PEERS ALLEY MEDIA

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WORLD CONGRESS ON

ADVANCES IN PLANT SCIENCE AND PLANT BIOLOGY

MARCH 31 - APRIL 01, 2025

ADV.PSPB 2025

SCIENTIFIC PROGRAM

DAY 01

MONDAY

MARCH 31, 2025

(GMT) Greenwich Mean Time

08:20-08:30	**Opening Ceremony**
Topics: Plant Genomics | Plant-Microbe Interactions | Plant Hormones | Plant Pathology | Plant Biotechnology | Plant Metabolomics | Plant Proteomics | Sustainable Agriculture | Plant Cell Signaling | Plant Physiology | Soil Plant Interactions | Plant Genetics | Plant Ecology | Agricultural Biotechnology | Plant Immunity	
08:30-08:50	Title: Analyzing the Value Chain of Banana Commodity in Maluku Islands, Indonesia **Semuel Leunufna,** *Pattimura University, Indonesia*
08:50-09:10	Title: Identification of Novel Pathogenicity Related Genes in *Botrytis cinerea* **Pamil Tayal,** *University of Delhi, India*
09:10-09:30	Title: Biopesticide Effect on Crops for the Bioactive Components Extracted from *Tagetes erecta* and *Tagetes patula* **Pavithra Raju,** *PES University, India*
09:30-09:50	Title: Hypersensitive Response a Key Mechanism of Resistance in Potato: Artificial Induction of Defense in Susceptible Genotype to Invoke a Silent Resistance **Veena S Anil,** *University of Agricultural Sciences GKVK, India*
09:50-10:10	Title: Global Trade and Food Security: Economic Impacts and Strategic Market Solutions **Sukanya R,** *CHRIST (Deemed to be University), India*
10:10-10:30	Title: Prp8 Intein Splicing Inhibition in *Aspergillus fumigatus*: Could it be a Target for New Antimycotics **Jyotirmayee Turuk,** *ICMR-Regional Medical Research Centre, India*
10:30-10:50	Title: A Comprehensive Analysis of Genetic Diversity, Structure, and Anthracnose Resistance in Common Bean Germplasm Collected from the Garhwal Himalayas **Deepti Prabha,** *HNB Garhwal University, India*

10:50-11:10	Title: Management Interventions to Improve Applied N Recovery Efficiency with Least Reactive N Losses in a Terrace Paddy Field of Bangladesh **Masuda Akter,** *Bangladesh Rice Research Institute, Bangladesh*
E-Poster	Title: Trends in the Abundance of Anatids (Anseriformes, Anatidae, Aves) on the Western Coast of the Caspian Sea in the Era of Climate Change (Republic of Dagestan, Russia) **Evgeny Vilkov,** *Dagestan Federal Research Center, Russia*
REFRESHMENT BREAK 11:10-11:30	
11:30-11:50	Title: Techno-Economic Analysis of Biomass Pelletization as a Sustainable Biofuel with Net-Zero Carbon Emissions **Muhammad Asif,** *University of Agriculture Faisalabad, Pakistan*
11:50-12:10	Title: The Effects of Climate Change on the UAE and its Agricultural Sector **Ahmed Abdulqader Talabani,** *Shiekh Hamdan bin Rashid Al Maktoum Foundation for Medical and Educational Sciences, UAE*
12:10-12:30	Title: Environmental Stresses and Plant Metabolome **Nina Terletskaya,** *Institute of Genetic and Physiology, Kazakhstan*
12:30-12:50	Title: Multipurpose use of Collections and Exhibitions in Botanical Gardens **Zarema Smirnova,** *Federal State Budgetary Institution of Science N.V. Tsitsin Main Botanical Garden, Russia*
12:50-13:10	Title: The Importance of Fatty Acids – Metabolites of Aquatic Macrophytes for Managing and Indicating the Ecological State of Aquatic Ecosystems **Evgeny Kurashov,** *Papanin Institute for Biology of Inland Waters Russian Academy of Sciences, Russia*
E-Poster	Title: Influence of Drought and Flood on Plant Potential to Protect Plasmid DNA Structure **Ivana Šola,** *University of Zagreb, Croatia*
LUNCH BREAK 13:10-13:40	

13:40-14:00	Title: Effects of Different Doses of Iba on *Ex Vitro* Rooting of Micro Cuttings in the Floating Perlite Bed and Growth Performance of Micro-Propagated Plants in Pyrodwarf Pear Rootstock
	Farangis Nawandish, *Ankara University, Türkiye*
14:00-14:20	Title: Protein-Protein Interactions Revealed by Machine Learning Algorithms for Salt Tolerance in Rice Mutant Lines
	Akram Ghaffari, *Seed and plant certification and registration institute (SPCRI), Iran*
14:20-14:40	Title: Simultaneous Effect of Medicinal Plants as Natural Photosensitizers and Low-Level Laser on Photodynamic Inactivation
	Zahra Aghaebrahimi, *Islamic Azad University, Iran*
14:40-15:00	Title: Valorization of Amphiphilic Secondary Metabolites from Plant Derived Agri-Food Bio-Wastes as Bioactive Ingredients in Functional Products
	Alexandros Tsoupras, *Democritus University of Thrace, Kavala University Campus, Greece*
15:00-15:20	Title: Consumer Perception of Plant-Based Eggs: A Scoping Exercise
	Isabella Nyambayo, *Wrexham University, UK*
15:20-15:40	Title: Weed and Yield of Different Field pea Seed Rates and Carryover Effect of ALS Inhibitor herbicides Applied in Preceding Wheat Crop
	María Angélica Ouellette, *North Peace Applied Research Association, Canada*
15:40-16:20	Title: Thigmomorphogenesis in Woody Plants
	Frank W. Telewski, *Michigan State University, USA*
NETWORKING	
End of Day 1	

SCIENTIFIC PROGRAM

DAY 02

TUESDAY

APRIL 01, 2025

(GMT) Greenwich Mean Time

07:20-07:30	**Opening Ceremony**

Topics: Plant Genomics | Plant-Microbe Interactions | Plant Hormones | Plant Pathology | Plant Biotechnology | Plant Metabolomics | Plant Proteomics | Sustainable Agriculture | Plant Cell Signaling | Plant Physiology | Soil Plant Interactions | Plant Genetics | Plant Ecology | Agricultural Biotechnology | Plant Immunity

07:30-07:50	Title: DnaDot - Fixing Ecology and Evolution's Blind Spot, Population size **William Sherwin,** *School of Biological Earth and Environmental Science, UNSW Sydney, Australia*
07:50-08:10	Title: Genotypic Responses to Post-Flowering Heat Stress in Wheat **Muhammad Yahya,** *The University of Queensland, Australia*
08:10-08:30	Title: Biofuel Production for Circular Bioeconomy: Present Scenario and Future Scope **Huiying Zhang,** *Fujian Agriculture and Forestry University, China*
08:30-08:50	Title: From Arabidopsis to Crops: the Arabidopsis QQS Orphan Gene and its Interactor NF-YC Modulates Composition Across Species **Lei Wang,** *Shihezi University, China*
08:50-09:10	Title: High Hydorstatic Pressure for the Development of Functional Bioactives from Plant Sources **Chong-Tai Kim,** *R&D Center, Ilshin T.H.E./Sokcho Bio, Republic of Korea*
09:10-09:30	Title: Managing Minute Duckweed (*Lemna perpusilla Torr*) Cultivation for Fish Feed in Indonesia **Awalina Satya,** *National Research and Innovation Agency, Indonesia*
09:30-09:50	Title: Current Development and Evaluation of Mechanical Properties of Sandwiched Layers Orientations of Natural Fibres for Sisal and Jute Fibres **Sanjay Kumar S M,** *SJB Institute of Technology, India*

E-Poster	Title: Ethnonutritional Study of Fruits of *Solanum aethiopicum* L. and *Solanum melongena* L. in the District of Galim (Bamboutos) in West Cameroon **Adriel Martin Collet EPANDA,** *The University of Douala, Cameroon*
REFRESHMENT BREAK 09:50-10:10	
10:10-10:30	Title: Bioactive Nanopaper Solutions: Cinnamon Essential Oil-Infused Packaging for Extended Shelf Life of Coriander Leaves **P M Sabura Begum,** *Cochin University of Science and Technology (CUSAT), India*
10:30-10:50	Title: Marker Assisted Pyramiding of APR Genes for Durable Rust Resistance in Wheat (*Triticum aestivum L.*) **Niharika Mallick,** *ICAR-Indian Agricultural Research Institute, India*
10:50-11:10	Title: Predictive Analytics for Crop Economics **Prity Kumari,** *Anand Agricultural University, India*
11:10-11:30	Title: Complex Regulation of Micro-RNA and their Targets under Low-light Stress in Shade-tolerant Swarnaprabha Rice **Madhusmita Panigrahy,** *Siksha 'O' Anusandhan University, India*
11:30-11:50	Title: R & D in Plant Sciences with "Human Concern": Turn Globe Hunger-Free **D. Radhakrishnan Nair,** *Christ (Deemed to be University), India*
11:50-12:10	Title: Optimizing Nitrogen Management through Nano N-fertilizer for Wheat Resilience under Salt Stress **Parvender Sheoran,** *ICAR-Central Soil Salinity Research Institute, India*
12:10-12:30	Title: Anti-diabetic Potential of *Exacum bicolour Roxb.* -an in silico study **Saisha Vinjamuri,** *BMS College of Engineering, India*
12:30-12:50	Title: Genomic Insight into the Major Foliar Maize Diseases of India **Bhupender Kumar,** *ICAR-Indian institute of maize research institute, India*
LUNCH BREAK 12:50-13:30	
13:30-13:50	Title: Physiology of Flowering in Litchi *vs* Mango **Sanjay Kumar Singh,** *ICAR-Central Institute for Subtropical Horticulture, India*

13:50-14:10	Title: Sensing Nature's Alarm: SnO_2/MXene Gas Sensor unveils Methyl Jasmonate Signatures of Plant Insect Stress
	Prem Kumar, *Institute of Nano Science and Technology, India*
14:10-14:30	Title: Hydroponic Cultivation Enhances Morpho-Physiological Traits and Quality Flower Production in Three Cultivars of French Marigold (*Tagetes patula* L.)
	Bhavya Bhargava, *Council of Scientific and Industrial Research (CSIR), India*
14:30-14:50	Title: Starch Wall of Urea: Facile Starch Modification to Residue-free Stable Urea Coating for Sustained Release and Crop Productivity
	Kanchan Swami, *Institute of Nanoscience and Technology, India*
14:50-15:10	Title: Electrical Study of Plants for Biosensing and Communication in Precision Agriculture
	Lee Bar-On, *Tel Aviv University, Israel*
15:10-15:30	Title: *In Vitro* Regeneration and Bulbil Multiplication of *Squilla maura*: An Endemic Species of Morocco
	Ibtisam Chakrane, *National Institute of Agricultural Research, Morocco*
15:30-15:50	Title: LEDs Lighting as a Modulatory Key of the Temperature Stress Responses in Tomato Plants
	Costantino Paciolla, *Università degli Studi di Bari Aldo Moro, Italy*
15:50-16:10	Title: Biopiracy and Development of Plant Genetic Resources: Domestic Appropriations and Impacts on Women in the Global South
	Irekpitan Okukpon, *University of Bradford, UK*
REFRESHMENT BREAK 16:10-16:30	
Pre-recorded	Title: Optimization of Growth Media on the Yield of two Carrot (*Daucus carota* L) Varieties Grown with Plastic Water Bottles in Nsukka Southeast Nigeria
	Anozie Chukwunyere, *University of South Bohemia, Czech Republic*
16:30-16:50	Title: Biodiversity and Sustainability: The Crucial Role of Mangroves in Coastal Protection
	M.Kanimozhi, *Ethiraj College for Women, India*
16:50-17:10	Title: Proteomic Analysis Reveals the Molecular Pathways Responsible for Solar UV-B Acclimation in High-altitude Malbec Grapes
	Germán Murcia, *Fundación Instituto Leloir, Argentina*

17:10-17:30	Title: The Role of Non-Crop Vegetation on the Diversity of Parasitoids in Irrigated Rice Fields **Simone Mundstock Jahnke,** *Federal University of Rio Grande do Sul, Brazil*
17:30-17:50	Title: On the Morning Appetite of Maize **Bruce B. Hicks,** *University of Tennessee, USA*
17:50-18:10	Title: Low Temperature Plasma: An Emerging Green Technology for Seed Priming, Improving Plant Growth and Yield, and Food Safety **Srinivasa Rao Mentreddy,** *Alabama A&M University, USA*
18:10-18:30	Title: An Effective Integrated Approach for Managing Phytophthora blight (*Phytophthora capsici*) of Cucurbits **Mohammad Babadoost,** *University of Illinois, USA*
18:30-18:50	Title: The Future of Pink Pine Nut Production in Mexico **Sandra Luz Castro Garibay,** *Colegio de Postgraduados, Mexico*
18:50-19:10	Title: Differences in Growth and Survival of two Varieties of *Ochroma pyramidale* in Rustic Plantations in Southern Mexico **Samuel Israel Levy-Tacher,** *El Colegio de la Frontera Sur, Mexico*
NETWORKING	
End of Day 2	

ADV.PSPB 2025

DAY 01

VIRTUALEVENT

WORLD CONGRESS ON

ADVANCES IN PLANT SCIENCE AND PLANT BIOLOGY

MARCH 31-APRIL 01

SPEAKER TALKS

Analyzing the Value Chain of Banana Commodity in Maluku Islands, Indonesia

Semuel Leunufna

Faculty of Agriculture, Pattimura University, Indonesia

This study (presentation) was developed out of two consecutive collaborations between Netherlands and Indonesia; Research project on banana diversity in Maluku Islands involving Wageningen University and Research, Agrofair Company and Pattimura University, and the project “Setting up a Blended Learning Program for Sustainable Inclusive Agricultural Value Chain Development in Indonesia” involving Agrofair Company, Maastricht School of Management (MSM), Bogor Agricultural University (IPB) and Pattimura University as well as Netherlands Institution for Internationalization of Education (NUFFIC) as a funding provider. The aim was to describe the value chain system of banana in Maluku islands, Indonesia. A number of government officials, traders, and farmers were interviewed in this study in addition to field observations, studies of reports, statistical data and literatures. The study was able to map the Banana value chain system in Maluku Province and identified parties involved in the value chain. It was shown that Banana cultivation practices in Maluku Islands is still very simple, subsistent manner and lacks assistances from government or other related parties. Data indicated, however, that there is a possibility to obtain five times benefit in Banana cultivation out of the capital invested. Banana is rich in genetic diversity in Maluku province, which provide possibilities for further development in food, medicinal and agronomic sectors. There is, however, a need for improvement in some aspects along its value chain, including training of officials and farmers, provision of facilities for trading especially for export etc. Along with an opportunity for international market, there is a threat in that other provinces and other countries may take over the market nice if Maluku is not able to meet the standards required.

Biography

Dr. Semuel Leunufna received his MSc. from the Crop Science Department (Ontario Agriculture College/ OAC), University of Guelph, Guelph, Ontario, Canada in 1995 and Doctor Agriculturarum (Dr. Agr.) from the Martin Luther University Halle-Wittenberg, Germany, completed a PhD program and employed for one year as a Scientific Staff at the Institute for Plant Genetics and Crop Plant Research (IPK) Gatersleben, Germany in 2004. Recently, he is an Associate Professor at the Faculty of Agriculture Pattimura University, Indonesia, has published a great number of Scientific articles in international journals, been invited as keynote speaker and attended various national and international scientific conferences. Dr. Leunufna serves as the general secretary of Wallacea Center of the Pattimura University, Indonesia and the Director of the Center for the Conservation of Maluku's Biodiversity (CCMB) in addition to being the head of the Maluku Branch of Indonesian Association for Agricultural Meteorology.

Identification of Novel Pathogenicity Related Genes in *Botrytis cinerea*

Pamil Tayal

Assistant Professor, Department of Botany, Sri Venkateswara College, University of Delhi, India

Botrytis cinerea is a ubiquitous fungal pathogen that resulted in agricultural losses under pre- and post-harvest condition in more than 300 crops. The pathogen flourishes on the aerial plant parts appear as grey coloured mold. It also produces sclerotia that further serve as complementary inocula and aid in its spread. The pathogen is highly efficacious due to its broad host range and high genome plasticity that led to adaptive infectious cycle and reproductive potential of the fungus. The application of fungicides serves as the main method for the control of the pathogen spread; however, under field conditions the pathogen soon develops resistance against the tested fungicides. Thereby, understanding the genetic / molecular basis of its pathogenicity is crucial for developing effective disease management strategies. The study aimed to identify novel-pathogenicity related genes in *B. cinerea* through random insertional mutagenesis approach. The genes were found to play critical roles in infection structure formation, toxin production or stress response. Our study expands the current understanding of *B. cinerea* pathogenicity and offer promising avenues for exploring new strategies to combat its infection to reduce crop losses.

