phenotypic variations with EST markers provided valuable insights into the genetic basis of heat tolerance in wheat. By analyzing the percentage of phenotypic variation linked to these markers, we identified putative markers for terminal heat tolerance in wheat. These markers can be utilized in plant breeding programs to develop wheat varieties with enhanced heat resilience in future agricultural systems. In summary, this study integrates bioinformatics approaches and field-based observations to design EST markers linked to heat stress tolerance, providing a foundation for advancing marker-assisted breeding aimed at improving wheat performance under terminal heat stress conditions.

Keywords: Wheat, EST Markers, Marker-Assisted Breeding, Terminal Heat Tolerance, In-Silico.

Biography

Ms. Anukriti Srivastava studied Biotechnology at Banasthali Vidyapith, Rajasthan, India, and graduated with an MSc in 2019. In 2022, she joined the PhD program under the mentorship of Dr. Girish Chandra Pandey, Assistant Professor at the Department of Bioscience and Biotechnology, Banasthali Vidyapith, Rajasthan. Ms. Srivastava has actively participated in numerous international conferences both in India and abroad. She was awarded the Best Poster Presentation at Banasthali Vidyapith. Additionally, she has published two review articles, one in the Journal of Cereal Research and another in Frontiers, contributing to her field of research and scientific community..

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Biotechnological potential of aeroterrestrial algae from the Algal Collection of Sofia University (ACUS)

The living algal collection (ACUS) of Sofia University St. Kliment Ohridski (Bulgaria) has been the most important centre and custodian of aeroterrestrial algal biodiversity in Bulgaria since its establishment in 2006. Its mission is fulfilled through systematic research, pioneering innovations, implementation of new technologies and the exchange of knowledge. The aeroterrestrial prokaryotic and eukaryotic microalgae preserved in the collection were collected from various substrates, such as different soils (including the soil around plant roots), megaliths, stones, rocks, artificial substrates, etc. The relatively rich biodiversity of algae discovered in such extremophilic habitats, exposed to extremely high and low levels of temperature, humidity and UV radiation, demonstrates the high survival potential of aeroterrestrial algae and their remarkable cell protection capabilities. These microorganisms contain a wide range of valuable bioactive compounds that could be utilised by humans. For this reason, there is currently a growing interest in the utilisation of aeroterrestrial microalgae in modern biotechnology, food industry, medicine, pharmacy, cosmetics, etc. The biotechnological potential of the Bulgarian aeroterrestrial algal strains is aimed at their use as a source of:

1) A high content of commercially valuable carotenoids such as the health-promoting xanthophyll astaxanthin, various amounts of lutein, luteoxanthin, beta-carotene, violaxanthin, vaucheriaxanthin, canthaxanthin, zeaxanthin and antheraxanthin;

2) Tocopherols (vitamin E) and mycosporine-like amino acids with strong antioxidant activity, which are particularly interesting for the cosmetics industry;

3) Novel oleaginous algae for biodiesel production due to their high growth and biomass rate;

4) Important secondary metabolites such as polyketides with good biological and pharmacological activities for the production of clinical drugs;

5) Algae-based wastewater treatment as a promising microalgal biotechnology for the production of biofertilizers, the extraction of valuable elements and sustainable phosphorus management in wastewater treatment plants.

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Biography

Blagoy Uzunov received his PhD in Natural Sciences from the Institute of Botany at the University of Innsbruck, Austria. He currently works as an Associate Professor at Sofia University St. Kliment Ohridski, Bulgaria. Since 2002 he has been Head of the Department of Botany at the Faculty of Biology. His publications include more than 70 peer-reviewed research articles. His research focuses mainly on the systematics of algae and fungi. His main work is on the taxonomy, diversity and ecology of algae from different environments. He has been curator of Algal Collection of Sofia University (ACUS) since its foundation in 2006.

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Plants with microbial fuel cells for green energy production, green sustainable remediation, and net zero emissions

The excessive use of fossil fuels increases greenhouse gas concentrations, leading to the greenhouse effect and climate change. Human activities also contribute to environmental pollution, including soil and water contamination. Plant-Microbial Fuel Cells (PMFCs) are an emerging technology capable of converting solar energy into electrical energy. This system consists of plants, substrates, microorganisms, and electrochemical components. Plants perform photosynthesis, absorbing carbon dioxide from the atmosphere. Their roots secrete organic matter, which is utilized by microorganisms, generating electrons that are transferred to the cathode via wires to produce electricity. PMFCs offer the advantages of utilizing solar energy as a power source and producing no secondary pollutants. They can be implemented in various configurations, including green roofs, farmlands, artificial wetlands, and environmental restoration projects. In an experiment, a PMFC system was constructed using sediment from Shuanglianpi Lake in Yilan County, Taiwan. The results showed that system voltage gradually increased over the first 27 days, reaching 366.75mV. After plants were introduced on the 28th day, both voltage and power density significantly increased, stabilizing within a fixed range after 41 days. The highest average voltage recorded during the experiment was 616.80mV on day 65, with a peak average power density of 21.53mW/m^2. These findings indicate that PMFCs can generate stable electricity, contributing to sustainable energy development. PMFCs were also applied to remediate heavy metal pollution at contaminated sites in Taichung City, Taiwan. After 120 days of operation, chromium concentrations in the soil decreased from 255.01 mg/kg to 124.46±21.86mg/kg in the cathode soil and 214.52±14.12mg/kg in the anode soil. Copper concentrations dropped from 416.03mg/kg to 172.46±25.41mg/kg in the cathode soil and 245.7±22.67mg/kg in the anode soil. Both removal rates were higher than those observed in control conditions without vegetation or with an open circuit. Additionally, over the same 120-day period, zinc concentrations in simulated zinc-contaminated groundwater decreased from 60.29mg/L to 33.21mg/L. These results demonstrate that PMFCs can simultaneously generate renewable biomass electricity and facilitate environmentally sustainable remediation, supporting efforts toward environmental protection and net zero emissions.

Biography

Chung-Yu Guan is currently Associate Professor in the School of Forestry and Resource Conservation, National Taiwan University. He was an Associate Professor in Department of Environmental Engineering at National Ilan University. He was a Visiting Scholar at the Hong Kong Polytechnic University in Hong Kong and Kyushu Institute of Technology in Japan. Chung-Yu Guan holds Ph.D. from National Taiwan University, Taiwan. He has published over 30 SCI journal papers these five years and serves as Gust Editor of some SCI Journal. His team aspires to develop green technologies for carbon sinks, green and sustainable remediation, biorefinery, and wetland research.

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Abc1kN is involved in glucosinolate metabolism and stress response during seed development in *Arabidopsis thaliana*

The activity of bc1 complex kinases is a group of proteins that share a highly conserved ABC1 domain (that is not related to the ATP-Binding Cassette–ABC–transporter proteins) widespread among living organisms. Homologous proteins are grouped into an interesting protein family, ABC1Ks, that, although showing the typical kinase domain(s), lacks many of the features of eukaryotic protein kinases. Members of the family have been isolated from mitochondria, chloroplasts, and the sub-plastidial plastoglobule vesicles, which points to the wide distribution of members of this family among archaea, eubacteria and eukaryotes. In our work, we describe the characterization of the knock-out mutant lines on one of these Abc1k genes of the *Arabidopsis thaliana* genome, that we termed Abc1kN. The gene seems to be expressed mainly during embryogenesis, as proven by blue colour of embryos in transgenic plants adopted for GUS assay driven by the native promoter. Moreover, mRNA is not detectable in leaves, shoots or roots, by Real Time PCR. Mutant lines have been analysed, and although the lack of the gene function does not influence the overall plant fitness, development and reproduction, mutant seeds show a different colour and size, reduced ABA accumulation and anomalous glucosinolate modifications. Also germination is affected as well as abiotic stress response of germination. An RNA-seq approach was conducted on siliques, highlighting differences in expression of genes involved in abiotic stress response.

Biography

Giovanni Dal Corso graduated in Biotechnology at the University of Verona. After graduation, he started his research activity studying cyclic electron transport in photosystem I at the Max Planck Institut für Züchtungsforschung (Germany). In 2007, he received his PhD in Natural Sciences from the Ludwig-Maximilians-Universität (Germany). Currently, he is a researcher at the Biotechnology Department at the University of Verona. Dr. Dal Corso's research activity is oriented towards plant-environment interaction and gene characterization, with a special focus on the study of genetic and molecular mechanisms involved in the processes of uptake, accumulation and detoxification of heavy metals in plant species.

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Development of *Gibbatrianth mycoherbicide* to control *Trianthema portulacastrum* (*Horse purslane*), a notorious agricultural weed

Weeds are a problem in crop production associated with declines in crop yields and quality, as a source of allergenic pollen and as an aesthetic nuisance. Horse purslane (*Trianthema portulacastrum*), a member of the family Aizoaceae, is considered number one problematic agricultural weed by virtue of its infestation in various vegetable and agricultural fields. In India, it heavily infests mustard, maize, sorghum, potato, mung beans, soybean, onion, sugarcane and cotton causing heavy losses in yields.

In the past 50 years, the control of agricultural and forest weeds using biocontrol agents: fungi, bacteria and viruses, has drawn increasing attention in the quest to reduce the level of dependence on chemical products for agriculture production. Phytopathogenic fungi i.e., the fungi causing disease in plants, offer a tremendous opportunity to develop as bioherbicides/ mycoherbicides. The formulations of host-specific plant pathogenic microorganisms that are applied at high inoculum rates in a similar way as chemical herbicides used to control/manage weeds are called bioherbicides. In the majority of the bioherbicides, the fungal organisms are the active ingredients, therefore the term mycoherbicide has often been used interchangeably with bioherbicide. Bioherbicides have gained acceptance because they are safe, environment-friendly, prevent hazards resulting from chemical herbicides to environment, human health, animal health and soil microbiota. Currently, they have drawn increasing attention in the quest to reduce the level of dependence on herbicides to produce organic foods for human's health and longevity. The global bioherbicides market size is rapidly growing that had been valued at US $2.7 billion in 2023 is expected to hit US $7.4 billion, at a CAGR of 11.4%, during 2024-2032 (IMARC Group, 2024).