Biography

Dr. Pamil Tayal holds a Ph.D. degree from Department of Botany, University of Delhi, where she specialized in Molecular - Microbiological studies and Interaction studies of plants with pathogenic and symbiotic fungi. She is presently working as an Assistant Professor at Department of Botany, Sri Venkateswara College. Dr. Tayal is actively involved in research, with her work spanning various domains such as role of mycorrhizal fungi in combating biotic and abiotic fungi, transformation in pathogenic fungi and role of microplastic accumulation on marine population. She has authored/co-authored many publications in reputed journals of international and national repute, contributing significantly to the advancement of knowledge in her field. Dr. Tayal plays a pivotal role in shaping the minds of future generations. Her teaching methodology emphasizes critical thinking, creativity, and practical application, inspiring students to excel in their academic endeavors.

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Biopesticide Effect on Crops for the Bioactive Components Extracted from *Tagetes erecta* and *Tagetes patula*

Pavithra Raju, Keerthana Kannan, B. N. Keerthy, Ananya Rajagopal and **Sasmita Sabat**

PES University, India

Botanical extracts from plants like Marigold, Chrysanthemum, Basil, and Rosemary are increasingly being explored as eco-friendly alternatives to chemical pesticides due to their efficacy and non-hazardous nature. Tagetes species, rich in bioactive thiophenes, possess strong biocidal properties. In this study, crude extracts from various parts of *Tagetes erecta* and *Tagetes patula* were obtained using Soxhlet extraction. The leaf extracts were analyzed *via* GC–MS to identify their components and confirm the presence of thiophenes. The larvicidal effects of these extracts were tested on two significant crop pests, *Spodoptera litura* and *Corcyra cephalonica*, belonging to the Lepidoptera order, Noctuidae and Pyralidae families. Two methods were employed: an indirect method, where *S. litura* larvae were fed castor leaves sprayed with different concentrations of methanolic extracts, and a direct method, where both larvae were sprayed with low and high concentrations of crude extracts from *T. patula* and *T. erecta*. Significant reductions in larval activity and survival rates were observed within 24 to 48 hours. Trials used varying volumes (10 to 1000 µl) to assess larvicidal activity. The root and stem extracts of *T. erecta* at 25 µl killed 100% of larvae within 24 hours, while 50 µl of *T. patula* flowers, roots, and stem extracts achieved 50% larval mortality within 48 hours. A mini nursery evaluation was conducted by directly spraying larvae on jowar saplings. This led to 100% mortality within 24 hours when 25 µl of *T. erecta* leaf and flower extracts and *T. patula* flower extracts were applied. These findings suggest that extracts from *T. patula* and *T. erecta* are highly effective larvicides against *S. litura* and *C. cephalonica*.

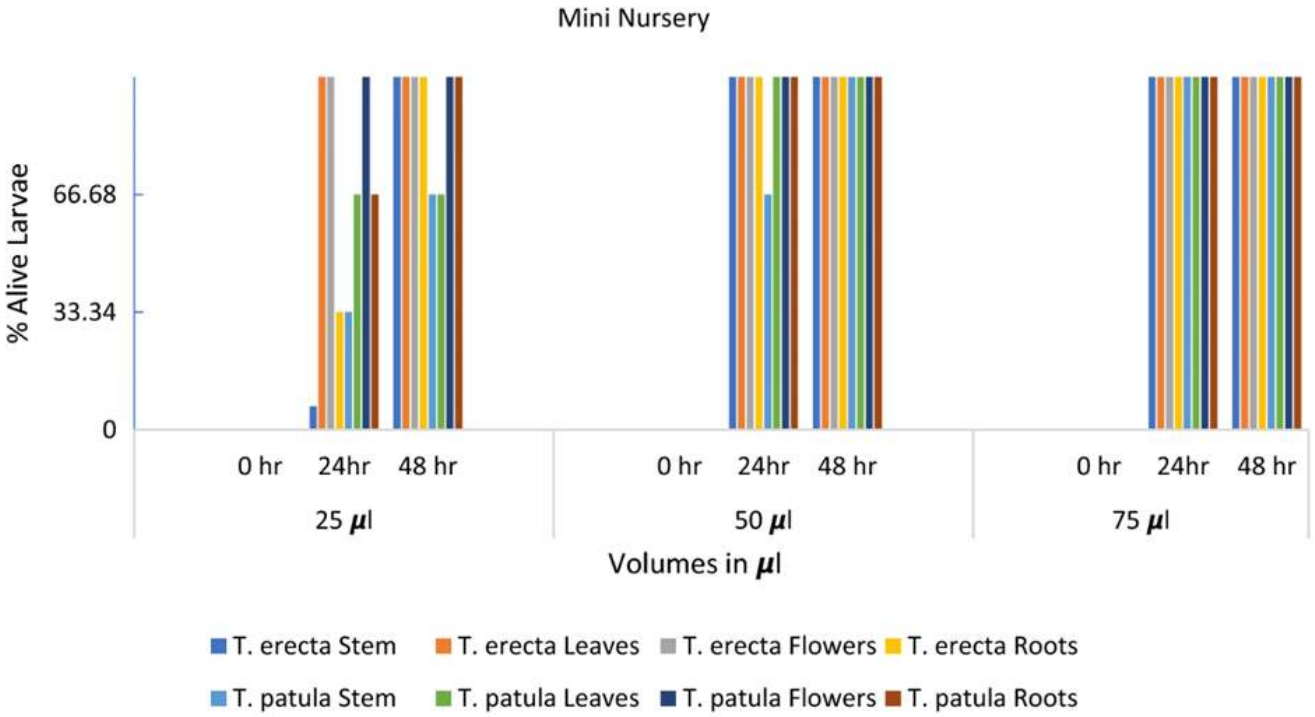


Fig. Mini nursery evaluation of larvicidal effect of cyclohexane-dissolved extracts of *T. erecta* and *T. patula* stem, leaves, flowers and roots at different concentrations on *S. litura*

Biography

Pavithra Raju have done her Bachelor of Engineering in Biotechnology from PES University, India, and a Master of Engineering in Biotechnology from BITS Pilani, India. She began her career at the National Dairy Research Institute, where she contributed to bioinformatics research. She later transitioned into the healthcare industry, working as an Analyst at IQVIA, where she specialized in healthcare analytics. Continuing her academic journey, she pursued a Master of Science in Bioinformatics from San Jose State University, USA, further deepening her expertise in computational biology. Her diverse experiences in biotechnology and bioinformatics, spanning both research and industry, reflect her passion for merging technology with life sciences to drive meaningful solutions in healthcare.

Hypersensitive Response a Key Mechanism of Resistance in Potato: Artificial Induction of Defense in Susceptible Genotype to Invoke a Silent Resistance

Veena S Anil

Professor, Department of Plant Biotechnology, UAS Bangalore GKVK campus, India

Late blight, caused by Phytophthora infestans (Mont.) de Bary, is the most devastating potato disease causing colossal yield losses in potato globally. With the goal of identifying resistant potato genotypes and understanding underlying mechanisms, nine potato genotypes comprising of wild type species (*Solanum chacoense* (/AC1, AC2), *Solanum sparsipilum* (AC3, AC4, AC5) and *Solanum spegzinii* (AC6) and three potato cultivars (Kufri Jyoti [KJ], Kufri Chandramuki [KC] and Kufri Girdhari [KG]), were evaluated for their response to Late Blight in field, *in vitro* detached leaf assays and biochemical analysis. The study identifies genotypes, AC1, of *Solanum chacoense* and AC4 of *Solanum sparsipilum*, and cultivar, Kufri Girdhari as highly resistant, and genotype AC6, of *Solanum spegzinii* as the most susceptible genotype in this study. At the field level, resistant genotypes AC4 and AC1 exhibit a novel mechanism of shedding infected leaves with a concomitant up-regulation of a systemic immune response. At the cellular level, the resistant genotypes exhibit robust hydrogen peroxide production, cell death and callose deposition at the site of infection, thus arresting progression of disease. With the initial infection, AC4 and AC1 showed significant induction and prolonged heightened SOD activity even towards the end of the cropping season. The study implicates hypersensitive response as paramount in resistance of Potato species against Late Blight. The popular and susceptible cultivar Kufri Jyoti, that was introduced initially as a resistant cultivar, was found to have many of the resistance mechanisms in place, however, showed subdued hypersensitive response. An exogenous application of jasmonic acid or compost tea resulted in significant reduction in late blight severity by the induction of a robust hypersensitive response that was otherwise dormant in this susceptible genotype. More insights will be discussed.

Biography

Dr Veena S Anil, Professor of Biochemistry, Department of Plant Biotechnology, College of Agriculture, GKVK, UAS, Bangalore, completed her PhD from the Indian Institute of Science (2001), Bangalore, followed by a post-doctoral fellowship at NCBS, Bangalore (as TIFR visiting fellow). She also worked as a Senior Research Scientist at Monsanto Research Centre (2007-2010). After joining UAS, B in 2010, Dr Veena first served for 5 years at the College of Agriculture, Hassan, a sub campus of the University till 2015. Currently, she is a Professor of Biochemistry at the Department of Plant Biotechnology, GKVK campus, UAS, Bangalore. Dr Veena Anil has several papers in peer reviewed scientific journals and is the recipient of awards such as the Prof Giri memorial Medal for best Thesis 2001 (IISc), INSA Medal for young Scientist 2003, Anil Kumar Bose award, 2008 (by INSA, New Delhi), Innovative Young Biotechnologist Award (IYBA 2010) (DBT, GoI), Newton Bhaba fellowship (2016) (DBT GoI).

Global Trade and Food Security: Economic Impacts and Strategic Market Solutions

Sukanya R

Assistant Professor, Department of Commerce, Central Campus, CHRIST (Deemed to be University), India

Global trade plays an instrumental role in food security by influencing the distribution, accessibility, and affordability of agricultural products across borders. This presentation examines the economic dimensions of food security through the lens of international commerce, with a focus on trade policies, market dynamics, and supply chain resilience. Key issues explored include the effects of tariffs and trade agreements on food prices, the economic risks posed by dependency on imported staples, and the role of emerging markets in reshaping global food accessibility. By analyzing trade patterns and policy interventions, this session highlights strategies for stabilizing food markets, ensuring price stability, and promoting equitable food access worldwide. Participants will gain an understanding of the commercial mechanisms driving food security, along with insights into fostering sustainable trade practices that benefit both producers and consumers.

Biography

Dr. Sukanya R holds a Ph.D. in Finance from CHRIST (Deemed to be University), specializing in Outward Foreign Direct Investment (FDI) from India. Since 2022, she has serves as an assistant professor in the Department of Commerce at CHRIST. Her research interests include key areas such as Outward FDI, globalization, internationalization, and urbanization. Dr. Sukanya R's work also focuses on financial services, consumer satisfaction, food security, and sustainability. She aims to inform policies that promote economic growth, environmental awareness, and social responsibility. Her research provides valuable insights into the intersections between economic development and sustainability. With a strong background in globalization and economic development, Dr. Sukanya contributes to academic discourse on these critical issues. She collaborates widely and has published extensively on these topics. Her work is dedicated to advancing knowledge and shaping sustainable development strategies.

Prp8 Intein Splicing Inhibition in *Aspergillus fumigatus*: Could it be a Target for New Antimycotics

Jyotirmayee Turuk, Sunita Panda and **Sanghamitra Pati**

Mycology Division, ICMR-Regional Medical Research Centre, Nalco Square, Chandrasekharpur, India

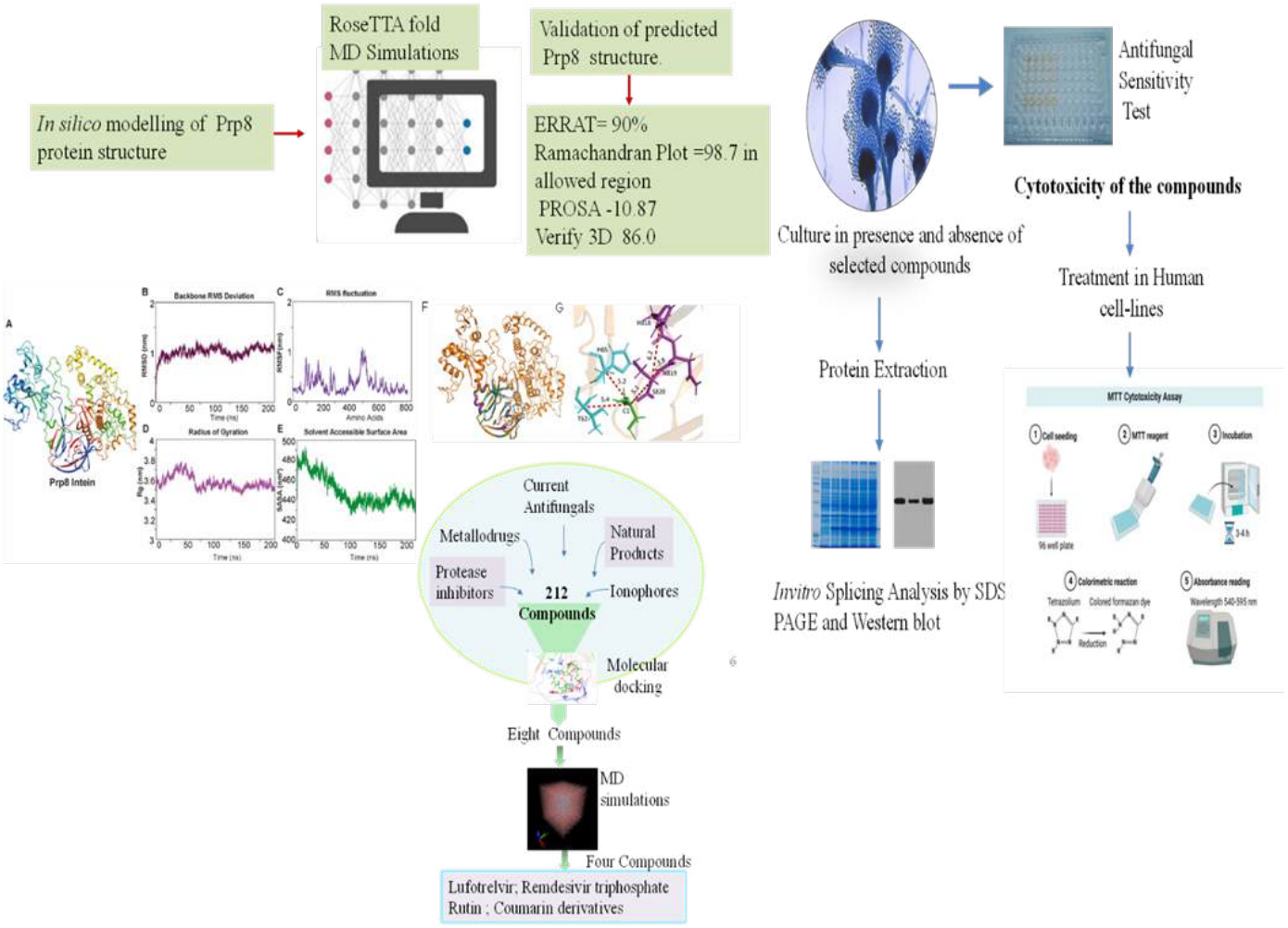
The World Health Organization has declared a pathogen priority list especially for *Aspergillus fumigatus, Cryptococcus neoformans, Candida auris*, and *Candida albicans*, in terms of disease prevalence and resistance to current antifungals. Resistance to azoles and amphotericin B especially in *A. fumigatus*, is a growing concern in the treatment of invasive fungal infections, which is seen in post-COVID aspergillosis. At this critical juncture, intein splicing would be a productive and inventive target for establishing therapeutics. Inteins are mobile genetic elements that apply standard enzymatic strategies to excise themselves post-translationally from the precursor protein *via* protein splicing. The splicing process consists of a four-step nucleophilic cascade similar to proteases. Thus, we hypothesised that protease inhibitors would successfully prevent intein splicing and growth of pathogens.

Objective: Currently, our lab is focusing on the structure based anti-intein drug development against *Aspergillus fumigatus* where we have included FDA approved protease inhibitor drugs, metallo drugs and natural compounds known to have protease activity. We found those are inhibiting intein splicing by interacting with critical residues and also possess antifungal activity with good biocompatibility.