Gibbatrianth is named after its host-specific fungal pathogen (*Gibbago trianthemae*) and the weed host *Trianthema*. This mycoherbicide is a liquid formulation of conidia, mycelial fragments and surfactant. The fungus *G. trianthemae* was isolated for the first time from Kurukshetra (India) in 1999 from this weed infesting fields of sarson (*Brassica campestris*). It is a hemi-biotrophic, phaeodictyoconidial hyphomycetous fungus, growing best at 25oC on simple agar media. It is characterized by non-beaked, dark, conidia having both transverse and longitudinal septa, and developing singly through porogenous development. Each conidium germinates producing several germ tubes, and a germ tube in turn produces another conidium at its tip. Studies carried out on the mode of infection, disease development, bio efficacy and host specificity revealed that germination of conidia on leaves occurs within 6 to 12 hours post spraying, causing infection within 3 to 4 days. Entry of a conidial germ tube into the leaves takes place through stomata by producing appressoria, which is a peg like structure. Defoliation starts after 20 days leading to death of the complete plant within 30 days of inoculum spraying. Once the weed is gone, the pathogen also disappears, revealing its hemi-biotrophic nature. This pathogen showed host- specificity (i.e., causing infection exclusively to its host), an important criterion for any biocontrol agent to be developed as a bioherbicide. Gibbatrianth is the first and the only mycoherbicide developed for controlling horse purslane globally. There is a huge scope for commercial exploitation of Gibbatrianth, a nonchemical herbicide, for controlling horse purslane worldwide, including India, for getting organic vegetables, free from the carcinogenic chemicals.

Biography

Dr. Aneja got his B.Sc., M.Sc. and PhD degrees from Kurukshetra University Kurukshetra. He has a vast research and teaching experience of 38 years in Botany, Microbiology and Biotechnology. He joined the teaching faculty in the same Institute and served as Professor & Chairman for 11years. He is the recipients of many Awards and Fellowships, the major one's are INSA-Royal Society Academic Exchange Fellowship, Best Citizens of India, Rashtriya Gaurav and ISWA lecture awards. He is the 2022 Lifetime Achievement Awardee and past President of the Mycological Society of India; Recorder of ISCA; Shiksha Rattan Samman, and 2023 Unnat Bharat Shewa Shree Award. He has supervised 23 PhD scholars & over 35 M.Phil. students; published 180 research papers/ reviews/chapters; over 50 abstracts, attended over 35 National and International Conferences, delivered lead lectures and chaired several sessions; authored/co-authored 15 books, edited 5 books, written 2 manuals, and Proceedings of an International Conference published by International Publishers (04) and National Publishers (19). He served as the Governor's/Chancellor's nominee for Teacher's selection at Punjabi university, Patiala. Currently, he is serving as an Honorary Professor & Research Advisor in Sardar Bhagwan Singh University, Dehradun (Uttarakhand), a Member of the Research Advisory Committee of ICAR Weed Research Centre, Jabalpur, M.P, India and an Expert Member of the ICFRE, Dehradun.

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Synthesis of hydrogels with controlled nutrient release utilizing fishery industry waste

Water scarcity and soil degradation are global problems that directly affect agricultural productivity. Conventional agriculture, characterized by inefficient water use and high dependence on chemical fertilizers, exacerbates these problems. This research aims to reverse this trend by providing a sustainable and efficient alternative. For the synthesis of the hydrogel, specific biomedia from the fish farming industry, in this case salmon farming waste, were selected based on their chemical composition and availability. The biomedia were then subjected to a pre-treatment process to eliminate impurities and obtain a matrix suitable for hydrogel formation. For the hydrogel formulation, different formulations were developed by varying the proportion of biomedia, cross-linking agents and additives. Eucalyptus nitens was used as a study specimen and was monitored for 120 days in a climate-controlled chamber; throughout the study, measurements were taken of variables such as chlorophyll content, root and stem growth, dry biomass and nutrient concentration in plant tissues. In order to optimize the properties of the final material, a control group with no treatment and a commercial product currently used by the forestry industry were included in the study. A factorial design was used to vary the nutrient concentration, the amount of biomedia and the immersion time to obtain the hydrogel. The synthesized hydrogels were characterized using techniques such as Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA) to evaluate their structure, rheological behavior, chemical composition and thermal stability.

The results obtained showed that the nutrient contents in the obtained hydrogels in nitrogen, phosphorus and potassium were 1.09g/L, 2.5mg/L and 0.018mg/L, respectively. These values are within the optimal range for the rooting stage of Eucalyptus nitens. In addition, the proposed hydrogel allowed achieving a more balanced N:P:K ratio compared to the commercial product, which can be attributed to the presence of hormones contained in the microalgae. Nutrient release tests showed that the proposed hydrogel has a similar behavior to commercial fertilizers, releasing nutrients gradually and sustained over time, which allowed a continuous supply of nutrients to the plants. Finally, the swelling analysis of the proposed hydrogel reached values up to 450%, which contributed to improve the moisture retention in the soil, resulting in a reduction of the irrigation frequency. With the results obtained, it can be concluded that it is possible to obtain a new source of sustainable and environmentally friendly nutrients from fish waste to be used in massive cultivation of Eucalyptus nitens in its early stages of rooting.

Keywords: Hydrogel, Controlled release, Nutrients, Fishery Industry Waste.

Biography

Dr. Luis Felipe Montoya is a Chemical Engineer from the Pontifical Bolivarian University, Colombia, and holds a PhD in Science with a mention in Chemistry from the University of Concepción, Chile. He is currently an Assistant Professor in the Department of Chemical Engineering at the Faculty of Engineering, University of Concepción. His research focuses on electrochemical engineering and advanced coatings. He holds two patents related to anticorrosive and self-cleaning coatings. Dr. Montoya has published over 30 scientific articles and has received the "Science with Impact" awards in 2018 and 2019 for achievements in technology transfer.

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Readthrough events in plants reveal unprecedented plasticity of stop codons

Stop Codon Readthrough (SCR) has important biological implications but remains largely uncharacterized in plants. Here, we identify 1,009 SCR events in plants using a proteogenomic strategy. Plant SCR candidates tend to have shorter transcript lengths, fewer exons and splice variants than non-SCR transcripts. Surprisingly, mass spectrometry evidence reveal that stop codons involved in SCR events can be recoded as 20 standard amino acids, some of which are also supported by suppressor transfer RNA analysis. We also observe multiple functional signals in 34 maize extended proteins and characterize the structural and subcellular localization changes in the extended protein of basic transcription factor 3. Furthermore, the SCR events exhibit non-conserved signature and the extensions likely undergo protein- coding selection. Overall, our study not only demonstrates that SCR events are commonly present in plants but also reveals the unprecedented recoding plasticity of stop codons, which provides important insights into the flexibility of genetic decoding.

Biography

Dr. Liuji Wu received her PhD degree from Zhejiang University in 2009, and later conducted collaborative research as a visiting scholar at Huazhong Agricultural University and the University of California, San Diego. She is currently a professor at Henan Agricultural University, focusing on the discovery and functional characterization of non-canonical proteins and peptides, particularly in maize stress resistance. Dr. Liuji Wu has published more than 35 research articles as the first or corresponding author in high- impact SCI journals, providing new insights into plant proteome diversity and novel mechanisms of plant stress resistance.

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In-vitro rooting of micropropagated shoots from the clonal rootstock of cherry, colt

One of the decisions in planning a fruit plantation is the selection of the rootstock, since these make up the root system of fruit trees and provide vital elements such as anchoring, absorption of water, nutrients, and protection against pathogens. There are difficulties associated with the propagation of this culture, with the in vitro culture technique being an excellent opportunity that will allow its massive propagation in a short term. In this research, an efficient In-vitro rooting protocol for the clonal cherry rootstock, Colt, has been developed for the first time. The experiment was carried out in the Plant Biotechnology-Biotec laboratory of the company Camposol S.A. In this study, the effect of different types of basal culture medium, source of iron, amino acids and growth regulators for in vitro rooting was analyzed. In vitro shoots or microshoots of 3 to 5 cm in length were grown in basal culture medium MS (Murashige & Skoog), N & N (Nitsch & Nitsch) and Q & L (Quorin & Lepoivre) in the following concentrations of macrosalts: 25%, 50%, 75% and 100%, in combination with different concentrations of 3-indole butyric acid (IBA): 0, 1.0, 2.0 and 3.0 mg/L, adding as an extra source of iron: 50 mg/L FeNa-EDDHA and enriched with amino acid: 1.0 mg/L proline; in addition, 20 gr/L of sucrose and 7.0 gr/L of phytagel. The plants were maintained in the planting room with a temperature of 25 ± 2 °C. After four weeks of culture, the elongated shoots were isolated and the response to rooting in vitro was evaluated. The addition of auxin indole-3-butyric acid (IBA) 1.0 mg/L in the MS culture medium with 50% concentration of macrosalts, enriched with 50 mg/L of FeNa-EDDHA and 1.0 mg/L of proline, was highly efficient for in vitro rooting and a significant improvement in plant quality. The results showed that the best rooting percentage obtained was 85% after two weeks of cultivation. Finally, the rooted in vitro plants were removed from the culture medium and transferred to a substrate composed of peat and perlite (2:1 v/v). After 60 days, 90 to 100% of plants successfully rooted and reactivated their growth after the greenhouse acclimatization process. This technique is effective in guaranteeing a high ex vitro survival rate of the clonal rootstock (Colt), opening opportunities for scaling the production of rootstock plants in the laboratory and improving the quality of post-transplant plants.

Biography

Martha C. Guillén Murrieta is a Biologist qualified as a CONCYTEC Researcher, RENACYT code: P0080672, María Rostworowski Group-level III. She holds a Certification in Responsible Research Conduct (CRI: Conducta Responsible en Investigación)–CONCYTEC Peru. Currently, She is the Head of Research and Development - Biotechnology at Camposol S.A. in Peru. She has experience in Biotechnology, Plant Physiology, Genetics, Biological Control, Systemic Disease Control, and In Vitro Clonal Propagation Technologies in crops such as blueberries, Grapevines, fruit trees, forestry, sugarcane, pineapple, strawberries, asparagus, and ornamental plants. Additionally, She possesses knowledge in Molecular Biology applied to Biotechnology. She focused on scaling up in vitro plant production and implementing a Fruit Plant Biofactory. She has Experience in developing technical profiles, managing basic, applied, and innovative research projects, with knowledge in interpreting and applying OSHA, ISO 17025, and Global Gap 5.0 regulations. She has an extensive professional background in agro-industrial companies, specifically in the research field, where She has led Biotechnology projects for export-oriented crops.

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Algal collections in the green era

The challenges of climate change and adaptation to this change, the increasing scarcity and depletion of natural resources and the resilience to pressures resulting from the disruption of ecosystems have forced governments and international organisations to move from traditional practises to the green era and pay more attention to environmental sustainability. The green economy and the sustainable development of communities around the world have already begun since the end of the 20th century (Woodrow 2010). The significant role of algal culture collections in achieving sustainability is based on their active role as a global bioresource centre and standards organization, main developer and supplier of microalgal strains used in various areas of human life. They are a source of biological standards for comparative molecular, biochemical, taxonomic, physiological, biotechnological and ecological studies. The algal collections are also a fund of biological diversity that is important for future generations. In today's world, such microalgal hubs can help countries create the means to conserve their own genetic resources, make them available for research and thus unlock nature's potential to provide solutions to national economic, environmental, nutrition and health problems - the algae-based bioresource cycle (Wilkie et al., 2011). Algal culture collections are not only cultivation centres but also provide the knowledge, data and foundations needed for the development of bioindustries that will lead to economic development. Such bioindustries are based on algal biomass used for: the production of third-generation biofuels, photosynthetic textiles, air purifiers, superfoods and food supplements, cosmetic products, wastewater treatment, soil fertilisers, etc.