Method and Result: We used Rosetta Fold and molecular dynamics simulations to model the Prp8 intein structure similar to a typical intein fold. To completely comprehend the active site of the Afu Prp8 intein, Cys1, Thr62, His65, His818, Asn819, and Ser820 were identified. Molecular docking and MD simulation demonstrate that two FDA-approved drugs, Lufotrelvir and Remdesivir triphosphate, and natural compounds such as rutin and methoxycoumarin are interacting with critical residues of Prp8 intein. Additionally, they induce a conformational change and form stable complexes via hydrogen and hydrophobic networks. Interestingly, rutin suppresses the growth of intein-bearing fungi

such as Aspergillus fumigatus and C. neoformans at lower concentrations while inhibiting C. albicans at greater concentrations. Furthermore, the suppression of intein splicing in intein-bearing fungi is confirmed by Western blot.

Figure 1. Method employed and results obtained during the intein inhibition study targeting Prp8 intein in A.fumigatus



Biography

Dr Jyotirmayee Turuk is a dedicated scientist with a comprehensive medical and research background, holding an MBBS and an MD in Microbiology. Currently affiliated with the Indian Council of Medical Research - Regional Medical Research Centre (ICMR-RMRC) in Bhubaneswar. She started her career as clinical microbiologist and later shifted for a career in infectious diseases and public health, with a focus on virology, tuberculosis, microbiology, mycology and related public health initiatives. Her work at ICMR-RMRC places us at the forefront of addressing critical health challenges in India and beyond.

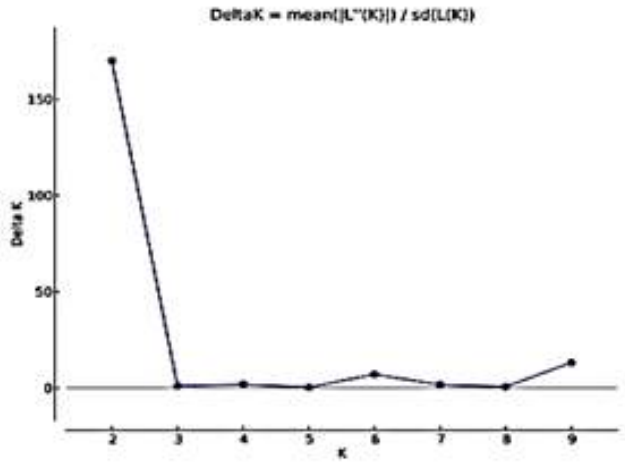
She has 45 publications in both national and international peer-reviewed journals which encompass a range of topics that address key issues in infectious disease management, diagnostics, and public health strategies, underscoring her commitment to both.

A Comprehensive Analysis of Genetic Diversity, Structure, and Anthracnose Resistance in Common Bean Germplasm Collected from the Garhwal Himalayas

Deepti Prabha[1], Navneeti Chamoli[1], Yogesh Kumar Negi[2] and **J S Chauhan[1]**

[1]Dept. of Seed Science & Technology, HNB Garhwal University, India
[2]Department of Basic and Social Sciences, College of Horticulture, VCSG UUHF, India

French bean is an important food crop and a crucial source of dietary protein for millions of people. The Himalayan region of India is rich in unexplored French bean diversity. This study employed ten qualitative traits, fourteen quantitative traits, and microsatellite markers (SSR) to evaluate genetic variation among 176 French bean accessions.



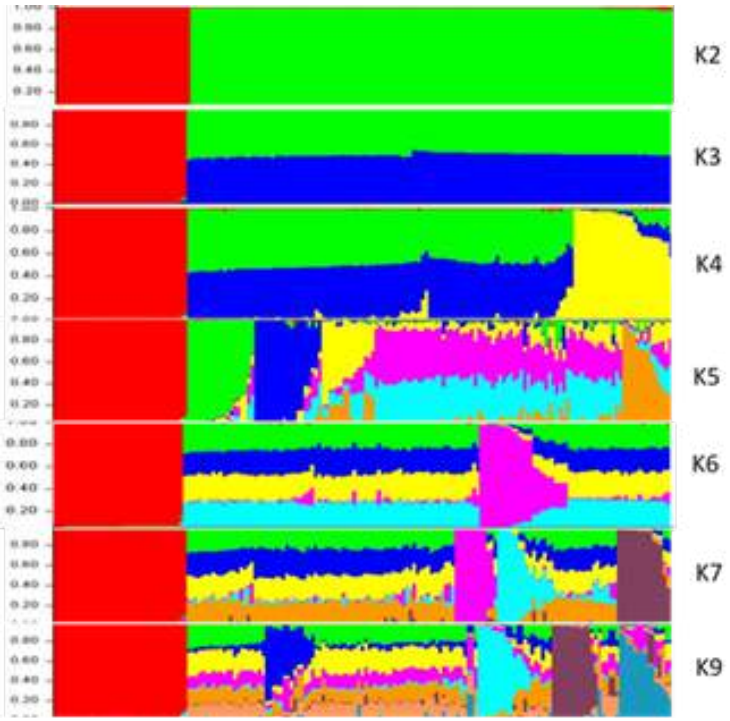


Figure 1. Evanno analysis results for determination the best number of clusters (DELTA K). b. Population structure analyzed for 176 accessions and grouped at k=2, k=3, k=4, k=5, k=6, k=7 and k=9. The red group contains Andean gene pool while other Mesoamerican gene pool.

We found the genotypic variance to be 43.87% and the phenotypic variance to be 46.06%, indicating that genetic factors primarily influence the observed trait variation. Principal component analysis (PCA) revealed that the 15 measured traits were distributed across five components, with the first two components explaining 45.38% of the variance. Twenty microsatellite markers spanning 11 linkage groups were used to identify 290 alleles among the accessions. Bayesian clustering analysis conducted in STRUCTURE software demonstrated the presence of both Mesoamerican and Andean gene pools, with the Mesoamerican gene pool being more predominant (Fig.1). The average number of alleles per locus was 4.25 for the Andean gene pool and 32.38 for the Mesoamerican gene pool. We observed moderate genetic diversity, with approximately 21 accessions exhibiting agronomic superiority. Additionally, a neighbor-joining tree revealed duplications within the germplasm.

Anthracnose, caused by *Colletotrichum lindemuthianum*, is a significant disease of common bean (*Phaseolus vulgaris* L.), leading to around 50% yield loss, especially in high humidity and moderate temperature regions (13 to 27°C). To identify resistance, accessions of common bean were screened in two multilocation field trials (Table 1) and using 13 SCAR primers.

Table 1. K-mean cluster analysis of French bean accessions for disease score of resistant and moderately resistant accessions under field trials and under *in vitro* condition.

Cluster No	Accessions / cluster	Within SS
1	GFB-1, GFB-39, GFB-81	0.583
2	GFB-3, GFB-30	0.031
3	GFB-37, GFB-46, GFB-59, GFB-64, GFB-65, GFB-67, GFB-84, GFB-86, GFB-87, GFB-95, GFB-96, GFB-99	4.802
4	GFB-5, GFB-50, GFB-74, GFB-75, GFB-76, GFB-83, GFB-93, GFB-98	2.992
5	GFB-27, GFB-45, GFB-49	0.750
6	GFB-4, GFB-13, GFB-23, GFB-24, GFB-34, GFB-35, GFB-53, GFB-66, GFB-82, GFB-89	6.537
7	GFB-10, GFB-19, GFB-40, GFB-41, GFB-48, GFB-51, GFB-58	3.571
8	GFB-21, GFB-60, GFB-78, GFB-91	1.609
9	GFB-22, GFB-28, GFB-31	2.083

SS- Sum of square, 52 accessions were screened under *in–vitro* conditions.

The primer SZ04 showed the highest amplification (65%), with primers SF10 (49%) and SAZ20 (38%) following. Twelve accessions exhibited no amplification. The accessions with

resistance genes, particularly those with SF10 (Co-10) and SAS13 (Co-42), demonstrated complete resistance to anthracnose. Eight accessions showed full resistance, and two accessions, GFB-3 and GFB-30 (INGR-20026 and INGR-20027), have been registered with the National Bureau of Plant Genetic Resources. The information generated in this study will play a significant role in future common bean breeding programs.

Biography

Dr. Deepti Prabha, an Assistant Professor in the Department of Seed Science & Technology at HNB Garhwal University, Uttarakhand, India, with twelve years of teaching and research experience. She earned her M.Sc. and Ph.D. in Seed Science & Technology from GB Pant University. In 2020, she received the Young Scientist Award from the Uttarakhand Council for Science and Technology, for her contribution in research. Her research focuses on the collection and screening of germplasm from Himalayan crops and the development of seed invigoration techniques. She has registered two anthracnose resistant common bean accessions with the NBPGR, New Delhi. She has published around twenty research papers and authored two books and five book chapters, while actively participating in various national and international conferences.

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Management Interventions to Improve Applied N Recovery Efficiency with Least Reactive N Losses in a Terrace Paddy Field of Bangladesh

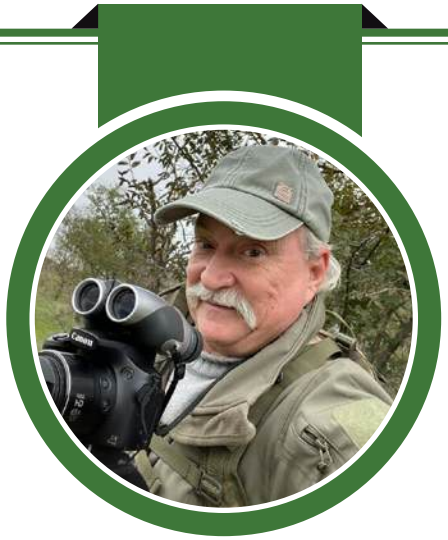
Masuda Akter, U A Naher, M R Islam, A Islam, M Maniruzzaman, M S Kabir, J C Biswas, Bob Rees and **M A Sutton**

Senior Scientific Officer, Soil Science Division, BRRI, Bangladesh

The experiment was conducted in dry season, 2021 at the field of BRRI Soil Science Division to assess N fertilizer recovery (RE_N) efficiency and gaseous N (NH_3, N_2O) emission under various N managements. The rice cultivar was BRRI dhan89. Overall 28 (7 treatments × 4 reps.), 20m^2 plots were established following RCB design. The tested seven treatments were: T_1: no N fertilizer (N0), T_2: 140 kg N ha^{-1} from prilled urea (N140PU), T_3: T_2+25% N (N175PU), T_4: T_2-25% N (N105PU), T_5: Cow dung (2 t ha^{-1}) + IPNS with T_2 (N140 PU+CD), T_6: BRRI Organic Fertilizer (2 t ha^{-1}) + IPNS with T_4 (N105 PU+BOF) and T_7: Deep Placed Urea (UDP) alike T_4 (N105 UDP). Air samples were collected to analyze N_2O. NH_3 emission was measured after each split application of PU by closed chamber technique and boric acid trap method. Amongst N fertilizer treatments, grain yield was higher in T_6, which was statistically identical with that in T_2, T_3, T_5 and T_7 but significantly ($p<0.01$) greater than that in T_4. The RE_N (%) was greater in T_7 (55) and T_6 (52). Among PU-N applied treatment, total NH3-N emission (kg ha^{-1} season^{-1}) was significantly ($p<0.01$) greater in higher N rates T_3 (6.7) than in T_2 (4.5) and T_4 (3.2). Total NH_3-N emission was statistically identical between T_2, T_5 and T_6, which were significantly lower ($p<0.01$) than that in T_3. Total NH_3-N emission was significantly ($p<0.01$) lowest in T_1 (0.6) and T_7 (1.1). Amongst N fertilizer treatments, lower seasonal (3.1 kg ha^{-1}) N2O emission resulted from T_7. These results on yield, RE_N, gaseous NH_3-N and N_2O-N emission indicate that 105 kg N ha^{-1} from UDP and PU+BOF would be the most suitable N managements to sustain rice production and reduce environmental harm but requires further verification *via* ^{15}N isotope tracing.

Biography

Masuda Akter started her service at BRRI Soil Science Division as Scientific Officer on 12 November 2007 and promoted to Senior Scientific Officer in November 2012 with continuing her work at BRRI. She served BRRI as a researcher in soil fertility and nutrients (mostly N) management. She has experiences to work with Soil Fertility and Nutrient Management Research Group at Dept. of Soil Management, Ghent University, Belgium, as MSc and PhD Scholar. She has experiences in paddy soil N dynamics particularly (a)biotic controls of N mineralization, fixed NH4+ analysis, greenhouse gas (N_2O, CH_4, CO_2) emission under different water saving irrigations, redox potential and pore water chemistry (Fe-Mn reduction, DOC, DON), microbial activity (MBC, MBN). She has also employed multiple techniques like experiments setup at lab, green house and fields, GC and ICP-OES analysis. She is author of 10 articles published at national journals and 5 published at international top ISI- journals.



Trends in the Abundance of Anatids (Anseriformes, Anatidae, Aves) on the Western Coast of the Caspian Sea in the Era of Climate Change (Republic of Dagestan, Russia)

E.V. Vilkov

Caspian Institute of Biological Resources, Dagestan Federal Research Center, Russian Academy of Sciences, Russia

The decrease in the number of waterfowl and near-water birds on a global scale is largely associated with a reduction in the area of wetlands in the era of climate warming. On the example of transboundary populations of Anseriformes (Anatidae), data on long-term monitoring obtained in the period 1995–2020 in two Key Ornithological Territories of Russia of international importance (in Sulakskaya and Turalinskaya lagoons, Republic of Dagestan) are reflected (Fig. 1).

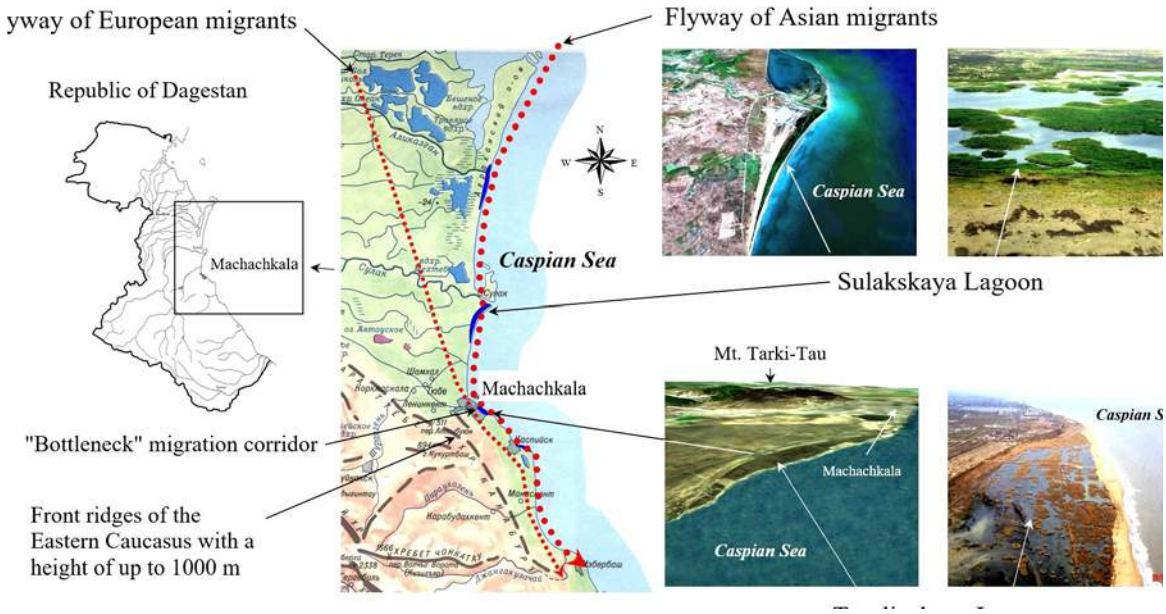


Fig. 1. Model of the lagoons, migration corridor and flight paths of European and Asian migrants. The dotted arrows indicate the direction of the flight paths of migrating Anseriformes.

The model lagoons are located on one of the largest Western Caspian flyways in Russia, which is arranged as a "bottleneck," where the flight routes of European and Asian migrants intersect. A model group Anseriformes, which includes 18 mainly background species, was selected based on the regularity of their encounters during migratory flight. Based on data on ring returns obtained from the Research Information Center for Bird Ringing of the Institute of Ecology and Evolution, Russian Academy of Sciences, a conditional contour of the generalized range of Anseriformes was determined; their faunogenetic basis consists of widespread Arctic and Siberian representatives of the fauna types. (Fig. 2).

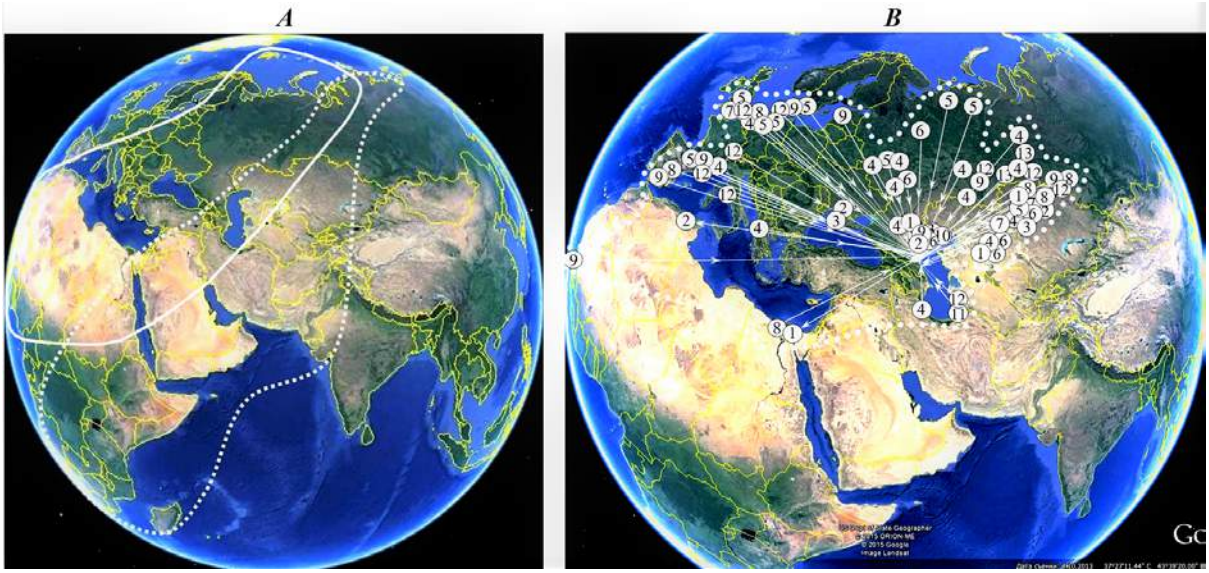


Fig. 2. Geographic dispersion of Anseriformes populations migrating through model lagoons. Legend: A – flyways – Black Sea-Mediterranean (white solid line) and West Siberian-East African (white dotted line) (Veen et al., 2005; Boere, Stroud, 2006); B – conditional contour of the generalized range of anatid populations migrating through the study area (white dotted line) and vectors of the supposed migration of anseriformes populations (white arrows). Anseriformes species: 1 –*Tadorna tadorna*, 2 –*Anser anser*, 3 – *Cygnus olor*, 4 – *Anas platyrhynchos*, 5 – *Anas crecca*, 6 – *Anas strepera,* 7 – *Anas penelope*, 8 – *Anas acuta*, 9 – *Anas querquedula,* 10 – *Anas clypeata,* 11 – *Netta rufina,* 12 – *Aythya ferina*, 13 – *Bucephala clangula.*

According to ringing data and published sources, the geographical location of the anatid populations (regularly migrating through the study region) was determined. It was established that out of 18 species tested, the numbers of 12 species decreased significantly, those of two species increased, and those of four species remained stable (Table).

No	Species	I	II	III	IV	V	VI		VII	
		Residence status in the study area	Faunogenetic group	Individuals	Participation share, %	Population trend, %	r – coefficient of correlation	p – level of reliability	r – coefficient of correlation	p – level of reliability
Numerous species										
1	*Aythya fuligula* Linnaeus, 1758	P, W	widespread	276318	67.1	-12.21	0.10	0.6494	0.04	0.8347
2	*Anas platyrhynchos* Linnaeus, 1758	R, P, W	widespread	74133	18	455.05	0.59*	0.0021	-0.62*	0.0008
3	*Anas crecca* Linnaeus, 1758	P, W	widespread	19391	4.7	-76.32	-0.29	0.1607	0.29	0.1541
4	*Anas querquedula* Linnaeus, 1758	P, IW	widespread	9863	2.4	-87.14	-0.54*	0.0051	0.37	0.0618
5	*Cygnus olor* J.F. Gmelin, 1789	Ø, P, W	European-Chinese	7749	1.9	-81.37	-0.57*	0.0032	0.39	0.0522
6	*Anser anser* Linnaeus, 1758	P, IW	widespread	4826	1.2	-95.6	-0.14	0.5130	0.07	0.7486
7	*Netta rufina* Pallas, 1773	B, P, IW	Mediterranean	4401	1.1	-87.76	-0.45*	0.0245	0.36	0.0671
Common species										
1	*Aythya nyroca* Güldenstädt, 1770	Ø, P, IW	widespread	2261	0.6	-98.36	-0.61*	0.0012	0.57*	0.0022
2	*Anas clypeata* Linnaeus, 1758	P, IW	widespread	2226	0.5	-68.18	-0.59*	0.0020	0.32	0.1059
3	*Cygnus cygnus* Linnaeus, 1758	P, W	Arctic	2200	0.5	-68.57	-0.61*	0.0014	0.38	0.0542
4	*Bucephala clangula* Linnaeus, 1758	P, IW	Siberian	2170	0.5	1850	0.53*	0.0060	-0.23	0.2636
5	*Aythya ferina* Linnaeus, 1758	P, W	European-Chinese	1871	0.4	-99.77	-0.68*	0.0002	0.42*	0.0322
6	*Mergus albellus* Linnaeus, 1758	P, IW	Siberian	987	0.2	-96.97	-0.41*	0.0410	0.22	0.2745
7	*Anas acuta* Linnaeus, 1758	P, IW	Siberian	982	0.2	-99.83	-0.62*	0.0009	0.18	0.3689
Small species										
1	*Tadorna tadorna* Linnaeus, 1758	Ø, P, N	Mongolian	839	0.2	-80	-0.22	0.2887	-0.02	0.9257
2	*Anas penelope* Linnaeus, 1758	P, IW	Siberian	757	0.2	-97.78	-0.69*	0.0001	0.23	0.2583
3	*Anas strepera* Linnaeus, 1758	Ø, P, IW	widespread	531	0.1	-99.36	-0.71*	0.0001	0.42*	0.0312
4	*Tadorna ferruginea* Pallas, 1764	P, N	Mongolian	303	0.1	-95	-0.50*	0.0102	0.33	0.0962

Note to the table: Columns I–II: Model species of anseriformes indicating the status of stay in the study area and the faunogenetic group; Column III – total number of each species for the entire study period; Column IV – share of participation in the total number of each species; Column V – trend in the number of each species for the entire study period; Column VI – correlation coefficient between the number of the model group of birds and the average annual air temperature for 1995–2020; Column VII – correlation coefficient between the number of the model group of birds and the dynamics of the Caspian Sea level for 1995–2020 (*– marked correlations are valid at $p<0.05$ significance level). Status of stay: R – sedentary; B – breeding migratory; Ø – nesting at the early stages of lagoon succession; P – occurs during migration (individuals of the local population were not taken into account); W – wintering (stays on wintering grounds for more than 10 days); IW – does not occur in winter every year; N – summering (occurs during nesting season, but definitely does not nest)).

The obtained population trends were synchronized with data from literary sources for the same Anseriformes species, but in their nesting places. The coincidence of the trends indicated above with the population trends of the same species in their nesting places confirms the correctness of the estimation of the number of geographically distant populations of Anseriformes obtained along the their flight routes in the model lagoons. A correlation between the average monthly air temperatures in the autumn–winter period in the Primorskaya Lowland of Dagestan and fluctuations in the number of 12 model species was detected. It was proven that the number of migrating populations of anatids in cold years and the intensity of their flight in the study region increase, while in warm years there was a decrease as a result of delays of migrants on the flight routes andchanges in their wintering places. Correlation analysis demonstrated a significant association between the increase in the number of Anseriformes wintering in the Caspian Sea and sea level regression, in which the shallow region of marine waters improved the access of anatids to food resources (benthos). Three key factors determining the dynamics of the number of Anseriformes populations are discussed: hydroclimatic cycles, anthropogenic effect, and foraging. It is recommended to introduce a temporary ban on hunting of eight vulnerable species (graylag goose, common teal, garganey, gadwall, Eurasian wigeon, northern pintail, northern shoveler, and common pochard) in Western Siberia, Kazakhstan, the Ural Federal District, Cis-Urals, Volga Region, and the Southern and North Caucasian Federal Districts until their populations are restored sustainably.

Biography

Evgeny Vilkov, born on April 2, 1962 (Makhachkala, Russia). 1969-1979 – secondary school (Makhachkala). 1979-1984 – biology faculty of Dagestan University (honors diploma). 1984-1987 – laboratory assistant, Caspian Fisheries Research Institute (Makhachkala). 1984-1987 – bacteriologist, Sanitary and Epidemiological Laboratory (Makhachkala). 1987-2006 – methodologist, Republican Ecological and Biological Center (Makhachkala). From 04.06.1996 – junior researcher, Precaspian Institute of Biological Resources of the Dagestan Research Centre, RAS. 2004 – defended PhD thesis on ecology (Moscow). 2004 – research fellow, 2008 – senior research fellow, 2020 – lead research fellow. Launched two large scientific directions to study the avifauna of the Caspian lagoons and mountain ecosystems of Dagestan. Author of 226 scientific publications. Over thirty times participated in All-Russian and International conferences, including in Poland (Gdansk, 1999 and in Serbia (Novi Sad, 2013). Member of 4 scientific ornithological societies: – Menzbier Ornithological Society, Working Group on Anseriformes of Northern Eurasia, Working Group on Cranes of Eurasia and Working Group on Waders of Northern Eurasia.

Techno-Economic Analysis of Biomass Pelletization as a Sustainable Biofuel with Net-Zero Carbon Emissions

Muhammad Asif[1,2], Daniel Edward Ciolkosz[1] and **Muhammad Usman Farid[2]**

[1]The Pennsylvania State University, State College PA 16802, United States of America

[2]University of Agriculture Faisalabad, Pakistan

The impacts of the feedstock types and their blending ratios on pellet formation and system performance were studied. Each model scenario is broken down into four sections: transportation of the feedstock, pre-processing, conversion to pellets, and storage of the final product. Simulations of relevant unit operations were carried out for all plant activities using the required technical information, such as operating size, number of components, materials for construction, and operational characteristics. Four simulation scenarios were selected for study, termed plant-1, plant-2, plant-3, and plant-4. Parameters were assessed by varying the costs of pelletizer, grinder, shredder, binder, feedstock, labor, utility, and revenue selling price by±10% and±20% from their current market prices, considered a base value. Capital investment ranges from $404,000 to $468,000, with plant-2 (100% SD at 15% binder and 15% moisture content (MC)) having the lowest value and plant-4 (75% SD+25% CC at 15% binder and 20% MC) having the highest value. The operating cost (OC) of plant-3 (100% CS at 15% binder and 20% MC) was found to be the lowest, while plant-1 (100% SD at 20% binder and 20% MC) is the highest due to the higher percentage of binder having a high drying cost as well as a high procurement cost. Pellets are the main revenue stream obtained from all plants. Plant-3 is observed as the most economical among all plants, having the highest value of gross margin (GM), highest internal rate of return (IRR), highest net present value (NPV), highest percentage of return on investment (ROI), lowest operating cost (OC), and lowest payback time (PBT) of 6.54%, 11.96%, $15,8000, 18.67, $954,000, and 5.36 years, respectively. Sensitivity analysis shows that the cost of binder, feedstock cost, and labor costs have influential effects on input costs. Pellet selling price is the most influential factor affecting economic returns.

Biography

Dr. Muhammad Asif is a Research Scholar at The Pennsylvania State University, USA. Where he actively participates in weekly group meetings on Techno-economic Analysis (Super Pro Designer) Software and LCA. His major interest is to convert Biomass waste to Biofuel in a sustainable way.

He holds Ph.D. in Agricultural Engineering from the University of Agriculture Faisalabad (UAF)-Pakistan. His groundbreaking research is on the development of Pelletizer machine to produce Refused Derived Fuel (RDF) from Solid waste with fully funded research grant by ORIC-UAF.

At this conference, Dr. Asif will be presenting his latest research on Techno-economic analysis of biomass pelletization as a sustainable biofuel with net-zero carbon emissions in combating climate change, providing valuable insights and fostering discussions on sustainable way of biofuel production.

In his free time, Dr. Asif enjoys hiking and photography, often combining his passions to capture the beauty of natural landscapes and raise awareness about environmental issues.

The Effects of Climate Change on the UAE and its Agricultural Sector

Ahmed Talabani

Shiekh Hamdan bin Rashid Al Maktoum Foundation for Medical and Educational Sciences, United Arab Emirates

This paper discusses the effects of climate change on the United Arab Emirates (UAE) and the Emirati agricultural sector. The paper aims to demonstrate the impact of climate change on the agricultural sector and food security in the UAE, with a particular focus on the water sector, given the interconnectedness of water, energy, and food. The paper will also discuss the initiatives taken by the UAE government, demonstrating the flexibility and success of the country's agricultural sector in addressing climate change.

The paper's scope is from a diplomatic and security perspective; therefore, discussing the water-energy-food nexus adds a security element to the paper. Additionally, the timeframe of this paper is from 2020 to 2024, which includes COVID-19, the war in Ukraine, and the Israel-Gaza war. These events matter in discussing the agricultural sector and the great disruption that occurred to the sealines of communications regarding the United Arab Emirates, amongst others. Food product and goods prices have risen, significant geopolitical shifts have occurred, new blocs and alliances have formed, and global tensions have escalated.

The development of the paper on the previously discussed topics will determine the research results, but the methods employed will shape them. This will be determined through a combination of research methodologies. The paper will include graphs and figures. Leading to the conclusion of the paper, which must contain an answer to the following questions: From an international relations perspective, how flexible and successful is the UAE in addressing the numerous challenges affecting its agricultural sector due to the effects of climate change? What are the threats to the UAE food security? Why was the UAE so successful and resilient during the COVID-19 pandemic?

Biography

Ahmed Talabani is an accomplished scholar and emerging leader in the field of international relations and diplomacy. He holds a Bachelor's degree in International Relations from the University of Warsaw, where he demonstrated exceptional academic prowess and a keen interest in global affairs. Following his undergraduate studies, Ahmed received a full scholarship for a Master's degree in Diplomacy at the American University in the Emirates in Dubai, specializing in security and global studies. He graduated at the top of his class, reflecting his dedication to academic excellence.

During his academic journey, Ahmed's passion for research and intellectual inquiry led him to receive recognition for his outstanding contributions. He was awarded the Best Paper in the panel of International Affairs and Economic Warfare at the 1st International Arabian-Gulf Security Conference. Additionally, Ahmed actively participated in various conferences and research competitions, including the Community Leaders Conference hosted by the Arabic-European Center for Human Rights and International Law, where he was honoured as an ambassador of peace and goodwill.

He currently is a main researcher at the Shiekh Hamdan bin Rashid Al Maktoum Foundation for Medical and Educational Sciences. Through this role, Ahmed combines his theoretical knowledge with practical experience, contributing valuable insights to both academia and the professional sphere.

Environmental Stresses and Plant Metabolome

Terletskaya N.V.

Institute of Genetic and Physiology, Kazakhstan

The environmental challenges significantly influence growth and development of plants. High-mountain and desert plants developed complex, multifaceted adaptive features to survive including secondary metabolite biosynthesis. This study examined metabolomic, changes as the adaptive mechanisms of plants across conditions *in situ*, *in vivo* in laboratory conditions, and *in vitro*. So, the study of *Rhodiola semenovii* in the context of source–sink interactions revealed significant changes in production dynamics of secondary metabolites-antioxidants. For the first time, the presence of seasonal changes in the content of glycosides in organs of plants was demonstrated, what allowed for recommendations on collecting medicinal raw materials without damaging the root system. The comprehensive analysis of *Rhodiola linearifolia* shoots at varying altitudes supported the conclusion that stress on plants intensifies with increased altitude and enhances the synthesis of valuable secondary metabolites, which also could be significant for selecting plants for pharmaceutical applications. The main metabolic pathways responsible for the biosynthesis of metabolites that enhance resistance to gall inducers were identified for *Haloxylon* species. The results of the laboratory study of *Sedum hybridum* demonstrated that against the background of even mild and moderate stressful effects in the absence of visible changes, there are significant metabolomical changes in plants that are aimed at maintaining the vital activity of plants. According to our results, the cold-stress conditions profoundly altered the metabolism of *Juglans regia* microclones. Notably, there was a sevenfold (7×) increase in juglone concentration. These findings are important for advancing metabolomics and enhancing our understanding of plant responses to abiotic stress factors. It´s also aid in identifying the role of individual metabolites in the adaptation processes, which is essential for developing strategies to improve plant resilience and tolerance to

adverse conditions and for works on the directed induction of valuable secondary metabolites in plants to obtain new herbal medicines.