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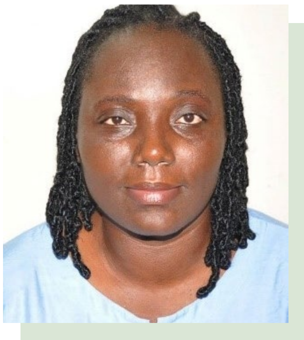
Biography

Maya Stoyneva-Gärtner received her PhD and DrSc in Botany from the Department of Botany at Sofia University "St. Kliment Ohridski", Bulgaria. She attended courses for Lake Management (Hungary), Stream and Lake Restoration (Sweden), Cryptogamic Botany (Austria) and postdoctoral fellowship supervised by Prof. Wim Vyverman in the Ghent University (Belgium). She is a Professor at Sofia University, Head of the Working Group for Systematics of Algae and Fungi, and Director of the Living Algal Collection of Sofia University (ACUS) since its foundation in 2006. Her publications include more than 200 peer-reviewed research articles, oriented mainly on freshwater and aeroterrestrial algae.



Mildred Osei-Kwarteng

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Impact of plant structural and architectural traits on tomato fruit quality: A systematic review

Tomato fruit quality is determined by physical, chemical, and sensory attributes, including size, colour, texture, sugar content, acidity, and flavour. Consumers prioritise sensory traits, whereas commercial grading emphasises uniformity, firmness, and the absence of defects. The quality of tomatoes is influenced by physiological processes, genetics, agronomic practices, and environmental factors. Key determinants include plant structure, comprising leaves, stems, roots, and fruiting organs, and plant architecture, referring to the three-dimensional organisation of these elements, including branching patterns and canopy structure. These factors regulate nutrient distribution, water uptake, photosynthesis, and fruit development. This PRISMA-guided systematic review examines the role of structural and architectural traits in enhancing tomato quality. A comprehensive literature search across scientific databases included studies from the past 10–15 years, excluding non-peer-reviewed and unrelated works. Findings indicate that optimised plant height, leaf area, and branching improve photosynthesis, thereby enhancing fruit size, texture, and biochemical composition. Additionally, shorter internode lengths increase fruiting efficiency, while a robust root system supports nutrient uptake and flavour development. These insights underscore the potential of breeding and precision agriculture to improve tomato quality through the optimisation of structural and architectural traits.

Biography

Ms. Mildred Osei-Kwarteng is a Lecturer with over 14 years of academic and research experience in the Department of Horticulture, Faculty of Agriculture, Food and Consumer Sciences, at the University for Development Studies, Tamale, Nyankpala campus. She obtained a Master of Science degree in International Horticulture, specialising in Vegetable Crop Production, from the University of Hanover, Germany, in 2006. Currently, she is pursuing a Doctor of Philosophy (PhD) at the same institution, focusing on functional-structural plant modelling.

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Futuristic transformation of herbal industry: Sustainable soilless herb production with hydroponics and aeroponics

The herbal sector is undergoing a paradigm change towards sustainability, demanding novel techniques to assure a steady supply of high-quality raw materials. This study provides a disruptive approach for meeting the demands of the herbal sector by integrating hydroponics and aeroponics in soilless plant production. Traditional farming practises have frequently put pressure on the environment, resulting in deforestation and habitat degradation, as well as concerns about herb scarcity. Hydroponics and aeroponics, on the other hand, provide a sustainable alternative that has the potential to drastically reduce the industry's environmental footprint. These approaches use nutrient-rich fluids and a controlled atmosphere to reduce water consumption and eliminate the need for chemical pesticides. Furthermore, they allow for year-round cultivation, increasing the dependability and regularity of herbal raw material output. The benefits of soilless agriculture go beyond environmental benefits; they also provide superior herb quality by allowing plants to thrive in optimal settings free of soilborne diseases and contaminants. Furthermore, these procedures allow for more control over nutrient intake and growth factors, resulting in plants with enhanced therapeutic characteristics.

This study investigates the application of the use of hydroponics and aeroponics in commercially important herbs like *Hemidesmus indicus, Bacopa monnieri, Stevia rebaudiana, Hemidesmus indicus Withania somnifera* and *Coleus forskohlii* with high market demand in pharmaceutical, nutraceutical and cosmetic industry. The findings shed light on the potential of using soilless plant production for bio-stimulation as a cost-effective and sustainable method of increasing lead metabolites in the selected plants, consequently benefiting the pharmaceutical and nutraceutical industries.

Biography

Dr. Moumita Gangopadhyay working as Associate Professor, Department of Biotechnology, Adamas University, WB, India. She has completed her MSc in Agriculture, MTech in Biotechnology and MBS in Agriculture and Rural Management from reputed Indian Universities or Institutes. She was awarded her PhD from J C Bose Institute, Kokata 2009 in Medicinal Plant Biotechnology. She was awarded many prestigious post-doctoral fellowships, like CSIR, DAE from India, DAAD (Germany), Endeavour (Australia). She has published 34 research papers with 5 book chapters and she has 2 patents. Her citations are 1938 with 25 i10 and 19 H index.

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Performance of Nepalese wheat genotypes under abiotic stress environments

Abiotic stresses are the major yield limiting factors for wheat production worldwide. Identification of stable and high yielding genotypes of wheat could be done using Additive Main Effects Multiplicative Interaction (AMMI) and Genotype×Genotype×Environment biplot (GGE). Twenty elite wheat genotypes including two commercial checks Bhirkuti and Gautam were evaluated in an alpha lattice design of experiment at Institute of Agriculture and Animal Sciences (IAAS), Paklihawa Campus and Sunwal, Nawalparasi in growing season of 2022-2023 under Irrigated, Heat stress, and drought environments. The combined Analysis of variance revealed environment had a significant effect on all the quantitative traits of wheat. DTB, DTH, DTA, Ph, SL, NSPMS, NSPS and NGPS were reduced by 11.85%, 14.50%, 15.32%, 7.53%, 4.02%, 12.03%, 5.43%, 9.46% under Heat stress environment was and by 12.28%, 15.25%, 16.24%, 16.33%, 16.17%, 8.65%, 16.71%, 23.75% under drought environment as compared to Irrigated environment. Similarly, Grain yield was reduced by 24.37% under heat stress whereas 48.72% under heat drought environments as compared to irrigated environment. Which-Won-Where model showed, BL 4919, NL 1368, and NL 1387 had a best performance under Irrigated, heat stress and drought environments of Rupandehi whereas, NL 1384 was best under irrigated and NL 1179 performed best under both heat stress and heat drought environments of Nawalparasi. Assessing molecular study on twenty genotypes by using 16 SSR stress linked marker showed considerable variability and classified into four clusters whereas Bhrikuti showed district classes probably due to different in their parentage. Genetic variability among existing germplasm plays important role for enhancing amelioration of genotypes and it can also be used in further hybridization programme.

Keywords: Wheat, Adaptability, Stability, Genetic Diversity.

Biography

Mukti Ram Poudel was born on 29th Nov 1987 in Sainamaina Municipality-6, Rupandehi as older son of Mr. Ram Chandra Poudel and Mrs. Din Kala Poudel. He completed his School Leaving Certificate (SLC) from Government Model Senior Secondary School, 22A at Chandigarh, India in 2004 A. D. He received his Higher Secondary Degree in science (10+2) from Oxford College, Butwal in 2006 A.D. The author got an opportunity to pursue Beachlors (B.Sc.Ag.) and Master's Degree (M.Sc. Ag.) in merit scholarship majoring in Plant Breeding at IAAS, Rampur. The author obtained his Ph.D. degree from Agriculture and forestry university, Nepal in 2020 by getting Ph.D. grant from University Grant Commission, Nepal. He has keen interest on plant breeding researches and works. He has published dozen of articles and participated in national and international training and seminar related to plant breeding research. He always opts for excellence and wishes to contribute the nation through his hard work. He is a gentle and diligent person with strong will power. He always opts for excellence and wishes to contribute to the Nation through his hard work.

Doctor of Sciences eng. tech. Nedyalka Valcheva

Lecturer at the Vocational High School "Prof. Asen Zlatarov

The Rhodopean silivryak (*Haberlea rhodopensis*), the "resurrection plant" or the flower of orpheus

The Rhodopean silivryak (*Haberlea rhodopensis* or *Rhodopean haberlea*) is a representative of the Gesneriaceae family. It is a Balkan endemic, a protected relict species. It is known for its long-term anabiotic drought resistance, also known as the “resurrection plant” or the flower of Orpheus. It has been established that the Orpheus flower is a pre-glacial relic, its existence dating back to about 25 million years ago.

The Orpheus flower is among the most interesting and rare representatives of the Bulgarian flora and a unique plant in many ways. It has amazing properties among flowering plants (angiosperms), with which it can survive extreme and prolonged dehydration. Haberlea rhodopensis can survive three years in a herbarium. This property is called anabiotic drought resistance and is therefore called the resurrection flower. The orpheus flower can fall into a state of anabiosis (pseudo-death), both in summer and in winter and revive with sufficient moisture, light and heat. When water is available again, the flower can recover (resurrect) in less than two days and continue to develop.

The flower has healing properties to cleanse the liver, stomach, kidneys, blood vessels, has a tonic and rejuvenating effect. Tea from the herb can be drunk once every 5 years, because it is very strong. Its chemical composition is not very well studied, but it is known to contain polyphenols in its leaves, which are strong antioxidants. The herb contains unique beneficial substances, which is why it was used in the past to treat foot-and-mouth disease in animals and wounds.

Biography

Nedyalka Valcheva completed a Master's degree program in "Technology of Vegetable, Food, and Flavor Products" at the University of Food Technologies in Plovdiv, Bulgaria, in 1990. From 1990 to 2016, she worked as a lecturer at the Vocational High School of Chemical and Food Technologies "Prof. Asen Zlatarov, PhD." in Dimitrovgrad, Bulgaria. In 2014, she earned a Ph.D. degree from the University of Food Technologies in Plovdiv, with a dissertation titled "Microflora of Healing and Spring Waters in the Haskovo and Stara Zagora Regions." Since 2016, she has been a senior expert and organizer in the Department of Biochemistry, Microbiology, and Physics at Trakia University in Stara Zagora, Bulgaria. In 2023, she completed her DSc. at the Institute of Cryobiology and Food Technologies, Agricultural Academy, in Sofia, Bulgaria, with a dissertation titled "Physical, Chemical, and Microbiological Characteristics of Mineral, Mountain, and Spring Waters from Bulgaria, and Biological Properties of Identified Microorganisms." In 2024, she resumed her position as a lecturer at the Vocational High School "Prof. Asen Zlatarov, PhD." in Dimitrovgrad, Bulgaria.