Biography

Specialist on physiology of plant stress resistance. Head of Laboratory of ecological physiology of plants at Institute of Genetics and Physiology, Ministry of Science and Higher Education of the Republic of Kazakhstan. Professor of Al-Farabi Kazakh National University, Faculty of Biology and Biotechnology, Department of Biodiversity and Bioresources. Until 2020 was leading researcher at the Laboratory of Cell Engineering at the Institute of Biology and Biotechnology RK. PhD in “Breeding and Seed Production” and “Plant Physiology” from 04.06.1996. Associate Professor, “Biology” from 09.25.2018. Professor, “Biological Sciences” from 13.09.2024. Was leader of one international and seven national scientific projects.

Multipurpose use of Collections and Exhibitions in Botanical Gardens

Zarema Smirnova

Federal State Budgetary Institution of Science N.V. Tsitsin Main Botanical Garden, Russia

A feature of botanical gardens is their complex combination of a variety of functions allowing for simultaneous research and study of plant resources, cultural and educational activities, and recreational events. At the Main Botanical Garden of the Russian Academy of Sciences (MBG RAS) this work centers on the creation of a display collection of beautifully flowering shrubs, which allows for scientific research, monitoring the dynamics of growth and development, taking measurements, photography, and agrotechnical care of plants.

At the same time, the display is a highly decorative section of the botanical garden, attracting many visitors. This makes possible the presentation of the largest collections of the genera Philadelphus L., Spiraea L., and Hydrangea L. to their best advantage, in landscape-decorative style. The compositions created in the collection areas are based on the use of external characteristics of plants, such as color, height, shape, texture, duration and timing of flowering, aroma of flowers, winter hardiness of plants and their adaptability to the climate conditions of the Moscow region. The displays are located on a 1.5-hectare area of the Main Botanical Garden, around a new tropical and subtropical greenhouse, which is a point of attraction for a large number of visitors. The exposition includes Philadelphus: 5 species, 29 varieties; Spiraea: 7 species, 29 varieties; Hydrangea: 1 species, 40 varieties (H. arborescens: 6 varieties; H. paniculata: 34 varieties; and H. petiolaris: 1 species, 2 varieties) with the best decorative characteristics and high winter hardiness. The plants are grouped according to systematic principles by genera, species and varieties, which contributes to enhancing the decorative qualities of closely related species in plantings and creates artistic unity. The specific characteristics of the main collections on display: their volume, prospects for expansion, compatibility of crops, and environmental requirements

are fundamental to the process of designing display areas. The result, consisting of three genera of beautifully flowering shrubs: Philadelphus, Spiraea and Hydrangea, with various decorative characteristics, demonstrates the validity of this method of forming displays. The selection of plants based on contrasts and additions in habitus, leaf and flower colors, and duration and timing of flowering ensures the decorativeness of the entire display for six months (May-October). The educational and environmental benefits are the main arguments for attracting visitors to expositions that meet people's esthetic needs.

Birography

Smirnova Zarema Ibragimovna

After graduating from Bashkir State University (USSR) in 1972, she worked for 1.5 years in the botanical garden, and in 1974 entered the post graduate school of the Main Botanical Garden of the Russian Academy of Sciences. Since defending her PhD thesis she has been working as a Senior Research Scientist in the Main Botanical Garden to the present day.

From 1977 to 1994, she conducted scientific work on flower crops: tulips, remontant carnations, and gerberas.

From 1994 to 2016, she was Department Head for the Implementation of Scientific and Technical Achievements and the Nursery at the Main Botanical Garden. During this period the number of plants in the nursery assortment increased by more than 200 varieties.

From 2017 to the present, she is the curator of the "Beautifully Flowering Shrubs" collections (mock orange, spirea, hydrangeas, deciduous rhododendrons). In 2022, she received a patent and certificate for a new variety of the mock orange "Apple Blossom".

She is the author of 80 scientific papers and publications.

The Importance of Fatty Acids – Metabolites of Aquatic Macrophytes for Managing and Indicating the Ecological State of Aquatic Ecosystems

Evgeny Kurashov [1,2] and **Julia Krylova** [1]

[1] Papanin Institute for Biology of Inland Waters Russian Academy of Sciences, Russia
[2] Kinneret Limnological Laboratory, Israel Oceanographic & Limnological Research, Israel

Free fatty acids, both saturated and unsaturated, are among their main metabolites synthesized by aquatic macrophytes. They perform a number of important ecosystem functions. Firstly, fatty acids are important as allelochemicals that suppress the development of phytoplankton and prevent harmful cyanobacterial “blooms” (HCB). Second, they are important for the health of aquatic and terrestrial inhabitants as well as for human health. According to our research, fatty acids can be components of the so-called algaecides of the new generation. These algaecides are unique because they imitate the allelopathic impact of macrophytes on cyanobacteria, preventing their high development and, consequently, the formation of HCB. At several research levels, including laboratory, mesocosm, and whole pond ecosystem trials, we have shown that fatty acids are efficient against cyanobacteria. Using new algaecides containing fatty acids, a convergent, nature-like technology for preventing HCB can be proposed. In addition, fatty acids in the low-molecular-weight metabolome of aquatic plants can be a good indicator of the ecological state of aquatic ecosystems. We have shown that under anthropogenic impact, aquatic macrophytes include fewer fatty acids (in composition and content) in their low-molecular metabolome than in clean, undisturbed, or slightly disturbed habitats (oligotrophic and mesotrophic conditions). The hypothesis about the decrease in the specific production of saturated and unsaturated fatty acids by macrophytes per unit of their biomass with the intensification of eutrophication and pollution in aquatic ecosystems has been tested. It has been shown that anthropogenic impact leads to a decrease in the quality of aquatic ecosystems and a decrease in their role as producers of fatty acids important for maintaining the health of aquatic organisms, near-water animals, and humans. This pattern can be used for the

assessment of anthropogenic impact on aquatic ecosystems, as shown by the example of Potamogeton perfoliatus in Lake Ladoga.

Biography

Evgeny Kurashov received his scientific degree of Doctor of Biological Sciences at the age of 37 from the State Higher Certification Committee of the Russian Federation in 1998. The title of professor was received in 2013. He has published more than 300 scientific papers in journals and monographs in the field of aquatic ecology. He is a member of some expert committees and an editorial board member of five scientific journals.

Influence of Drought and Flood on Plant Potential to Protect Plasmid DNA Structure

Ivana Šola and **Karlo Miškec**

Department of Biology, Faculty of Science, University of Zagreb, Croatia

The occurrence of extreme conditions is becoming more frequent due to climate change, with significant implications for agriculture, ecosystems, and global food security. This study aims to comprehensively evaluate how drought and flood stresses influence the ability of plant extracts to protect plasmid DNA structure from ROS. As a plant model we used broccoli (Brassica oleracea L. *convar. botrytis* (L.) Alef. var. *cymosa Duch.*) sprouts. Two methods for assessment of DNA nicking protection were used: with Fenton's reagent and with UV/H2O2. A degree of DNA damage was assessed by evaluating changes in band intensity and pattern using the imaging software ImageJ, version 2.2.0. Drought-stressed broccoli extract was significantly more effective in the preservation of plasmid DNA exposed to the Fenton's reagent (57.82 ± 3.32%) than control and flood-stressed broccoli extracts (36.10 ± 3.44 and 44.91 ± 5.59%, respectively), but on the level $p \leq 0.05$ that was not significant. None of the extracts was as good in supercoiled DNA preservation as the standard Trolox, a well-characterized reference, at a concentration of 30 mg/mL (75.90% of plasmid supercoiled DNA maintained). In the experiment with UV/H_2O_2, control and drought- stressed broccoli extracts were significantly more effective in the preservation of the supercoiled DNA form (76.93 ± 0.22% and 75.48 ± 3.00%, respectively) than flood-stressed broccoli extracts (57.47 ± 1.81%). In general, broccoli extracts were more effective in the preservation of the supercoiled DNA from UV/H2O2 photolysis than from the Fenton's reagent. Also, in both cases, extracts of drought-stressed broccoli were more effective than extracts of flood-stressed broccoli and, in the case of the Fenton's reagent, drought-stressed broccoli was even better than control plants in protecting the supercoiled DNA structure. This suggests that drought-stressed broccoli extracts might offer greater protection against DNA degradation compared to control and flood-stressed extracts.

Biography

Dr. Ivana Šola, Assoc. Prof. works in Laboratory for Phytochemistry at the Department of Biology, Faculty of Science, University of Zagreb. Her main scientific interest is plant specialized metabolism plasticity under different environmental conditions. So far, she has led, or was a collaborator, on more than 10 international and national projects. She is a coauthor of 44 scientific papers, 1 manual, and participated in more than 80 international congresses. She teaches Fundamentals of Phytochemistry, Plant Anatomy, Plant Bioactive Substances, Plants in Phytotherapy, Molecular Biology of Plants, and leads the Laboratory Professional Practice.

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Effects of Different Doses of Iba on *Ex Vitro* Rooting of Micro Cuttings in the Floating Perlite Bed and Growth Performance of Micro-Propagated Plants in Pyrodwarf Pear Rootstock

Farangis Nawandish, Hatice Domanoglu and **Golge Sarikamis**

Ankara University, Türkiye

This study examined the effects of different IBA (indole-3-butyric acid) doses—0 (control), 25, 50, 100, and 150 mg/L—on the *ex vitro* rooting of Pyrodwarf pear rootstock (Pyrus communis) micro cuttings in a floating perlite bed. The study also investigated how certain effective rooting treatments influenced plant growth performance.

In the first experiment, micro cuttings (except for the control group) were dipped in IBA solutions for 10 seconds before being planted in the floating perlite bed. The cultures were maintained in a climate chamber for four weeks at 25±2°C with a 16-hour light period (35 µmol·m-2·s-1) and an 8-hour dark period. In the second experiment, plantlets rooted in the floating perlite bed with the control, 25, and 50 mg/L IBA doses were then planted in a peat-perlite mix and grown in greenhouse conditions from June to November.

In the first trial, there were no statistically significant differences between treatments in rooting percentage (77.8±2.2% to 81.1±4.0%), root number (1.9±0.2 to 2.5±0.2 roots per cutting), or the length of the longest root (22.8±0.2 to 36.8±0.2 mm). During the growing season, the treatments had generally similar effects on plant height, leaf count, and internode number. At the end of the season, plant height was also similar across treatments (111.7±6.6 to 118.7±4.1 mm). However, the 50 mg/L IBA treatment yielded the highest values in other traits, showing a significant difference. Specifically, stem diameter reached 4.5±0.1 mm, fresh and dry root weights were 1173.0±126.0 mg and 196.5±12.8 mg per plant, respectively, and fresh and dry shoot weights were 1547.8±30.6 mg and 704.7±16.7 mg per plant.

In conclusion, the floating perlite bed technique effectively supports ex vitro rooting and simultaneous acclimatization of Pyrodwarf rootstock micro cuttings. Additionally, dipping the micro cuttings in a 50 mg/L IBA solution for 10 seconds before planting enhances

growth performance in later stages.

Biography

Farangis Nawandish is a Food Engineer and Agricultural Engineer specializing in food technology and plant biotechnology. Born in Kabul, Afghanistan, in 1989, Nawandish graduated from the Food Technology Department of Kabul Polytechnic University in 2014. She continued her academic career and completed her master's degree in the Department of Agriculture at Ankara University's Faculty of Agriculture in 2023.

In her professional career, she gained experience in the food industry by working for a year at a bread production factory, followed by five years of research on plant tissue culture. She is currently working as the Plant Tissue Culture Laboratory Coordinator at a private company. With an interest in food technology and agricultural biotechnology, Nawandish aims to conduct innovative research in the field of plant biotechnology.

Protein-Protein Interactions Revealed by Machine Learning Algorithms for Salt Tolerance in Rice Mutant Lines

Akram Ghaffari

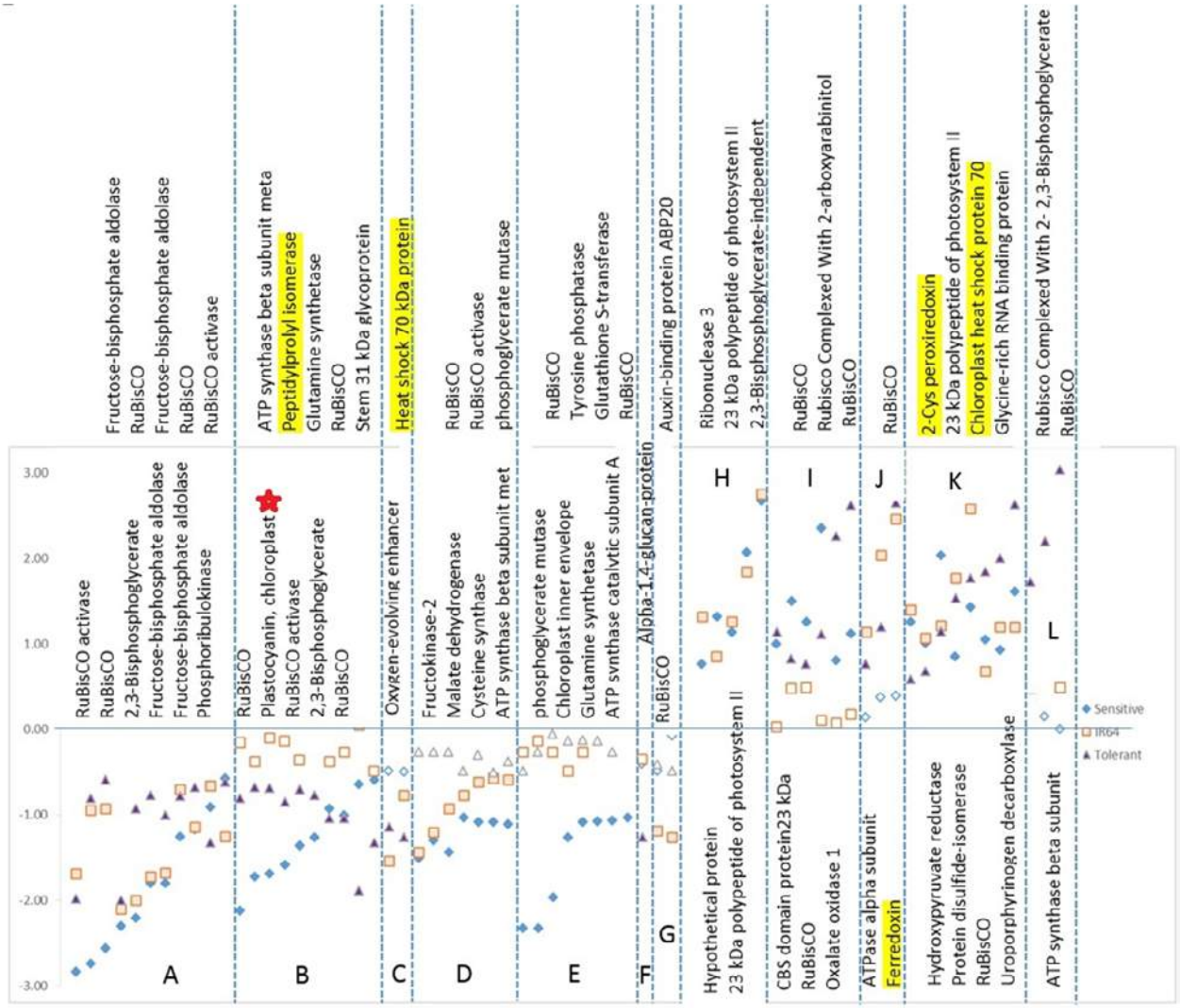
Molecular markers lab, Registration and identification of plant varieties department, Seed and plant certification and registration institute (SPCRI), Agricultural Research, Education, and Extension Organization (AREEO), Iran

Scope: Proteins cannot make a single stable three-dimensional structure in various physiological conditions. Thus, they interact through various binding modes as ordered and disordered bindings.

Objectives: Mutants are the best examples to study protein-protein interaction (PPI) under abiotic stress conditions.