Parvender Sheoran

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Aligning agronomic solutions for sustainable agriculture and food systems in salt-affected regions: Field insights and participatory validation

Continuous use of bicarbonate–dominated residual alkalinity in groundwater (RSCiw) results in build–up of soil sodicity and negatively impacts Rice–Wheat System (RWS) productivity. Therefore, it is imperative to develop a climate–resilient and ecologically sustainable management system to harness the potential of salt–affected soils. Different sets of field experiments on adaptation (crop management) and mitigation (soil reclamation) strategies were laid out in farmers' participatory mode for sustainable rice–wheat production in sodicity–affected Ghaghar Basin of Haryana, India. This study highlights the need of devising ecosystem–based approach involving combinations of genetic tolerance with affordable soil, crop and nutrient management practices in alleviating the sodicity stress, bridging yield gaps with optimal resource use. Sustainable use of sugarcane pressmud compensating 25% gypsum requirement provided an affordable alternative for reclaiming sodic soils. Validation of farmer's perception with added N beyond the existing recommendations suggests upward revision and corrective N applications to compensate yield penalty in sodic agro-ecosystems. This study demonstrates how combining participatory research and perceived farmer's experience is decisive for appropriate technology assemblage and interlink action towards sustainable rehabilitation, closing yield gaps and increasing farm profitability in salt-affected ecologies and similar conditions elsewhere.

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Diversity in the genus geranium from Pangi Valley, an unexplored trans Himalayan region along with new records for Himachal Pradesh, Western Himalaya, India

Introduction: The genus Geranium L. belongs to the tribe Geranieae Benth. of the family Geraniaceae and comprises ca. 430 species distributed in tropical, temperate and alpine regions of the world. The first systematic account of the Indian Geranium is available in "Flora of British India" in which 18 species were recorded from the British India out of which 17 species were found within India's current political borders.

Pangi Valley which is concealed between the Pir Panjal and Zanskar mountains of the Western Himalaya is one of the most remote territories in Western Himalaya. Pir Panjal range is well connected with Zanskar Mountains in Trans Himalayan region, so, the floral elements can migrate from Zanskar to Pir Panjal region. Its geological history, physiographic diversity and climatic complexity have provided the environment to support a rich flora as well as angiosperm endemism.

Aim: The study of new distribution range of two species of the genus Geranium (family Geraniaceae) has been reported for the first time from the Western Himalaya of India i.e., Geranium swatense and G. rubifolium for the state Himachal Pradesh. Geranium swatense has so far been known to occur in the Swat Valley of Pakistan and subsequently known through the Kashmir Himalaya in India; likewise, G. rubifolium was previously known from Kashmir Himalaya. Hence, the present report of those taxa brings new additions to the flora of Himachal Pradesh, thus extending the distribution from the Kashmir Himalaya to Himachal Pradesh of Western Himalaya.

Material and Methods: Interesting specimens of Geranium and the field data were collected during fieldworks, since the last 4 years (2021-2024), conducted as a part of floristic studies from Pangi Valley, Indian Himalayan region. Further critical studies have been carried out based on the available data and relevant material housed in various regional, international herbaria and virtual databases i.e., JSTOR, POWO, GBIF, NY, K, P. Leica S8 APO stereo zoom microscope was utilised to measure floral parts, while a Micro-morphological data pertaining to various plant parts were documented using a Scanning Electron Microscope. A distribution map was generated based on geographical coordinates and validated through the utilization of QGIS 3.32 Lima Software. The voucher specimens have been deposited and accessioned at LWG herbarium for future reference.

Results: We confirmed the identity of these specimens as *Geranium swatense* Schönb.-Tem., G. *rubifolium* Lindl., G. *himalayense* Klotzsch, G. *pratense* L., G. *nepalense* Sweet, G. *wallichianum* D.Don ex Sweet.

Conclusions: We now have a better understanding of the total diversity of the genus Geranium in Pangi Valley. In addition, an updated distribution map of the above taxa is also provided.

Biography

Miss Dey studied Botany at the Darjeeling Govt. College of North Bengal University, India as MSc in 2018. She then qualified CSIR-NET-Junior Research Fellowship in 2019. She then joined the research lab of Dr. Priyanka Agnihotri at the CSIR- National Botanical Research Institute (NBRI), Plant Diversity, Systematics and Herbarium Division through Academy of Scientific & Innovative Research (AcSIR) in 2020. She also received Women Scientist Award in National Conference on Himalayan Ecosystem by Department of Botany, Govt. P.G. College Nagnath-Pokhari & Uttarakhand Science & Education Research Centre Dehradun in 2024. She has published 8 research articles in SCI (E) journals.

Dr. Prabhakar D Pandit[1*], Rajesh Pal[1], Rahul Warke[2], Hemant Purohit[1], Gangadhar M Warke[2]

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Organic amendments enhance crop yield by improving rhizospheric microbiome diversity

Rhizosphere associated plant microbiome plays an important role in nutrient acquisition, plant growth promotion, and stress tolerance. Abundance and diversity in the rhizospheric microbiome, which is host specific, has been correlated with plant productivity. In addition to host specificity, it is largely affected by use of agro-chemicals during crop cultivation. In this study, the effect of organic biostimulant viz., soil rejuvenator HPP-P3 on the rhizospheric bacterial community was analyzed in three crops viz. Cotton, Soybean, Turmeric and Pigeon pea using full length 16S rRNA gene amplicon sequencing. The crops were grown at the same location to avoid environmental factors affecting soil microbiome composition. This comparative metagenomics study revealed that the organic amendment improves crop specific rhizospheric bacterial communities with respect to its composition and abundance of dominant species. Overall, Proteobacteria, Firmicutes, Acidobacteria & Bacteroidetes were found to be the most dominant bacterial phyla collectively constituting more than 85% of total bacterial diversity of every rhizospheric soil. As compared to control plots the rhizospheric microbiome composition varies significantly in treatment plots as indicated by differential taxa abundance at every level of taxonomic hierarchy viz. Phylum, Class, Order, Family, Genus and Species. Interestingly, there is differential abundance of dominating bacterial genera specific to each crop, suggesting selective enrichment of microbes at rhizosphere depending on host plant physiology. Nitrospora, Sphingomoans and Gemmata were the top three genera dominating in cotton rhizosphere as compared to control plot. In case of Pigeon pea Vicinamibacter, Pseudomonas and Peribacillus were selectively enriched bacteria genera as compared to control plot. However, for Turmeric Bacillus, Peribacillus and Ornithibacillus were the top three dominant genera. For Soybean Vicinamibacter, Haliangium and Pseudomonas were dominating genera compared to control plot. The improved rhizospheric microbiome resulted in an increase in crop yield by 15-20 % as compared to control plot. The study reveals the mode of action of organic amendment through effective microbiome modulation at the rhizosphere.

Biography

Dr. Prabhakar Pandit has received his PhD (Biological sciences) in 2017 from The Academy of Scientific and Innovative Research, NEERI, Nagpur, India. He has received DST-INSPIRE Fellowship, Government of India during his PhD work. He has more than eight years of expertise in Industrial R and D and currently he is working as R and D manager (Bioprocess) at Himedia Microbiome Research Center Nagpur. His expertise is in the development of plant probiotics, endophytic microbial genomics and metagenomics. He has published eight research articles in SCI journals, two book chapters and he presented posters in more than eight international conferences.

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Rainfall fluctuation causes invasive plant *Prosopis juliflora* to adapt ecophysiologically and change phenotypically

Understanding how rainfall variability influences the ecophysiology of invasive plant in tropical grasslands is vital for sustainable ecosystem management. Climate change affects rainfall, which in turn alters the ecophysiology and functional traits of terrestrial ecosystem.

Recently, studies have been conducted to evaluate and comprehend how fluctuating precipitation affects plant growth and, consequently, ecological dynamics.

Here we investigate the same in three different rainout shelters subjected to three different rainout doses: Low Rainfall (LR, 500 mm, mimicking drought, 20% less rainfall than ambient), Normal Rainfall (NR, 1000 mm, average ambient rainfall), and high rainfall (HR, 1400mm, mimicking future rainfall changes; 60% more rainfall than ambient). Each rainout shelter was further divided into three replicate plots of 2 x 2 m2 using randomised block design. P. juliflora was transplanted into each 2 × 2 m2 subplot, with 20-25 seedlings. The observations were collected one year (2020) after the experimental plots were established. Among the studies physiological parameters, leaf traits and growth measurements such as biomass, height, diameter, photosynthetic rate, Leaf Area (LA), Specific Leaf Area (SLA), and leaf carbon (LC), leaf CN ratio and root shoot ratio varied significantly, showing positive responses to the precipitation change. However, WUE, LN, LDMC, and root length differed significantly, had negative responses, and were found to be the highest in plots receiving Low Rainfall (LR). Our results indicate that P. juliflora's ecophysiology and functional traits are greatly influenced by rainfall variability, which has consequences for the plant's ability to adapt to changing climatic circumstances and the ecosystem's overall functioning. The outcome suggests that P. juliflora is an invasive species with stronger phenotypic plasticity, confirming its superior development in both high and low precipitation conditions (especially helpful in disturbed ecosystems with frequent fluctuations in conditions).

Keywords: Prosopis Juliflora, Rainout Shelter Experiment, Photosynthesis, Plant Biomass, Plant Functional Traits.

Biography

Mr. Prakash Rajak completed his B.Sc. (Hons.) in Botany, Zoology, and Chemistry at Banaras Hindu University, India, in 2016. He then pursued an M.Sc. in Botany at Banaras Hindu University, India, in 2018 and joined Prof. Hema Singh's research group at the Ecosystem Analysis Laboratory Department of Botany, Institute of Science, Banaras Hindu University, Varanasi, India. He is also currently working on the project as a Senior Research Fellow (SRF) at the Department of Science and Technology-Science and Engineering Board (DST-SERB). His research publications and articles have been published in reputable SCI and Scopus journals.