Methods: In this research, proteome analyses of two contrasting mutant lines and their parent helped to find 67 responsive proteins in salt stress involved in various molecular processes including defense to oxidative stresses. PPI maps was employed to reveal proteins' interactions in regulating salt tolerance mechanisms in mutant lines and their parent through K-mean and MCL algoritms. Proteins' secondary structures were extracted through deep learning algorithms, NetSurfP-3.0, and the ordered and disordered interactions were analyzed in each cluster by several machine learning algorithms. Results: The responsive proteins were categorized in four groups through PPI maps. Each cluster had some antioxidant or folding proteins. Besides, we found that the most proteins that were involved in protein folding and oxidative stress pathways including Peptidyl-prolyl cis-trans isomerase, 70 kDa heat shock protein, Ferredoxin and 2-Cys peroxiredoxin had very long disordered regions. Our results showed that a cluster with Plastocyanin and Ferredoxin proteins had the highest disordered degree, while another cluster with protein of 70 kDa heat shock protein showed the highest ordered degree. The highest Relative Surface Accessibility (RSA) was allocated to the proteins with the highest ordered degrees. As a result, under the salt stress condition, proteins with the high disordered degrees like

Plastocyanin, antioxidant proteins and chaperons may interact with other proteins with high ordered degree to act as binding hubs or linkers via the formation of multiple, transient and often non-specific interactions. Therefore, the tolerant mutant would regulate salt tolerance efficiently due to fine-tuning expression of these disordered proteins compared to wild type and sensitive mutant.



Biography

Akram Ghaffari is a research associate at seed and plant certification research institute. Her research has been diverse, ranging from investigating the impacts of abiotic stresses (Salt and drought) on various plants, including rice, barley, sugar beet and canola by studying proteomics, bioinformatics and structural biology. She tend to find the mechanisms that regulate plants response under abiotics stress conditions by studying genes, proteins and physiological traits, interpreting the connections between them by machine learning algorithms (deep learning algorithms). Deep learning algorithms facilitate data extraction from primary sequence to predict secondary and tertiary structures of proteins were involved in protein-protein interactions. Results of her researches were published in several peer review journals to unravel how plants organize complex cellular behaviors under abiotic stress conditions. She is also interested in employing machine learning algorithms to reveal ordered and disordered interactions of proteins.

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Simultaneous Effect of Medicinal Plants as Natural Photosensitizers and Low-Level Laser on Photodynamic Inactivation

Zahra Aghaebrahimi[1], Jamshid Sabaghzadeh[1], Sasan Soudi[2], Mohammadreza Tanhayi Ahary[1], Seyed Hassan Nabavi[3] and **Malihe Ranjbaran[1]**

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[3]Department of Physics, Tarbiat Modares University, Iran

Photodynamic inactivation (PDI) technology is a promising alternative to antibiotics. This technology is defined as the inhibition of bacterial growth with photosensitizers while irradiated with low-level laser light in the wavelength of 532 ± 2.08 nm. A challenging area in this field is selecting photosensitizers with antibacterial potential. In this paper, to enhance the antibacterial efficiency, the photosensitizers (the selected plant extracts) with a high absorption peak at the selected laser frequency, 532 nm, were prepared. Low-concentration ethanolic plant extracts of Hibiscus sabdariffa and Opuntia ficus-indica were found to exhibit significant antibacterial activity against, Acinetobacter baumannii ATCC 19606 and, Staphylococcus aureus ATCC 33591 as two important human pathogenic bacteria. The effectiveness of these natural photosensitizers was measured by determining their Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) values and by performing a time-killing assay in the absence and the presence of laser irradiation. Our results showed that the combination of low-level laser irradiation and the selected photosensitizers had excellent potential for treating in vitro bacterial infections. Therefore, PDI technology has great potential as a viable alternative to traditional antibiotics for combating bacterial infections. This study presents a promising avenue for further exploration of PDI and the use of laser technology in medical science.

Biography

Zahra Aghaebrahimi hold a Ph.D. in Physics with a specialization in Biophotonics, a multidisciplinary field merging medicine, biology, photonics, physics, and chemistry. She is highly enthusiastic about exploring new sciences and engaging in innovative projects. Her work focuses on optimizing photodynamic inactivation using lasers and plant extracts to control bacterial growth. She has comprehensive lab experience in microbiology, plant biology, laser photonics, and analytical chemistry, including standard extractions and microbial assays. Additionally, she is proficient in various software such as statistical programs, MATLAB, Python, and OriginPro for data analysis and visualization.

Valorization of Amphiphilic Secondary Metabolites from Plant Derived Agri-Food Bio-Wastes as Bioactive Ingredients in Functional Products

Alexandros Tsoupras[1], Vasileios Manousakis[1], Christos Plakidis[1], Anita Marra[1], Maria Vandorou[1], Anastasia Maria Moysidou[1], Emmanuel Nikolakakis[1], Anna Ofrydopoulou[1], Katie Shiels[2] and **Sushanta Kumar Saha[2]**

[1]Hephaestus Laboratory, School of Chemistry, Faculty of Sciences, Democritus University of Thrace, Kavala University Campus, Greece
[2]Shannon Applied Biotechnology Center, Technological University of the Shannon: Limerick, Ireland

Objectives: To evaluate several amphiphilic secondary metabolites present in plants and in their agri-food bio-wastes as potential candidates for bioactive ingredients in applications related to developing functional products with health propmoting properties against inflammation related chronic disorders.

Scope: To clarify the molecular species and the content of amphiphilic secondary metabolites present in agri-food by-products of plants highly consumed globally with huge amounts of such bio-wastes, as well as to quantify the antioxidant, anti-inflammatory and antithrombotic potency of their extracts for evaluating their potential to be valorized as bioactive ingredients in functional foods, supplements, nutraceuticals, cosmetics and pharmaceuticals, in a circular economy design.

Methods: Extracts from both the fruits of plants (Avocado, Apple, Kiwi and Watermelon) and their by-products (pomaces) were separated in their total amphiphilic compounds (TAC) and total lipophilic compounds (TLC) and assessed for their total phenolic content (TPC), total carotenoid content (TCC) and antioxidant activities (by the DPPH, ABTS and FRAP assays), as well as for their anti-inflammatory potency against the thrombo-inflammatory mediator, platelet activating factor (PAF) and their antithrombotic effects against a standard platelet-agonist (ADP) in human platelets. Structural elucidation of these plant derived secondary metabolites present in their agri-food wastes was conducted by ART0FTIR and LC-MS analyses.

Results: The rich in TAC extracts showed much higher content in phenolics and carotenoids from the TLC extracts from the agri-food by-products of all plants assessed, which was also reflected by the much stronger antioxidant capacities observed in TAC. ATR-FTIR spectroscopy revealed the presence of not only phenolics and carotenoids, but also of amphiphilic polar lipids (PL) in TAC, the structural analysis of which with LC-MS further revealed a fatty acid composition favorable for unsaturated fatty acids (UFA) versus saturated ones (SFA). The presence of such bioactive PL that are rich in UFA within the TAC extracts provide an explanation for the observed potent anti-inflammatory effects and antithrombotic properties of these extracts, mainly against the inflammatory pathway of PAF, but also against platelet aggregation induced by ADP.

Conclusions: Overall, these results further support the antioxidant, antithrombotic and anti-inflammatory potential of the rich in TAC extracts from apple juice and especially from apple pomace, which can further be utilized as sustainable bioactive ingredients in several functional products, in a circular economy design.

Biography

Alexandros studied Chemistry (BSc) and Biochemistry (MSc and PhD), with scholarships, at the University of Athens, Greece, where he also worked as a Postgraduate and Postdoctoral Researcher and Teaching Associate. After a Sabbatical at the "Albany Medical College" (NY, USA) and being a Lecturer in several Colleges and a Scientist at the “Region of Attika”, he continued his Post-Doctoral at the University of Limerick (Ireland), where he was promoted as an Assistant Professor and currently as an Assistant Professor at the Democritus University of Thrace (Greece). He has participated in research concerning the effects of thrombo-inflammation and oxidative stress in chronic diseases and the evaluation of the antioxidant, anti-inflammatory and antithrombotic natural bioactive compounds, such as those present in plants and their agri-food bio-wastes, as potential ingredients for the development of new functional products (foods, supplements, nutraceuticals, cosmetics and/or pharmaceuticals) with health promoting properties against inflammation-related chronic diseases (Scopus h-index=27)

Consumer Perception of Plant-Based Eggs: A Scoping Exercise

Isabella Nyambayo and **Rebecca Keen**

Wrexham University, Faculty of Social and Life Sciences, UK

The food system is shifting towards a circular economy to sustain demand on food by the world growing population. However, this shift can increase non-communicable diseases rates in some population groups. Research is being carried out to determine consumer perceptions of protein alternatives; compare texture, appearance, aroma, and mouthfeel of the novel products; and using protein alternatives ingredients. The study aimed to investigate taste and texture perception of plant based egg and consumer perspectives of its sustainability. A questionnaire was used to collate data on demographics, perception of plant based eggs, willingness to eat or try new products, and marketing strategies. A Triangle test was conducted to determine if there is any difference between the egg samples and used a Likert scale to rate taste, texture, appearance, saltiness, and overall liking. Participants were screened for egg allergy and other food intolerances. Recruited participants (n=24, men=5 and women=19) lived in Wales (n = 12, 50%), England (n=4, 17%) and wider UK (n=8, 33%) of which 13% were Gen X, 54% Millennials and 8% Gen Z. Among the participants there was 100% willingness to try new foods however, 46% of participants never tried plant based eggs and 41% did not like them or did not see the point of buying plant based eggs. Nutritional value, taste and texture were main considerations when purchasing plant based products. Sustainability of the products didn't affect purchasing of products as 91% did not consider packaging when buying products. Participants could identify the odd sample (83%, n=20, P<0.001and 0.1 % significant, rejecting null hypothesis that there is no difference) and 92% (n=22) preferred the hen egg. There was no liking difference on colour and appearance of the samples but there was noticeable difference between taste and texture with hen egg being liked better.

Biography

Isabella Nyambayo is a: Senior Lecturer in Nutrition and Metabolism at Wrexham University and holds a PhD in Analytical Biochemistry, BSc Applied Biology and Biochemistry and an MSc in Human Nutrition and Metabolism, RegSensSci; CSci; FIFST; SFHEA; RegNutritionist registered with AfN; MRSChem, and MNS. She has food science and nutrition teaching experience in HE and industry experience on product design and quality control. Her research interests include food science, sensory science, and nutrition encompassing food & nutrient security and sustainability. Research projects are on food & nutrient security and sustainability focusing on new product design of free-from foods (fat, gluten, egg, and dairy) and protein alternatives (meat, milk, and eggs) and her texture profile and sensory evaluation. Other research projects focus on association of health, food preference, and consumer perceptions with bitterness (TAS2R38, TAS2R16), sweetness (TAS1R2, TAS1R3) genotypes of different population groups. Publications list is on: orcid.org/0000-0002-2413-1326

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Weed and Yield of Different Field pea Seed Rates and Carryover Effect of ALS Inhibitor herbicides Applied in Preceding Wheat Crop

María Angélica Ouellette and **Lance André Ouellette**

North Peace Applied Research Association, Canada

Intercropping with greater pulse seeding rates for weed mitigation could increase growers yield returns and potentially reduce weed resistance, caused by frequent herbicide applications. In 2021, a split-split plot experiment in North Star, Alberta was sown to wheat (*Triticum aestivum* L.) in two fields; half the plots were sprayed with Thifensulfuron-methyl+tribenuron-methyl at 29.65 g.a.i.ha-1 (9.89+4.94 respectively) at flag leaf with other half left untreated. In the following spring (2022), field pea (*Pisum sativum* L.) was sown at 0.5X,1X and 1.5X seeding rate (101, 202 and 303 kgha-1, respectively) with either ryegrass (*Lolium multiflorum* L.) or rye *(Secale cereal*e L.) at 5.6 and 19.1 kgha-1, barley (*Hordeum vulgare* L.) or oat (*Avena fatua* L.) at 33.7 kgha-1, plus monocrop control. Objectives were to a) identify most weed suppressive intercrop, and b) how companion crops affected pea seeding rates. Herbicide sprayed plots had less weeds compared to unsprayed despite cropping system adopted and rye was best companion crop to reduce weeds. Rye-pea (1.11) or ryegrass-pea (0.98) land equivalent ratio (LER) were greater than oat-pea (0.75). Cereal Agressivity (A) (2.64X10-3 and 2.18X10-2 in oat and barley) and actual yield loss (AYL) (3.06 in oat, 0,39 in barley) was greater than pea (-2.67X10-3, -2.29X10-2 for A and 2.95, 0.73 for AYL in oat and barley respectively), inversely to competitive ratio (CR) (0.07, 2.60 in oat and pea; 0.25, 0.63 in barley and pea). More pea stands decreased cereal CR (0.36,0.11 and 0.05 at 0.5X,1X and 1.5X pea seeding rates) and AYL (1.56, 1.41 and 0.59 for same pea seeding rates). Overall, a) increasing pea seeding rates reduce weeds and increase competitivity towards cereals, and b) despite rye being more suppressing, barley and oat promote pea yields with less area likewise. This study demonstrated the variety of IWM strategies possible in Northern Alberta.

Biography

Born and raised in Bogotá, Colombia, she moved to Canada when she was 17 years old. She started her BSc. in Environmental Science with certificate in GIS at York University in Toronto, Ontario. She started an MSc. in Environmental Science at Dalhousie University in Truro, Nova Scotia. Her research focused on site-specific application of herbicides and fertilizers in lowbush blueberry. She completed her PhD at the University of Guelph at Ridgetown, Ontario, where she studied the effects of herbicide residue in cover crop roots and subsequent impact in soil aggregate stability and fertility. Afterwards, she became a BASF Research Technician and worked with fungicide and herbicide trials in Winkler, Manitoba. She moved to Alberta, where she became Research Coordinator at the North Peace Applied Research Association (NPARA) in Manning. Now, she works as Research Scientist at the Lakeland Agricultural Research Association (LARA) in Bonnyville.

Thigmomorphogenesis in Woody Plants

Frank W. Telewski

Department of Plant Biology, Michigan State University, USA

Plants perceive and respond to mechanical loading, especially imposed by wind as first observed by Theophrastus ca 300 B.C.E. and experimentally proven by Knight in 1803. Jaffe coined the term thigmomorphogenesis in 1973 to describe the response as a way for plants to be protected from “high winds and moving animals”. Since then, numerous studies have reported on the details of the sensory pathway, gene expression and metabolic response, as well as the characterization of anatomical, morphological and biomechanical modifications in plant structure. These modifications confer acclimation via resistance and resilience against future mechanical loading. The changes are most readily observed in arborescent plants. In general, trees growing under windy conditions exhibit a reduction in height growth with an increase in radial growth, specifically in the direction of loading or bending of the trunk. The new wood formed by the vascular cambium is modified in such a way as to increase the absorption of bending energy by the trunk while increasing stiffness to retain a vertical orientation of the stem. A reduction in leaf area along with the formation of a more compact crown, which can be streamlined under more extreme exposure, results in a reduction in drag, shedding the wind energy away from the tree. This presentation will include a brief review of the development of our understanding of thigmomorphogenesis with a focus on woody plants and secondary growth arising from the vascular cambium of conifers and angiosperms. I will focus on how the change in morphology and anatomy influences the biomechanics of tree strength under conditions of mechanical loading and the potential for trait selection for wind tolerant trees.

Biography

Dr. Telewski earned his MA from Montclair State College, MS from Ohio University and his Ph.D. at Wake Forest University with Dr. Mark Jaffe. He joined the faculty of the Laboratory of Tree Ring Research at the University of Arizona in 1983. In 1990, he became Director of the Buffalo and Erie County Botanical Gardens and was an adjunct professor at the University of Buffalo and Buffalo State University. He moved to Michigan State University in 1993 where he joined the faculty of the Department of Botany and Plant Pathology and directed the W.J. Beal Botanical Garden while continuing his research on thigmomorphogenesis. Frank published over 70 scientific articles including on the Beal Seed Viability study and is recognized as a global expert on the effects of wind on trees.

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DAY 02

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SPEAKER TALKS

DnaDot - Fixing Ecology and Evolution's Blind Spot, Population size

William Sherwin

Evolution and Ecology Research Centre, School of BEES, UNSW-Sydney, Australia

To understand and manage any ecosystem, one of the most critical indicators is census population size ('N_c') for each component species. This is why the International Union for Conservation of Nature (IUCN) stipulates that it is ideal to know census size to an accuracy of ±10% for each managed, endangered or exploited population. Knowledge of population size is also critical for: ecological studies in general; allowing biodiversity measures with low error margins; and assessing potential for evolutionary adaptation in long-term management. Unfortunately, despite their importance, all existing methods for estimating N_c have many difficulties, especially requiring independent knowledge or assumptions about demography, including: immigration, emigration, family size and its variance. As a result, even in the IUCN red list, many species are listed despite having unknown population size or trends. Therefore, we need an improved approach. This article introduces 'DnaDot', a strong new addition to our armory of census population size estimates, because it is an accurate estimate, with few assumptions. DnaDot is based on mark-release-recapture, but instead of marking, uses pre-existing polymorphisms to divide the population into separate groups. The method uses one sample, minimizing effort, uses no demographic assumptions or data, and does not require genotyping to be accurate enough to identify individuals and kin, which is problematic for other genetic methods especially when degraded field samples are used. DnaDot applies to any kind of variants, from tissue samples, or from noninvasive samples such as hair provided that the researcher can identify species-identity and variants within the species. DnaDot outperformed close competitors on minimal assumptions, and good detectability of marks. Also, in simulations of a wide range of scenarios, DnaDot had superior accuracy and precision, usually meeting the IUCN criterion of ±10%, which competing methods rarely achieved. Finally, one other method is

said to need smaller sample sizes than DnaDot, but only if that method is not required to meet the performance criteria of DnaDot.

Biography

William (Bill) Sherwin, Evolution and Ecology Research Centre, School of BEES, UNSW-Sydney, Australia. W.Sherwin@unsw.edu.au Molecular genetics in biodiversity management and fundamental evolutionary biology. Sherwin's multidisciplinary team introduced information theory methods to forecasting and measuring biodiversity levels from molecules to ecosystems. This is used by many researchers and is underpinned by Sherwin's molecular work on endangered, pest, and harvested wildlife. Sherwin has also devised better ways of detecting genes that are under selection in wild populations, and a better way of assessing census population size of wild populations, DnaDot.

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Genotypic Responses to Post-Flowering Heat Stress in Wheat

Muhammad Yahya[1], Najeeb Ullah[2], Jack Christopher[1] and **Karine Chenu[1]**

[1]The University of Queensland, Queensland Alliance for Agriculture and Food Innovation (QAAFI), Australia

[2]Agriculture Research Station, office of VP For Research and Graduate Studies, Qatar

With climate change, heat waves during grain filling increasingly affect grain yield and grain quality of crops like wheat. The influence of critical post-anthesis heat stress on grain size and grain protein was investigated in both (i) controlled environments in lines contrasting for heat tolerance, and (ii) irrigated field trials with 25 or more genotypes. Field trials were conducted at three locations over three consecutive years with conventional and late sowing dates. A novel photoperiod-extension method (PEM; Ullah et al. 2023. *European Journal of Agronomy*. 144: 126757) enabled a focus on plants with synchronized flowering time regardless of the genotype maturity type. Stems with synchronized phenology were tagged and hand-harvested at maturity. Adjacent to the PEM trials, genotypes were cultivated in conventional yield plots that were machine-harvested at maturity. Grain number was strongly correlated to the number of warm days occurring between 200 and 300oCd before flowering, while individual grain weight and grain protein content were strongly correlated to the number of post-flowering hot days. Both controlled and field-based studies showed that heat stress occurring during early-to-mid-grain filling had the greatest impact on grain size. Substantial genotypic variations in heat tolerance were observed in all trial types. However for field-based methods, the effect of post-flowering hot days on studied genotypes was estimated more reliably with the PEM than in conventional plots, where results were confounded by phenological variation among genotypes. The findings of this study will help develop screening methods to identify genotypes that maintain grain quality in the presence of late-season heat stress.

Biography

Muhammad Yahya is a final-year Ph.D. student at the Queensland Alliance for Agriculture and Food Innovation (QAAFI), The University of Queensland, Australia. His research focuses on the impacts of post-flowering heat stress on wheat grain yield components and protein content. His project involves multi-location field trials across southern Queensland to explore the genetic diversity among wheat genotypes in response to heat stress. Specifically, Muhammad aims to elucidate the physiological and agronomic mechanisms of heat stress adaptation at the crop level.

He is investigating how heat-induced reductions in current assimilate supply affect crop productivity and grain quality. Additionally, his work explores the role of assimilate storage and remobilization in mitigating yield and quality losses under heat stress conditions.

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Biofuel Production for Circular Bioeconomy: Present Scenario and Future Scope

Huiying Zhang[8], Yuanyao Ye[1,2], Wenshan Guo[3], Huu Hao Ngo[3], Wei Wei[3], Dongle Cheng[4], Xuan Thanh Bui[5,6] and **Ngoc Bich Hoang[7]**

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In recent years, biofuel production has attracted considerable attention, especially given the increasing world- wide demand for energy and emissions of greenhouse gases that threaten this planet. In this case, one possible solution is to convert biomass into green and sustainable biofuel, which can enhance the bioeconomy and contribute to sustainable economic development goals. Due to being in large quantities and containing high organic content, various biomass sources such as food waste, textile waste, microalgal waste, agricultural waste and sewage sludge have gained significant attention for biofuel production. Also, biofuel production technologies, including thermochemical processing, anaerobic digestion, fermentation and bio electrochemical systems, have been extensively reported, which can achieve waste valorisation through producing biofuels and re-utilizing wastes. Nevertheless, the commercial feasibility of biofuel production is still being determined, and it is unclear whether biofuel can compete equally with other existing fuels in the market. The concept of a circular economy in biofuel production can

promote the environmentally friendly and sustainable valorization of biomass waste. This review comprehensively discusses the state-of-the-art production of biofuel from various biomass sources and the bioeconomy perspectives associated with it. Biofuel production is evaluated within the frame- work of the bioeconomy. Further perspectives on possible integration approaches to maximizing waste utilization for biofuel production are discussed, and what this could mean for the circular economy. More research related to pretreatment and machine learning of biofuel production should be conducted to optimize the biofuel production process, increase the biofuel yield and make the biofuel prices competitive.

Biography

Dr. Huiying Zhang (Huiying) received a PhD in Botany from the School of Life Sciences of Chongqing University in 2013. She completed a postdoctoral fellowship in Environmental Science and Engineering at Tsinghua University in 2015. Currently, she is an Associate Professor in School of Life Sciences of Fujian Agriculture and Forestry University. Huiying's expertise and practical experience are in synthetic biology, molecular biology, green technologies for waste/wastewater treatment and reuse, she has published nearly 20 papers in the Chemical Engineering Journal, Science of the Total Environment, Algal Research and other authoritative journals with 4 authorized patents. In the International Genetically Engineered Machine Competition, she won 3 gold awards, silver awards, best hardware awards, best environmental bioremediation awards, and best sustainable development nomination award.

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From Arabidopsis to Crops: the Arabidopsis QS Orphan Ggene and its Interactor NF-YC Modulates Composition Across Species

Lei Wang[1], Rezwan Tanvir[2] and **Ling Li[2]**

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The Arabidopsis orphan gene Qua-Quine Starch (QQS) was previously identified as a key regulator of carbon (C) and nitrogen (N) partitioning across multiple plant species, including Arabidopsis, rice, corn, soybean, and potato. Regarding the functional mechanism of QQS, our prior research multicellular genetic models demonstrated that QQS modulates this important biotechnological trait through interaction with NF-YC. Recently, we advanced these findings by developing single-cell genetic models using *Chlamydomonas reinhardtii* and *Saccharomyces cerevisiae*. These models enabled us to dissect the functional interactions between QQS and NF-Y subunits refining and updating our understanding of the QQS functional model in modulating C and N allocation. Genome editing has revolutionized biotechnology for crop improvement, particularly through the development of transgene-free products. However, most genome-edited traits to date have been achieved via gene knockouts. In our study, we introduce a pioneering approach that enhances gene expression by targeting and eliminating transcriptional repressor binding motifs. Specifically, we identified conserved repressor-binding motifs in the NF-YC4 promoters of rice (*Oryza sativa*) and soybean (*Glycine* max), which are targeted by RAV and WRKY transcriptional repressors. Using CRISPR/Cas9, we precisely deleted these motifs, reducing repressor binding and increasing NF-YC4 expression. This targeted editing strategy resulted in increased protein content and reduced carbohydrate levels in the edited rice and soybean plants. Our findings establish a novel framework for enhancing gene expression by editing noncoding regulatory sequences, providing a powerful tool for improving agricultural productivity and nutritional quality in crops. This approach has the potential to transform crop biotechnology, offering innovative solutions for sustainable agriculture.

Biography

Dr. Lei Wang earned his B.S. degree in Bioengineering from Inner Mongolia Agricultural University, and his M.S. and Ph.D. degrees in Cell Biology and Botany from Capital Normal University. He was a visiting research scholar at Cornell University from 2017 to 2018, and a postdoctoral fellow at Mississippi State University from 2018 to November 2023. Following this, he held the position of Assistant Research Professor in the Department of Biology at Mississippi State University from Dec 2023 to May 2024. Currently, Dr. Lei Wang is a Distinguished Professor of Shihezi University in China, where he is supported by "Tianchiyingcai" talent project and Shihezi University.

High Hydorstatic Pressure for the Development of Functional Bioactives from Plant Sources

Chong-Tai Kim

R&D Center, Ilshin T.H.E./Sokcho Bio, Republic of Korea

High hydrostatic pressure (HHP) processing has been used in food and bio-material industry in order to reduce microbial counts, and has been shown to affect enzyme activity and food product functionality since covalent bonds are not affected by pressure. From biotechnological point of view, enzyme processes at high temperature often provide considerable merits such as increased solubility and reaction rate, and reduced microbial contamination and solution viscosity, which is evidenced by the fact that most industrial enzyme processes are conducted at elevated temperatures. In this context, the maintenance of thermal stability of enzymes seems to be very important to conduct enzymebased food processes that comprise hydrolysis, synthesis and biotransformation.

One important issue in enzyme technology that gains recent attention is the enzyme reaction at high pressure. It has been shown that stability and activity of several enzymes are increased at specific conditions, and catalytic behavior is modified by changing rate-limiting step or modulating enzyme selectivity.

A combination of high hydrostatic pressure and enzymatic hydrolysis (HHP-EH) is a relatively new extraction method for bioactives from plant materials. High pressure 100 MPa is routinely used for food application such as extraction and hydrolysis of plant or animal sources as an alternative to high-heat treatment. High pressure of more than 300 MPa inactivates bacteria, yeast, or viruses at ambient temperature within several minutes. The application has been commercially available for many years even for industrial-scale processes.

In this lecture, the application for HHP-EH in plant materials have introduced. Total saponins, panaxadiols, and metabolites from fresh ginseng roots increased by the HHP-EH. The yield

of total saponin from the HHP-EH with cellulase, significantly higher than the yield from the HHP-EH with β-amylase. HHP-EH with Pectinex Be XXL and Ultra color highly increase the quality characteristics of mulberry fruits such as soluble solid content, yield, flavonoid content, and phenolic acid contents. Decrease in rutin content and increases in hyperoside and quercetin contents were found through HPP-EH, which may be the result of the two-step deglycosylation of rutin by pectinase activity. The extraction yield of mulberry fruits was maintained during HHP-EH from 0–36 hrs, and its bioactive compound profile was variously changed. Therefore, there is a new clues as to how the HPP-ET may promote changes in the extraction yield and bioactive substance profile of mulberry fruits and suggest the potential for use of natural materials based on mulberry fruit extracts.

Biography

Dr. Chong-Tai Kim is currently a director in the R&D Center of Ilshin T.H.E./Sokcho Bio Co., Seoul, Republic of Korea. His prior research area include in nanofabrication of functional ingredient and a combination of high hydrostatic pressure and enzymatic hydrolysis process, and reactive extrusion of food and bio-material. He received a PhD in Bioprocess Engineering at Myongji University in Seoul, Republic of Korea with a thesis entitled “Analysis of extrusion process for functional dietary fiber production”. He joined Korea Institute of Science and Technology in Seoul, Republic of Korea as a food process engineer. He also joined Korea Food Research Institute in Seongnam, Republic of Korea as a head of bioprocess engineering team for 30 years. He worked collaboratively with researcher at Southern Regional Research Center, United States Department Agriculture, New Orleans and at the University of Tennessee, Knoxville, Tennessee, USA. He has published over 150 reserach articles and has 15 patents. He commercialized a beverage product of protein and amino acid produced from animal source by HHP-EH process in Republic of Korea.

Managing Minute Duckweed (*Lemna Perpusilla Torr*) Cultivation for Fish Feed in Indonesia

Awalina Satya and **Tjandra Chrismadha**

Research Centre for Limnology and Water Resources, National Research and Innovation Agency, Indonesia

One of the most pressing concerns confronting Indonesia's expanding aquaculture industry is feed. Aquatic plants have been proposed as an alternative raw material for fish feed since they are easy to grow and have a satisfactory nutritional content. Minute duckweed (*Lemna perpusilla Torr*.), an aquatic plant, is supposed to be the promising answer. This species lives in vast numbers in tropical eutrophic waters, as in Indonesia. Although there have been reports of some success utilizing aquatic plants for feeding fish for a long time, field implementation has been unsuccessful due to a lack of understanding about how to regulate plant production in a harmonious way to fulfill the fish's needs. This paper describes a strategy for maximizing the use of minute duckweed for fish feeding in Indonesia.

Biography

Awalina (also known as Awalina SATYA) is a Senior Researcher (Peneliti Ahli Utama IV-e according to the Indonesian national researcher ranking system) at the Research Center for Limnology and Water Resources, Research Organization of Earth and Maritime, the National Research and Innovation Agency, Republic of Indonesia (PRLSDA-BRIN).

She earned a B.Sc. in Chemistry from the University of Hasanuddin-Makassar in Indonesia, a master's degree in Chemistry from the University of Indonesia, and a Ph.D. in Chemical Engineering from the Institut Teknologi Bandung (Bandung Institute of Technology) in Indonesia. In the last five years, she has conducted more than five research subjects, two of which belong to the national priority research project involved with the native strains of the Indonesian micro- and macroalga, with a specialty on photobioreactor for microalgae biomass cultivation through the CO_2 bio sequestration process. She is the author or co-author of over 27 peer-reviewed journal papers. Her research interests are broad and concerned: 1) the utilization of the local isolate of cyanobacterium for the carbon dioxide bio fixer in a photobioreactor system platform to produce a high-quality microalgae biomass; 2) the use of microalgae biomass for removing the heavy metals from the wastewater through the biosorption process in various adsorber reactors such as batch, the fixed bed, and submerged membrane adsorption systems; 3) the study on biotic and abiotic factor interactions dynamics (especially in the freshwater microalgae and aquatic macrophyte) in the inland water environment.

Current Development and Evaluation of Mechanical Properties of Sandwiched Layers Orientations of Natural Fibres for Sisal and Jute Fibres

Sanjay Kumar S M

Associate Professor, Department of Mechanical Engg, SJB Institute of Technology, India

The usage of synthetic materials is on the rise, which could lead to more pollution that harms the environment and living things. Therefore, natural, renewable, and biodegradable materials are desperately needed to replace synthetic materials that are hazardous to the environment from a sustainability perspective. Among the natural fibers, jute is essential to the development of composite materials that have shown promise for usage in home, automotive, and medical equipment, among other uses. Environmental concerns have led to an encouragement of natural fibers to be utilized in the automotive sector because of their low weight in comparison to materials like steel, aluminum, and synthetic fiber based polymer. Among the many applications for which a green composite is made are ships, cars, and sporting goods. Other natural fibers like jute, banana, flax, hemp, and sisal also have remarkable and fulfilling properties because of their accessibility, affordability, and environmental friendliness. Industrial commodities like sisal and jute fibres can employ both structural and non-structural construction depending on the matrix. The findings of this work are reviewed, and it will assist us in determining the mechanical properties of sandwiched composites for different combinations of orientation in accordance with ASTM standards.

Biography

Dr. Sanjay Kumar S M is currently working as Associate Professor in the Department of Mechanical Engineering, SJB Institute of technology, Bengaluru. He is graduated from PES College of Engineering, Mandya and obtained Master's degree (Machine Design) from SJC Institute of Technology, Chickballapura and received Ph.D In Mechanical Engineering from Jawaharlal Nehru Technological University, Anantapuram. He has an academic experience of about 23 years and 2 years of industrial experience.

He has presented/published about 30 research papers in the National/ International conference, published 22 journals papers with good impact factor/Scopus indexed journals, 2 textbooks and 1 book chapter publication in Springer. Out of eight patents, four patents are granted and four patents are published. He has got funding from KSCST, VTU and other funding agencies. His areas of research include Machine Design. Materials technology, Polymer composites, Production technology. Editorial Board member of international journals in Materials today proceedings, Springer and WoS Journals.