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Comparative evaluation of cherry-type tomato breeding lines for hydroponic greenhouse production

California is a leader in U.S. greenhouse tomato production, with hydroponic systems offering the potential for higher yields and enhanced sustainability. Cherry-type tomatoes, known for their rich flavor, are targeted in breeding programs for traits such as increased secondary metabolites and resistance to plant virus pathogens. However, challenges like blossom end rot and fruit cracking highlight the need for further genetic research and breeding strategies. This study evaluates five selected cherry-type tomato varieties grown in greenhouse hydroponic systems, assessing fruit qualities (e.g., cracking, blossom end rot, color, yield), plant mortality, and plant health indicators like NDVI and CCI. The study aims to evaluate the adaptability of these germplasms to hydroponic production systems, providing insights for future breeding programs. Preliminary data show significant differences among tomato lines, suggesting potential for breeding based on key traits impacting fruit marketability. The results contribute to enhancing tomato production and fruit quality in Southern California's conventional greenhouse hydroponic systems.

Biography

Dr. Saxena is an Assistant Professor in the Plant Science Department at Cal Poly Pomona’s Huntley College of Agriculture. She holds a PhD in Plant Biology, specializing in turfgrass breeding, from Rutgers University, NJ. Dr. Saxena is the Director of the Center for Turf, Irrigation, and Landscape Technology and Program In-Charge of the Organic Tomato Breeding Program at Cal Poly Pomona. Her research focuses on organic agriculture, plant breeding, sustainable farming, precision agriculture, water conservation, and turfgrass management. She supervises undergraduate and graduate students and teaches plant science courses, advancing agricultural science and education at Cal Poly Pomona.

Priyanka Prajapati*, R. N. Kharwar

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Fungal endophytes promote wheat growth (PBW-343) and enhance salt tolerance through improvement of ascorbate glutathione cycle and gene expression

Wheat (*Triticum aestivum L.*) faces considerable challenges in growth and productivity due to soil salinity, a major constraint to agricultural success. This study investigated the potential of fungal endophytes to enhance wheat growth and improve salt tolerance by influencing the ascorbate-glutathione cycle and gene expression. To address this study, A greenhouse experiment was conducted using saline soil (100 mM NaCl) conditions, with wheat plants inoculated with selected fungal endophytes such as Cladosporium parahalotolerant and Aspergillus medius isolated from salt-tolerant wheat genotypes (KRL-210, KRL-213 and KRL-19) in our previous study. These endophytes were used individually and in combination with each other on the Reactive Oxygen Species (ROS) scavenging and antioxidant functions in plants under salt stress. To do so, a 16-days old wheat (PBW-343) seedlings were subjected to 100 mM NaCl in present and absence of the fungal endophytes. The results revealed significant reduction in sugar, protein, chlorophyll, carotenoid content and chlorophyll fluorescence (Fv/Fm) of the plants lacking endophytes. Combinatory applications with two fungal endophytes (C. parahalotolerant and A. medius) significantly improved the above-mentioned parameters compared to non-inoculated control under salt stress. H_2O_2, O_2- and lipid peroxidation level were significantly reduced in the plants inoculated with fungal endophytes. Salt stress significantly increased activities of ascorbate peroxidase (APX) and Superoxide Dismutase (SOD) and decreased activities of Glutathione Reductase (GR), Monodehydroascorbate Reductase (MDHAR) and Dehydroascorbate Reductase (DHAR). Fungal endophytes inoculated salt stressed seedlings enhanced the above-mentioned indicators as compared to the salt-stressed plants without fungal endophytes, as well as in the ratios of reduced Ascorbate/Dehydroascorbic Acid (AsA/DHA) and Reduced Glutathione/Oxidized Glutathione (GSH/GSSG). Overall, fungal endophytes inoculation improved salt tolerance and reduced the accumulation of ROS by increasing their scavenging via improving the redox state of ascorbate and glutathione and promotion of antioxidant enzymes activity. To elucidate the molecular mechanisms behind these observed benefits, gene expression analysis was performed on key genes such as APX, SOD, GR, DHAR and MDHAR gene(s) involved in salt tolerance and antioxidant defense pathways. The study found that the expression levels of several genes associated with the ascorbate-glutathione cycle were upregulated in the endophyte-inoculated plants, indicating a more efficient antioxidant system capable of scavenging reactive oxygen species.

Biography

Priyanka Prajapati is currently pursuing a Ph.D. from the Department of Botany, Banaras Hindu University, Varanasi, under the supervision of Prof R.N. Kharwar. Her specializes in "Unraveling the role of fungal endophytes in plant abiotic stress tolerance". She has a strong academic background, having completed her BSc and MSc in Botany from Hansraj College, Delhi University, and her MPhil in Botany, from Delhi University. Her commitment to advancing scientific knowledge is reflected in her publication record, with contributions to reputed journals stemming from her MPhil and PhD research work. Her current research focuses on understanding the intricate interactions between fungal endophytes and plants under abiotic stress conditions.

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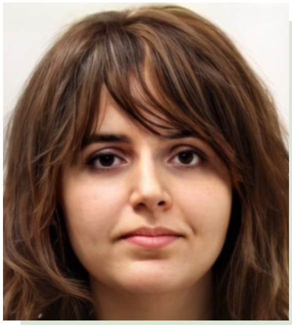
Application of bioengineering in construction

Bio-cement and bio-concrete are innovative solutions for sustainable construction, aiming to reduce environmental impact while maintaining the durability and versatility of building materials. Bio-cement is an eco-friendly alternative to traditional cement, produced through Microbially Induced Calcium Carbonate Precipitation (MICP), which mimics natural biomineralization processes. This method reduces CO_2 emissions and enhances the strength and durability of construction materials. Bio-concrete incorporates bio-cement into concrete, creating a self-healing material. When cracks form in bio-concrete, dormant bacteria within the material become active in the presence of water, producing limestone to fill the cracks, extending the material's lifespan and reducing the need for repairs.

The environmental impact of traditional cement production is significant, with cement generation accounting for up to 8% of global carbon emissions. To create more sustainable construction materials, innovative thinking is needed, with some using modern innovations to make concrete ultra-durable and others turning to science to create affordable bio-cement.

The research demonstrates the potential of bio-cement to revolutionize sustainable building practices by offering a low-energy, low-emission alternative to traditional cement, while also addressing environmental concerns. The findings suggest promising applications in various construction scenarios, including earthquake-prone areas, by enhancing material durability and longevity through self-repair mechanisms.



Sirangelo Tiziana Maria

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Molecular investigations on hemp seeds, a source of nutrients and bioactive compounds

Industrial hemp, which contains less than 1 percent of Tetrahydrocannabinol (THC), is a versatile crop that can be processed into different products with multiple uses. Hemp seeds are the most crucial part of the plant for food applications due to the abundance of proteins, polysaccharides, oils, cannabinoids, and other micro-nutrients. More specifically, they contain a great amount of polyunsaturated fatty acids, such as linoleic and α-linolenic acids, equivalent to ~50% and ~20% of total fatty acids, respectively. The various nutrients and bioactive compounds from hemp seeds allow to enrich ordinary food products obtaining functional foods, providing beneficial effects for human health.

Nevertheless, the poor research on their biosynthesis and gene regulation has limited the use of molecular breeding to enhance hemp's properties.

Here, we provide an overview of omics studies about the metabolomics and proteomics profile of hemp seeds, focusing on nutrients, such as proteins, carbohydrates, lipids, mineral and vitamins nutrients, and bioactive compounds, including terpenes, polyphenolics and phytosterols. Omics studies about the bio-products obtained from processing hemp seeds, such as oil, dehulled seeds, hulls, flour, cakes, other meals and proteins concentrates/isolates are also discussed. The pros of using proteomics and metabolomics approaches, highlighting the high nutritional values of the bio-products, are finally underlined.

This work, in our opinion, represents a great starting point for researchers interested in studying hemp seeds as source of nutrients and bioactive compounds, aimed to improve their knowledge from a molecular point of view.

Biography

Sirangelo Tiziana Maria is a researcher at ENEA-Biotechnology Division–and its main activities are about the genetic improvement of plants and the application of recent NGS technologies and bioinformatics approaches to investigate the molecular mechanisms involved in abiotic, biotic stress, disease, and other research fields. Previously, she worked at CREA - Council for agricultural research and economics. Tiziana Maria graduated from University of Calabria in Biology and obtained her PhD in Agni-food Sciences, Technologies e Biotechnologies at University of Modena and Reggio Emilia. She was involved in several projects focused on gene expression and GWAS analyses in several plant species, and the results were published in international scientific journals, with excellent recognition from the scientific community.

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Reinforcement of alginate beads of microalgal-bacterial immobilized consortia with cellulose nanofibers for aquaculture wastewater treatment

The increasing demand for sustainable wastewater management has driven the development of innovative solutions integrating biological and nanotechnological approaches. This study focuses on enhancing the mechanical and functional properties of alginate beads for microalgal-bacterial immobilization by incorporating Cellulose Nanofibers (CNFs) for efficient aquaculture wastewater treatment. CNFs were synthesized using TEMPO oxidation and enzymatic hydrolysis, then integrated into alginate beads at varying concentrations (2%, 5%, 10%, and 15%). The beads were evaluated for structural stability, mechanical strength, and nutrient purification efficiency under static and dynamic conditions.

Experimental results demonstrated that CNF-reinforced alginate beads exhibited improved resistance to degradation and enhanced structural integrity, as evidenced by stable weight and diameter in phosphate solutions. Dynamic analysis in photobioreactors revealed that TEMPO-oxidized CNFs provided superior mechanical reinforcement compared to enzymatically derived CNFs. Mechanical testing further confirmed that 5% CNF incorporation optimized compressive strength, while higher concentrations caused structural weakening due to excessive agglomeration.

The purification capacity of CNF-modified beads was assessed for nitrate, phosphate, and ammonium removal from recirculated aquaculture system (RAS) water. Beads containing CNFs achieved significant reductions in nutrient concentrations, with 91% phosphate removal, 100% ammonium elimination, and accelerated nitrate depletion within five days. The presence of microalgae in CNF-alginate beads contributed to enhanced purification through synergistic metabolic interactions with bacterial consortia, promoting nutrient uptake and conversion into biomass.

Confocal microscopy confirmed the homogeneous distribution of CNFs and microalgae within the alginate matrix, ensuring uniform performance. This research highlights the potential of CNF-reinforced alginate beads as a scalable and eco-friendly solution for aquaculture wastewater treatment, addressing nutrient recycling and environmental sustainability challenges.

Additionally, complementary studies have demonstrated that the microalgae immobilized in these biomedia can also function as agricultural fertilizers due to their nutrient profiles rich in nitrogen and phosphorus, which are essential for plant development. This potential is currently under investigation to broaden its applicability.

Keywords: Cellulose Nanofibers, Alginate Beads, Aquaculture Wastewater, Microalgae, Bioremediation, Nutrient Removal.

Biography

Teresita Marzialetti Bernardi, Chemical Civil Engineer and a specialist in Quality Management from the National University of the South, Argentina. She earned a Master's degree in Chemical Engineering and a PhD in Sciences with a mention in Chemistry from the University of Concepción, Chile. Currently, she serves as an Associate Professor in the Department of Chemical Civil Engineering at the University of Concepción. Her research focuses on the valorisation of lignocellulosic biomass and organic residues, as well as heterogeneous catalysis. She has published over 30 scientific articles, holds one granted patent, and has participated in more than 10 scientific research projects.

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Biogeosystem technique methodology in plant development condition refinement contributing to safe plant biology and ecosphere expanded reproduction

To increase the biosphere food and energy production, we developed a transcendental (not a standard direct imitation of nature) Biogeosystem Technique (BGT*) theoretical and technological framework to refine a technology imbedding to the ecosphere. The BGT* provides a higher rate waste recycling, an improved soil productivity and ensures improved conditions for the plant development. This is a contribution to the ecosphere plant biology.

The BGT* methodology includes: When applied once, the 20–50 cm layer intra-soil milling provides a soil stable fine multilevel geophysical architecture for a period up to 40 years improving rhizosphere soil biome, ensuring an optimal plant ontogenesis and providing a high rate long-term soil fertility.

The intra-soil pulse sequential-discrete watering ensures a matrix potential of the soil solution in the range circa –0.2 MPa to –0.4 MPa and a plant stomatal apparatus operates in a regulation mode. A water consumption of plants at this rather low matrix potential is circa 5 to 20 times less compared to the standard irrigation. Improved water and nutrient supply provides an optimal ontogenesis and a high productivity of plants.

The current outdated technologies of C irreversible sequestration fail in environmentally safe waste recycling, energy renewal, and safe ecosphere expanded reproduction. We developed a reversible sequestration of atmosphere C, simultaneously expanding a C soil and biological active phase.

The BGT* includes the C-free gasification byproduct intra-soil recycling. This provides a safety of environment and a higher soil biological productivity of ecosphere ensuring a higher rate atmosphere CO_2 disposing by plants and C reversible sequestration in the additional biomass and soil organic matter mitigating the climate system.

The BGT* is a new level contribution in the plant biology field because is capable to provide utterly possibility to the plant biology studies in a new highly productive and pollution free plant development ecosphere conditions.

Biography

Professor Dr. Sc (Biol) Valery P. Kalinitchenko. Institute of Fertility of Soils of South Russia, Director, Persianovka, Russia. All-Russian Phytopathology Research Institute, Leading Researcher, Big Vyazemy, Russia. Doctoral Degree in 1991 in Moscow State University, Soil Science Faculty. Don State Agrarian University, Persianovka, Russia, in 1976-2012, including Agriculture and Land Reclamation Department Chair, in 1992-2012. The area of interest: soil and water saving, waste recycling, environment sustainability, soil productivity and health, Biogeosystem Technique methodology. Editorial board member of eight scientific journals, 700 monographs, journal and conference papers and 50 patents. Member of the nine international scientific societies including ACS and EGU.

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Key innovations of prognostic breeding that increase the efficiency of crop genetic improvement

The aim of crop genetic improvement is to increase the level and stability of the yield potential of crops and improve their quality. Currently, the annual genetic gain of crops is, on average, around 1%. After systematic studies, the prognostic breeding approach adopted, as exclusive unit of evaluation and selection, the individual plant grown in the absence of interplant competition from the early generations of the breeding program. The main objective of this article is to provide an in-depth investigation of the causes of reduced efficiency in plant breeding and clarify important issues that are still somewhat nebulous among the global plant breeding community. Prognostic breeding is a crop improvement methodology maximizing selection efficiency through adoption of a series of innovations that effectively exploit available growth resources and maximize crop yields. One of the key innovations of prognostic breeding is the use of the honeycomb selection designs which sample effectively soil heterogeneity. Another innovation is the plant prognostic equation which is used to measure the crop yield potential of single plants. The equation ensures accurate whole-plant phenotyping by providing objective criteria, where selection is not visual but a matter of quantitative calculation.

Biography

Dr. Fasoula received her MS degree in Plant Biology from the University of Illinois, USA and her PhD degree in Plant Breeding and Genetics from the University of Georgia, USA. She is currently an Adjunct Research Scientist and Consultant in the Institute of Plant Breeding, Genetics & Genomics and Dept of Crop and Soil Sciences at the University of Georgia. She has been invited to present her work in various international Institutions and has published many book chapters and papers in the areas of density and competition, crop yield potential, stability, selection efficiency, honeycomb designs, gene action and whole-plant phenotyping.

Xing Zheng Wu

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Real-time *in-situ* monitoring of environmental stress in aquatic plants by dissolved oxygen-quenched fluorescence/materials movement-induced beam deflection

We report a novel optical detection system that allows for real-time in-situ monitoring of environmental stress such as heavy metal stress in aquatic plants by making use of the dissolved oxygen-quenched fluorescence and material movements-induced beam deflection. A blue semiconductor diode-laser was used as the light source of both the probe beam and excitation light for fluorescence. The laser light was focused to a vicinity of the plant/water interface in a culture dish by an objective lens. Deflection of the probe beam was detected by a position sensor, and fluorescence from the vicinity was monitored by a PMT. A Ru-complex (Tris (2, 2'-bipyridyl) ruthenium (II) chloride) was used as a fluorescent probe, and Egeria densa Planch. was used as a model aquatic plant. The results show that the optical detection system can monitor DO and the material movements at a vicinity of the aquatic plants not only much more sensitively, but also much more closely to real time than analytical methods that monitor concentration changes at a bulk solution. The method was successfully used for monitoring of heavy metal stress in aquatic plants.

Biography

Xing-Zheng Wu, Professor of Department of Life, Environmental and Applied Chemistry, Fukuoka Institute of Technology, grew up in China and received his Bachelor's degree from the Wuhan University in 1984. Then, he received his Master’s degree from Tokyo Metropolitan University in 1988 and Ph. D degree from Tokyo University in 1991. He received the Excellent Young Analytical Chemists Award from the Japan Society for Analytical Chemistry and is doing analytical chemistry research and teaching in Japan.

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Exogenous abscisic acid represses rice flowering via SAPK8-ABF1-Ehd1/Ehd2 pathway

Rice flowering is a primary agronomic trait that determines yield and ecological adaptability in particular regions. ABA is essential in rice flowering, but the underlying molecular mechanism is poorly understood. Here, we report the identification of a "SAPK8-ABF1-Ehd1/Ehd2" pathway, through which exogenous ABA represses rice flowering in a photoperiod-independent manner. Under short- and long-day conditions, simultaneous knock-out of ABF1 and its homolog bZIP40 accelerated flowering. At the same time, SAPK8 and ABF1 over-expression lines exhibited delayed flowering and hypersensitivity to ABA-mediated flowering repression. After perceiving the ABA signal, SAPK8 physically binds to and phosphorylates ABF1 to enhance its binding on the promoters of master positive flowering regulators Ehd1 and Ehd2. By interacting with FIE2, ABF1 recruited the PRC2 complex to deposit H3K27me3 suppressive histone modification on Ehd1 and Ehd2 to suppress these genes' transcription, eventually leading to later flowering. The current study shed a novel insight into the ABA inhibitive effects on rice flowering.

Biography

Dr. Wang Yifeng is an associate researcher and master tutor at China National Rice Research Institute. He graduated from Zhejiang University, China, with a Ph.D. in botany and worked at CNRRI in 2015. He is mainly engaged in Crop Functional Genomics and Biological Breeding. He presided over projects such as the National Natural Science Foundation of China, the Zhejiang Provincial Key Research and Development Program, and the Zhejiang Provincial Natural Science Foundation. As the first/corresponding author, he has published 17 articles in New Phytologist, Journal of Advanced Research, Plant Cell and Environment, etc., with a cumulative impact factor of >40 and H index>20.

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POSTER PRESENTATIONS

Chen Ge*, Linda Hoegfeldt*,
Bruno Trevenzoli Favero,
Henrik Lütken

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Ri technology: A Non-GMO approach to enhancing plant stress tolerance

Rhizobium rhizogenes is a plant bacterium that carries a plasmid containing the Root inducing (Ri) genes. These Ri genes can be inserted into the plant host's genome and induce hairy root formation. The integration process, called Horizontal Gene Transfer (HGT), has been exploited in research to generate naturally transformed plant lines of several species, e. g. in oilseed rape. Additionally, it has serendipitously occurred in nature millions of years ago yielding the presence of Ri genes in several species, e.g. sweet potato, blueberry, as well as some Nicotiana and Linaria species. Therefore, the naturally transformed plants, generated under controlled conditions, are not defined as a Genetically Modified Organism (GMO) according to the European Union and Japanese regulatory framework. Subsequently, the Ri technology can be used as a valuable biotechnological tool to generate plants with altered phenotypes, such as the already commercially marketed kalanchoe cultivar 'Molly', which shows compact growth. Previous studies demonstrated advantages of Ri oilseed rape under drought through e.g. increased root biomass or alteration of the phytohormonal status of the plant. Exploring further evolutionary advantages, one of the Ri genes, rolD, encodes the RolD protein, which shows sequence homology with ornithine cyclodeaminase. This enzyme catalyses the conversion of ornithine into proline in R. rhizogenes. This enzymatic activity was also detected in extracts from tobacco plants exhibiting rolD overexpression. The observed ability of wild plant species, such as Veronica agrestis, which carries this gene, to thrive in naturally cold environments, combined with the known role of proline in cold acclimation, led to the hypothesis that Ri genes may enhance the cold acclimation capacity of plants. In the current study, gene expression of rolD and other cold responsive genes were investigated in Ri oilseed rape. Further, the proline content has been determined and connected to the physiological status of the plant, represented through membrane stability, chlorophyll content and efficiency of photosystem II.

Another part of this study is to generate naturally transformed Arabidopsis thaliana with all Ri genes. Enabling the creation of a platform to study the mechanisms behind Ri technology, offering an efficient, convenient and fundamental approach to investigate the effect of Ri genes. In this study, three different methods to naturally transform Arabidopsis were conducted and compared. Inoculation with R. rhizogenes was applied on leaf explants and seedlings. After inoculation, the latter were observed for development of hairy roots. Based on that observation, hairy root induction efficiency was compared to non-inoculated explants. Floral dipping, as an innovative approach to generate Ri Arabidopsis, was tested for the first time.

By combining evolutionary insights with biotechnological approaches, this study advances our understanding of Ri gene effects and lays a foundation for innovative strategies to enhance plant resilience without the regulatory constriction associated with traditional GMO-methods.

Biography

Chen Ge studied Biotechnology at the Northwest A&F University, China. Right now, she is a MSc Biotechnology student at the University of Copenhagen, Denmark. Chen is currently working on her Master’s thesis at the Section for Crop Sciences, Department of Plant and Environmental Sciences at the University of Copenhagen.

Linda Hoegfeldt studied Environmental Management at the Justus-Liebig University, Germany. There, she worked as a scientific assistant at the Institute of Phytopathology in the research group of RNA-based plant protection. Right now, she is a MSc Agriculture student with the specialization in Plant Science at the University of Copenhagen, Denmark. Linda is currently working on her Master’s thesis at the Section for Crop Sciences, Department of Plant and Environmental Sciences at the University of Copenhagen.

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Characterization and conditioning of fibers obtained from agave cupreata and hemp (*Cannabis Sativa L.*)

Currently, various industries are seeking environmentally friendly raw materials, with textiles being one of them. Artificial textile fibers contribute to high levels of pollution, from production to disposal. Therefore, alternatives such as natural fibers, specifically hemp and agave, are being explored due to their inherent physicochemical characteristics. Evaluate the physicochemical characteristics of the fibers extracted from agave using *Pleurotus ostreatus* and low concentrations of magnesium hydroxide. The study results indicate that the use of *Pleurotus ostreatus* and chemical treatments with magnesium hydroxide and hydrogen peroxide allow for effective extraction of *Agave cupreata* fibers. A total approximate yield of 10% was achieved in the extraction process. FTIR analyses revealed significant changes in functional groups, with decreases in transmittance at the 1,023 cm-1 and 1,720 cm-1 region, indicating the release of the cementing matrix. Significant decreases in transmittance percentage in Cannabis sativa were observed in samples inoculated with *P. ostreatus,* with CaS4P (inoculated for 4 weeks) showing the lowest transmittance at 92% compared to CaS3P (inoculated for 3 weeks) at 83% at 3,336 cm-1 and 75% at 1,021 cm-1. These regions indicate the presence of alpha cellulose and cellulose, suggesting a release of the cementing matrix. The color values and scanning microscopy photographs indicate that the use of *Pleurotus ostreatus* and chemical treatments with magnesium hydroxide and hydrogen peroxide allow for effective extraction of fibers from Agave *cupreata* and *Cannabis sativa.*

Biography

Dra. Dolores Vargas-Alvarez studied engineer Agroindustrial University Autonomous de Chapingo., Mexico and graduated as EA in 1996. She then joined the research group of Prof. Saucedo Veloz Crecenciano y Dr. Marcos Soto Hernandez at the College of Postgraduates, Mexico, in Institute resources genetics and productivity. She received her PhD degree in 2004 at the same institution. After two years postdoctoral fellowship supervised by Dra. Ma. Teresa Colinas de Leon in horticulture; UACH Mexico. She obtained the position of Professor titular in University Autonomous of Guerrero,. She has published more than 40 research articles in SCI (E) journals.

Juan Jose Rodríguez Fuentes

Department of Plant and environmental Sciences, Section for Crop Sciences, University of Copenhagen, Copenhagen, Denmark

Exploring rooting systems of Ri-naturally transformed oilseed rape (*Brassica napus*)

Natural transformation involves the genetic modification of plants using wild strains of e.g. Rhizobium rhizogenes. This technique has emerged as a valuable biotechnological breeding method through the insertion of the Root-inducing (Ri) genes, which can introduce desirable traits in horticulturally and agriculturally relevant species e.g. plant compact growth, ethylene tolerance and drought resistance. Notably, the insertion of Ri genes via this method is exempt from GMO legislation in several countries, including the European Union and Japan. In this study, the aim is to compare two lines of naturally transformed oilseed rape (A11 and B3). The focus is to study these lines under semi-field conditions to assess morphological changes in both above- and below-ground traits. The hypothesis is that the Ri lines have a shift in biomass allocation favoring root development. The Ri lines exhibited altered leaf number, plant height, and green canopy fraction (Canopeo app) compared to WT. Furthermore, significant differences were observed in flowering time and floral abundance, with WT plants flowering, on average, one week earlier and producing more flowers than A11 and B3. These findings indicate a potential link between Ri gene presence and the regulation of the reproductive phase in oilseed rape.

Biography

Juan Jose Rodríguez Fuentes earned a Bachelor's degree in Biotechnology from the University of Granada, Spain, graduating in 2022. During his final year, he conducted his bachelor's thesis research at a Spanish National Research Council (CSIC) center under the supervision of Dr. María C. Romero Puertas. Following graduation, he spent a year working in agriculture in southern Spain before enrolling in the MSc in Agriculture program at the University of Copenhagen, specializing in Plant Science. He is currently completing his master's thesis in the Section for Crop Sciences at the same university, under the supervision of Professors Henrik Vlk Lütken and Bruno Trevenzoli Favero.

Khin Mar Cho*, Kadamb P, Wuang S.C, Goh L.B.

School of Applied Science, Temasek Polytechnic, Singapore In Collaboration with Metro Farm Pte Ltd, Singapore

Rooftop vertical aquaponics systems for sustainable urban farming

Unlike traditional farming, an urban farming is the practice of cultivating crops either in indoor or outdoor spaces of the buildings. It refers to the farming activities in urban areas, which are commonly used for income or food. The rooftop vertical farming helps to overcome limited agricultural land use such as Singapore. Food security is a global concern that refers to the availability, accessibility, and stability of safe and nutritious food. As such, urban farming would help transform the agri- food industry into one that is highly productive and employs climate- resilient, resource- efficient, and sustainable technologies, thereby contributing to Singapore's '30 by 30' goal set by the Singapore Food Agency- to reduce reliance on food imports and sustainably produce 30% of the country's nutritional needs by 2030.

Aquaponics has recently emerged as a sustainable and innovative agricultural system to produce plants and fish simultaneously to conserve land and water. It combines a Recirculating Aquaculture System (RAS) and hydroponics. It involves a process known as nitrification, whereby ammonia from fish waste is oxidized into nitrite by ammonia oxidizing bacteria, and converted into nitrates by nitrite oxidizing bacteria, mainly Nitrobacter spp. and Nitrospira spp. The nitrates and other residual nutrients are then taken up by the hydroponic plants. The symbiotic relationship in an aquaponics system may improve nutrient retention efficiency, reduce water usage and waste discharge to the environment, and increase profitability by simultaneously producing both fish and vegetables.

Aquaponics systems with optimized operating conditions to balance required amount of nutrients between fish and vegetables growing contribute to increase local food production and sustainable urban farming.

Biography

Dr. Khin Mar Cho is a scientist under CROPS (Centre for Research & Opportunities in Plant Science), School of Applied Science, Temasek Polytechnic. Mar Cho has over 15 years of experience in agricultural and industrial research. Her research areas are growing microgreens and their nutritional profile, optimisation of hydroponics and aquaponics growing systems, urban farming technology, composting methods, sustainable agriculture, soil fertility and soil quality management, plant nutrition, plant tissue culture techniques for orchids, ornamental, and aquatic plants, etc.

Tetiana Maıevska[1*], Nataliia Nuzhyna[2], Nataliia Raksha[2], Oleksiy Savchuk[2], Kostiantyn Maievskyi[3]

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Fish hydrolysates as effectıve biostimulants for plants

Climate change poses significant challenges to plant health, affecting their resistance to various stresses. Several strategies are used to increase plant resilience in the face of climate change. Among them is the use of biostimulants, which can help plants withstand stressful conditions while promoting growth and productivity. The biostimulants produced from fish waste may be a promising innovative solution for increasing crop yields by stimulating plant growth and development, as well as increasing their resistance to abiotic and biotic factors. Due to their high nutrient content, fish waste and by-products are among the most promising candidates for the production of alternative fertilizer products, such as plant biostimulants. Moreover, it can be a way to solve the problem of waste disposal. This approach is in line with the principles of the circular economy and is fully justified from both an economic and environmental point of view. Thus, the aim of the study was to develop an optimal method for the production of fish hydrolysates and test their effectiveness as plant biostimulants for important crops such as corn and beans. Rainbow trout (Oncorhynchus mykiss) fish waste was hydrolysed using proteolytic enzymes from trout entrails. Hydrolysate I consists only of homogenised fish viscera. Hydrolysate II consists of homogenised bones/heads and fish viscera in a ratio of 3:1. All samples were placed in a water bath at +37°C (12 hours) and then boiled for 1 hour. Common bean seeds (Phaseolus vulgaris L.) were planted in soil and watered once with 1%, 2% or 5% solutions of fish hydrolysates I and II. The control group was watered with water. The effect of hydrolysates on the germination and growth of beans, chlorophyll and carotenoid content was determined. It was found that treatment with a 1% concentration of fish hydrolysates is more optimal for beans, while at a concentration of 5%, hydrolysate I inhibited germination, and after treatment with 5% hydrolysate II, not a single seed germinated. Therefore, in the group of plants treated with 5 % fish hydrolysates, biochemical studies of photosynthetic pigments were not carried out. The treatment of beans with 1% hydrolysate I showed almost twofold growth stimulation. This hydrolysate was obtained only from the entrails, so the amount of enzymes in this sample is quite significant. The higher amount of enzymes could contribute to a better breakdown of proteins into low molecular weight peptides, which, accordingly, facilitated their assimilation by plants. On the other hand, hydrolysate II, which contained a lot of bones in the raw material, contains a correspondingly large amount of calcium, an excess of which can cause chlorosis. According to our data, hydrolysate I in both doses did not have a negative effect on the pigments of the photosynthetic system, while hydrolysate II had a destructive effect on the chlorophyll a content, even in low concentrations It is also known that calcium plays an important role in symbiotic signaling between the root system of legumes and nitrogen-fixing bacteria, so it is likely that an excess of calcium can additionally negatively affect this interaction. Consequently, it was found that for beans, a hydrolysate of fish entrails alone at a concentration of 1% is more effective as a plant biostimulant.

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Iron deficiency in rice under alkaline conditions is induced by the suppression of iron uptake mechanisms and iron transport responses

Under current environmental conditions on Earth, Iron (Fe) is readily oxidized from its divalent form (Fe^{2+}) to its trivalent form (Fe^{3+}). It predominantly exists in soil as Ferric Hydroxide ($Fe(OH)_3$), which is highly insoluble in water. This insolubilization is particularly severe in alkaline soils, which cover approximately one-third of the world's land area, severely limiting iron availability to plants. Consequently, crops are often afflicted by iron deficiency symptoms such as chlorosis, and in severe cases, their growth is inhibited, or they may die. To adapt to these iron-limited environments, graminaceous plants have evolved specialized mechanisms for iron uptake called Strategy II. In this system, plants secrete iron-chelating compounds called Mugineic Acids (MAs) into the rhizosphere, where they solubilize ferric hydroxide into an Fe-MAs complex, enabling iron absorption by the plants. While genes associated with Strategy II are known to be induced under iron-deficient conditions, the mechanisms of iron uptake and transport mediated by MAs in alkaline environments remain poorly understood. This study aimed to investigate the iron uptake mechanism of rice under iron-limited alkaline conditions. To achieve this, we analyzed the concentrations of metals in plant tissues and xylem sap. We also measured the levels of Deoxymugineic Acid (DMA), a type of mugineic acids, along with its precursor, Nicotianamine (NA). Additionally, we examined the secretion of DMA and NA into the rhizosphere.

Oryza sativa ‘Nipponbare’ plants were grown hydroponically for 40 days and then subjected to three treatments for an additional 10 days: iron-sufficient (control), iron-deficient, and alkaline (pH 9). After the treatment period, conduit fluids, plant tissues, and hydroponic solutions were collected. Metal concentrations were measured using ICP-MS after wet decomposition of the tissues with concentrated nitric acid. Additionally, DMA and NA concentrations in the samples were determined using LC-TOF-MS.

A quantitative analysis of iron concentrations revealed that, both in iron-deficient and alkaline conditions, the levels of iron in the largest and newest leaves were lower than those under control conditions. In contrast, iron concentrations in the roots exhibited different trends: they decreased under iron-deficient conditions compared to the control but increased under alkaline conditions. NA concentrations remained relatively stable across all growth conditions, but they exhibited a decreasing gradient from the hydroponic solution to the xylem sap, roots, and leaves. In contrast, concentrations of DMA increased in all samples under iron-deficient conditions compared to the control group. Additionally, under alkaline conditions, DMA concentrations rose in the leaves but significantly decreased in the hydroponic solution.

These results suggest that rice plants can sense their tissue iron levels and adjust the synthesis, secretion, and transport of DMA accordingly. Under alkaline conditions, due to the high concentrations of iron retained in the roots, DMA synthesis does not increase, and neither does its translocation to the shoots or its secretion into the hydroponic solution, even though the shoots exhibit iron-deficiency symptoms. This indicates that iron deficiency under alkaline conditions is caused by an unresponsive iron absorption mechanism distinct from that observed under iron-deficient conditions.

Biography

Tomoki Okamura studied Life Sciences at Toyo University, Japan, and graduated with an MS in 2024. They are currently pursuing a PhD in the Graduate School of Life Sciences at Toyo University under the supervision of Seiji Nagasaka. Their research focuses on plant nutrition and mechanisms of iron absorption. While they have yet to publish research articles, Tomoki Okamura has actively presented their work at several conferences, including those on agricultural chemistry and soil fertilizers, and has been recognized with an Outstanding Presentation Award. They are particularly interested in improving soils unsuitable for agriculture through their research.

Wu Changlan*, Chen Su

South-Central Minzu University, Wuhan, China

Study related to the active ingredients of tongguang vine injection in the treatment of ovarian cancer

Ovarian cancer is one of the three most common cancers of the female reproductive system, with the mortality rate ranking first among gynecological malignancies. Due to its special anatomical location, 75% of patients are already in advanced stage at the time of diagnosis, and the 5-year survival rate is only 29%. Tong Guan Vine is the dried vine stem of Tong Guan Vine in the genus Milkvetch, family Romeraceae, containing a variety of steroidal bitter ester glycosides, polysaccharides, alkaloids, resins and other active ingredients, with the efficacy of relieving cough and asthma, expectorant, purging heat and detoxification, and its preparation Tong Guan Vine Injection has been widely used in clinical antitumor, but the specific antiovarian cancer active substances and the mechanism of molecular action is not yet fully clarified. In this paper, we analyzed the chemical composition of Tongguan vine injection, combined with in vivo cellular experiments and in vitro transplantation tumor experiments in nude mice, to evaluate the antitumor effect of Tongguan vine injection on ovarian cancer, to explore the pharmacodynamic mechanism of its antitumor effect, and to find out the active ingredients of Tongguan vine injection in the treatment of ovarian cancer. The results showed that Tongguan vine injection and its active ingredients could effectively inhibit the value-added of tumor cells, migrate and promote the apoptosis of tumor cells in cell experiments. In nude mice tumor formation experiment, Tongguan vine injection and its active ingredients can effectively inhibit tumor growth, regulate tumor-related pathways, and exert anti-tumor effects. And the molecular biology experiment verified the mechanism of anti-ovarian cancer, providing theoretical support for clinical research.

Biography

Wu Changlan will graduate from South-Central Minzu University in June 2025 with a Master's Degree in Biomedical Engineering, specifically in the area of membrane ion channels and drug discovery and development. She mainly uses animal, molecular and cellular experiments to elucidate the mechanism of action of active ingredients in Chinese medicine. Her master's supervisor is Chen Su. Chen Su has completed his PhD from Beijing University of Technology and as Visiting scholar from University of Queensland, Australia. She is the Professor of South-central Minzu University. She has published more than 40 papers in reputed journals and has been serving as served as a reviewer for journals such as Planta Medica and Phytotherapy Research.

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WORKSHOP

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LATscan: Expanding horizons in plant biology with laser ablation tomography

Laser Ablation Tomography (LATscan) represents a revolutionary advancement in three-dimensional imaging and analysis of biological tissues, offering unprecedented precision and efficiency. Within the realm of plant biology, LATscan has proven instrumental in addressing critical challenges across diverse research areas. This presentation explores its multifaceted applications, highlighting its transformative potential.

From elucidating the intricate anatomy of xylem networks to assessing plant vascular responses to drought, LATscan enables high-resolution mapping of tissue structures, as demonstrated in studies of drought-resistant species. Furthermore, LATscan enhances the visualization of root-soil biota interactions, providing detailed insights into root colonization by mycorrhizal fungi, nematodes, and other edaphic organisms, which is pivotal for improving crop productivity. The technology also accelerates plant phenotyping under stress conditions, facilitating rapid, quantitative evaluations of root architecture and anatomy.

Beyond fundamental research, LATscan has been applied to practical agricultural challenges, such as evaluating grain quality and detecting internal insect damage in stored products. Its ability to complement and exceed traditional imaging methods, like X-ray and microscopy, underscores its versatility and robustness.

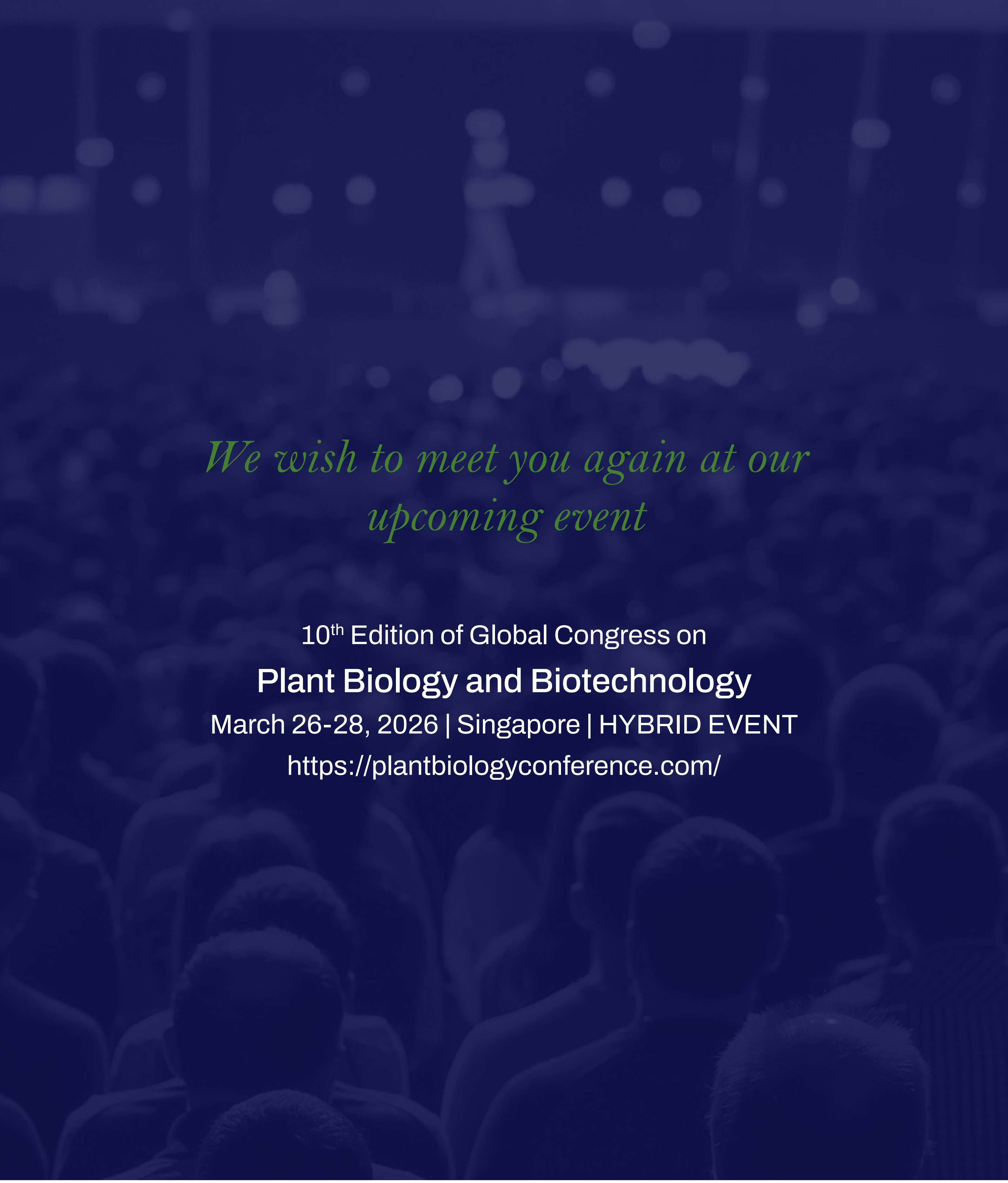
This presentation aims to highlight LATscan's contributions to addressing global challenges in agriculture, sustainability, and ecosystem resilience. By leveraging LATscan's capabilities, researchers can unlock new avenues for understanding plant systems and improving crop management strategies.

By bridging gaps in current phenotyping capabilities, LATscan represents a significant leap forward in plant science, offering researchers a powerful tool to unlock the potential of plant genetic resources and optimize agricultural productivity sustainably.

Biography

Benjamin Hall, co-founder and Chief Executive Member of Lasers for Innovative Solutions, LLC, has over a decade of experience developing advanced imaging technologies. A graduate of Pennsylvania State University, Ben has focused on leveraging laser-based systems for applications in plant biology, agriculture, and industrial innovation. LATscan has become a platform for bridging technological advancements with critical research needs, fostering transformative outcomes across plant science disciplines.

BOOK OF ABSTRACTS



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