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Ethnonutritional Study of Fruits of *Solanum aethiopicum* L. and *Solanum melongena* L. in the District of Galim (Bamboutos) in West Cameroon

Adriel Martin Collet EPANDA[1], Alice Virginie TCHIAZE IFOUE[2], Cédric KENDINE VEPOWO[1], Adelaide DEMASSE MAWAMBA[1], Aymar Rodrigue FOGANG MBA[1], Fabrice Fabien DONGHO DONGMO[1] and **Inocent GOUADO[1]**

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[2]Laboratory of Plant Biology, Faculty of Science, The University of Douala, Cameroon

Solanum aethiopicum L. and *Solanum melongena* L. are endemic plants (Fig 1) whose fruits (Fig 2) are used in the composition of cultural dishes in West Cameroon including Yellow, Black, Eggplant, Nkui and Okra sauces. This work aims to conduct an ethnonutritional study based on the knowledge and consumption of these dishes. Surveys were carried out including 480 persons of the district of Galim (Kieneghang I and Mbezaté) in the Bamboutos division in West Cameroon and the results revealed that the vernacular and common names for *Solanum aethiopicum* L. and *Solanum melongena* L. are respectively "Shusshui" and "sweet egglant"; "Nzuinzuiè" and "bitter eggplant". These fruits are rounded and spindle in shape. The fruits of *Solanum aethiopicum* L. exist in green, yellow and red colors with a mild flavor, while those of *Solanum melongena* L. are red and bitter. These fruits are preserved by sun-drying, smoking, and parboiled before drying. Their cultivation is traditional with a duration of 3–7 months using organic and chemical fertilizers. The age group 41–50 years had a good knowledge of fruits while the age group over 60 years had a better consumption frequency of eggplant-dishes. In addition, these fruits have important cultural values during traditional ceremonies at births, weddings, funerals, symbolisms such as acceptance, reconciliation, hospitality, consideration, and valorisation. These populations had knowledge for the prevention and or treatment of diabetes (6.66%), high blood pressure (25%), obesity (13.54%), cancers (1.66%) and mouth ulcers (2.70%). The valorization of these fruits could constitute a means of preserving cultural heritage.

Fig. 1 Plants: *Solanum aethiopicum* L. (A) and *Solanum melongena* L. (B)

Fig. 2 Fruits: *Solanum aethiopicum* L. (A) and *Solanum melongena* L. (B)

Biography

Dr Adriel Martin Collet EPANDA, 33-year-old Cameroonian and Pharmacist (2018 State Doctorate / Faculty of Medicine and Pharmaceutical Sciences of the University of Douala). Researcher since 2019, He has been working on two local and endemic eggplants from western Cameroon. He hold a Master's degree in biochemistry of food sciences and nutrition (2020 / faculty of sciences of the University of Douala), a Master's degree in Pharmaceutical Sciences (2022 / faculty of medicine and biomedical sciences of the University of Yaoundé I) and a University Certification in Quality Assurance and Quality Control of medicines and health products (2023 / Faculty of Medicine of the University of Liège/Belgium). Currently He is pursuing a PhD in biochemistry of food sciences and nutrition at the University of Douala on eggplants (*Solanum aethiopicum* L. *Solanum melongena* L.) with the aim of valorizing these eggplants through cultural practices and the establishment of eggplant products.

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Bioactive Nanopaper Solutions: Cinnamon Essential Oil-Infused Packaging for Extended Shelf Life of Coriander Leaves

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Nanocellulose is emerging as a “green magnet,” drawing attention across industries due to its abundant availability, biodegradability, and potential for smart applications. The study pioneers the use of pineapple pomace as an economical and sustainable source for producing cellulose nanofibers. Nanofiber isolation was achieved through a chemo-mechanical method, followed by solution casting to create nanopapers. The research provides a comparative analysis of nanofibers isolated using oxalic acid and sulfuric acid hydrolysis, examining their structural, optical, crystalline, dimensional, and thermal characteristics. This study also introduces an innovative antibacterial packaging solution by developing bioactive cellulose nanopapers derived from pineapple pomace and impregnated with cinnamon essential oil (CEO) in concentrations ranging from 1 to 5 wt%. Designed to extend the shelf life of coriander leaves, these nanopapers were characterized through comprehensive analyses of structural, crystalline, morphological, physico-mechanical, water barrier, permeability, and antibacterial properties. The incorporation of CEO decreased the crystallinity index and tensile strength due to a plasticizing effect, with 5 wt% CEO resulting in a 46% increase in elongation at break. Enhanced thermal stability, indicated by a Tmax rise of 26 °C, was observed, attributed to hydrogen bonding interactions between CEO and cellulose molecules. The CEO-loaded nanopapers also demonstrated significant reductions in oxygen and water vapor transmission rates (24% and 32%, respectively) compared to control samples, and exhibited strong antibacterial activity against *S. aureus* and *E. coli*. Applied as active packaging, these nanopapers effectively extended coriander leaves' shelf life by up to 3 days without refrigeration and 15 days with refrigeration. Additionally, chlorophyll, carotenoid, and moisture content in coriander leaves stored with CEO-loaded

nanopapers remained close to those of fresh leaves. This research presents a sustainable and biodegradable packaging alternative with potential applications in food preservation.

Biography

Dr P.M Sabura Begum is a Professor at Department of Applied Chemistry, Cochin University of Science and Technology, Kerala, India. She received her PhD degree from Cochin University of Science and Technology in 2010 She is actively involved in research in the various advanced fields of Polymer Science and Rubber Technology and has authored more than 50 peer reviewed journal articles. Her research areas of interest are green synthesis of polymer composites, synthesis of organic and inorganic fillers, plastic recycling etc. Five students have successfully completed their PhD under her guidance and six students are currently doing their PhD under her supervision. She has successfully completed a project on “Novel composites of natural rubber and rice husk nano silica for green tyres: synthesis, characterization and property evaluation” funded by Directorate of Environment and Climate Change. She has been serving as Head of the department since 2022 and as Chairman of the Board of Studies in Chemistry in Cochin University of Science and Technology, India.

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Marker Assisted Pyramiding of APR Genes for Durable Rust Resistance in Wheat (*Triticum aestivum* L.)

Niharika Mallick[1], Vinod[1], Manish K. Choudhary[1], S. K. Jha1, J. B. Sharma[1], M. Sivasamy[2], Vikash V. K.[2], M. Niranjana[1] and **Raghunandan K[1]**

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Out of three different types of wheat rusts, leaf rust caused by *Puccinia triticina* Eriks. is most common and widespread in India. Though incorporation of major genes can provide a high degree of resistance, it can easily be knocked down by virulent pathotypes because of their race specificity. In contrast race non-specific minor genes can provide durable resistance by combining two or more of them in same background. HD2733 is a high-yielding but leaf rust susceptible wheat variety was used as recurrent parent to develop Near iso-genic lines (NILs) of APR genes, Lr34/Yr18, Lr46/Yr29, Lr67/Yr46, and Lr68 using marker-assisted selection. Effect of different gene combinations were also studied at adult plant stage. Wheat cultivars parula (Lr34+Lr46+Lr68) and RL6077 (Lr67), were used as donors of leaf rust resistance genes. Four co-dominant markers, CSLV34, Xgwm259, XCfd23, and Xgwm146 for Lr34, Lr46, Lr67 and Lr68 respectively were used in marker-assisted selection. The cross between HD2733 and Parula, was unsuccessful because of hybrid necrosis, so Parula was crossed to HD3059, a noncarrier of necrosis genes, and the F1 was crossed with HD2733 to produce a three-way cross F_1 ($TWCF_1$). This $TWCF_1$ was viable and backcrossed with HD2733 to produce BC_1F_1 generation. BC_1F_1 generation of HD2733//HD3059/Parula and HD2733/RL6077 cross were analyzed with markers of Lr34, Lr46, Lr67, and Lr68, and marker-positive plants were identified. Some plants carrying two gene combinations, Lr34+Lr46 and Lr34+Lr68 in heterozygous state were also identified in BC1F1 generation. Further backcrossing of selected plants leads to the production of NILs with Lr34, Lr46, Lr67, Lr68, Lr34+L46 and Lr34+Lr68 in homozygous state in BC2F2 generation. These NILs were crossed with each other to produce NILs with all possible combinations of two and three-gene combinations. The disease progress of NILs and HD2733 were recorded thrice with an interval of seven

days starting from first appearance of disease on the flag leaves. It was found out that the disease progress in NILs with Lr34 is not only slower than RP HD2733 but also slower in comparison to NILs with Lr46, Lr67 and Lr68 individuallly. NILs with two gene combinations showed slower disease progress compared to NILs with single gene and almost immune response in case of NILs with three APR genes. These durable NILs can be released after being tested for long-term cultivation by the farmers.

Biography

Niharika Mallick have been associated with wheat breeding for more than 15 years. During this period, she has been developed more than 20 wheat varieties, out of which three are as the main breeders (HD3406, HD3407 and HD3437). She is using both conventional and molecular tools to improve already popular wheat varieties for rust resistance. She has developed a series of Near iso-genic lines (NILs) carrying different combinations of seedling (SR) and adult plant resistance (APR) genes (*Lr19/Sr25, Lr24/Sr24, LrTrk/YrTrk, Lr34/Yr18, Lr46/Yr29, Lr67/Yr46, Lr68, Sr26, Yr5, Yr10* and *Yr15*) in wheat varieties HD2967, HD2733, HD2932 and HD3059. These NILs will also turn into new varieties in near future. She has also contributed significantly in basic research and mapping of 5 novel leaf rust resistance genes viz., *LrM, LrSel212, LrSel2427, LrSyn45* and *LrTs276-2*. She is actively involved in teaching cytogenetics course since 2012-13 and guiding M.Sc and Ph.D students. She has published 45 research papers in NAAS rated journals. On these scientific contributions, she has been awarded with ICAR-Jawaharlal Nehru award, Nanaji Deshmukh Team research award, NESA-Scientist of the Year Award-2023 and two research grants as PI from DST-SERB.

Predictive Analytics for Crop Economics

Prity Kumari

College of Horticulture, Anand Agricultural University, India

Agriculture, a vital sector of the global economy, is significantly impacted by price volatility driven by seasonal production, weather variability, and market dynamics. Accurate price forecasting is crucial for stabilizing markets, optimizing resource allocation, and improving farmer incomes. While datasets such as crop yields, weather patterns and market arrivals offer valuable insights, their application in predictive modelling is often constrained by inconsistent availability, varying data frequencies and limited real-time accessibility. Additionally, many of these variables may not directly correlate with price changes, making price data the most reliable and consistent variable for forecasting purposes. Traditional models like ARIMA and SARIMA have been widely used for price forecasting but are constrained by linear assumptions, making them less effective in capturing non-linear and seasonal patterns in crop prices. In contrast, machine learning (ML) and deep learning (DL) techniques excel in capturing complex dependencies and adapting to dynamic patterns, offering enhanced forecasting accuracy.

This research validates the efficacy of ML models in forecasting banana, cumin and potato prices using data from Indian markets. For banana prices in Gujarat (2009–2019), Recurrent Neural Networks (RNNs) outperformed traditional statistical models like ARIMA and SARIMA, effectively capturing seasonal and non-linear trends with reduced errors. In cumin price forecasting (2002–2021), Stacked Long Short-Term Memory (LSTM) models demonstrated superior accuracy, achieving prediction errors of just 5% in pre-sowing and 18% in pre-harvest month. Similarly, for potato price forecasting (2006–2023), stacked ensemble models demonstrated impressive performance, achieving forecasting errors between 0.08% and 2.09%. These findings highlight the transformative potential of predictive analytics in crop economics, enabling stakeholders to make data-driven decisions, mitigate risks, and

promote sustainable agricultural practices amid evolving global challenges.

Biography

Dr. Prity Kumari, alumnus of Banaras Hindu University in Varanasi, Uttar Pradesh, India, has been making significant contributions as an Assistant Professor in the College of Horticulture at Anand Agricultural University, Gujarat, since 2015. Her research expertise spans a diverse range of areas, focusing on time series forecasting through statistical models and cutting-edge Deep Learning AI techniques. Dr. Kumari adeptly applies methodologies such as ARIMA, ARCH/GARCH, ANN, ML, Memory based Machine learning models and CNN to advance her research. Her scholarly achievements extend to the publication of research papers in reputable journals, as well as the authorship of several books and book chapters that reflect her academic credit. Notably, she actively mentors and guides numerous master's and Ph.D. students in the domain of agriculture. Beyond her academic responsibilities, Dr. Kumari has served as a visiting fellow at Western Sydney University, further enriching her research insights.

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Complex Regulation of Micro-RNA and their Targets under Low-light Stress in Shade-tolerant Swarnaprabha Rice

Madhusmita Panigrahy[1,2], Aman Kumar[2], Aman Ranga[2], Yugandhar Poli[3], Jyotirmayee Das[4] and **Kishore CS Panigrahi[1]**

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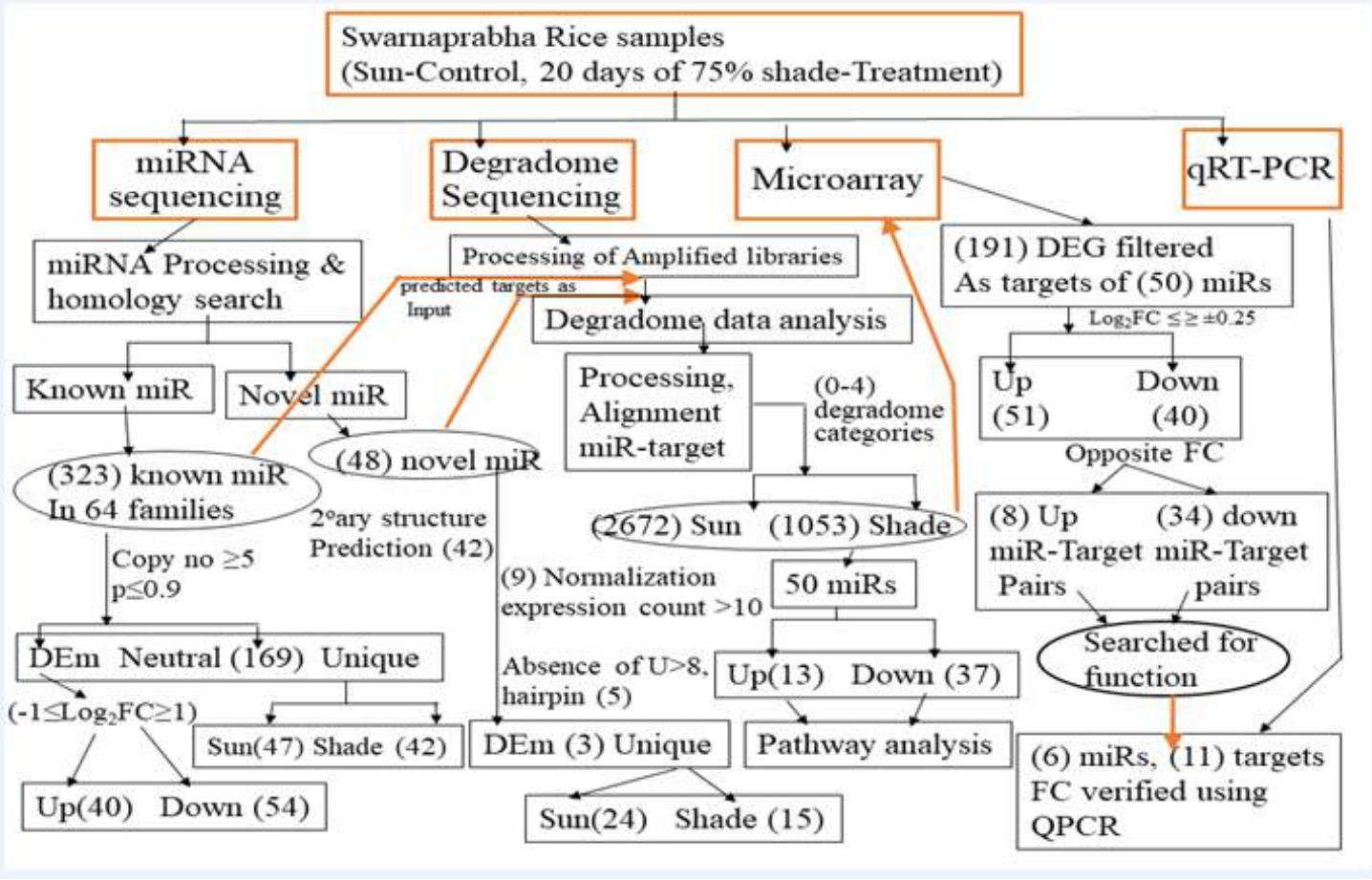
[2]National Institute of Science Education and Research, Homi Bhabha National Institute (HBNI), India
[3]Indian Institute of Rice Research-ICAR, Rajendra Nagar, India
[4]Orissa University Agriculture and Technology, India

Present work bears importance due to the present unpredictable climatic conditions, associated low-light, cloudy days and its impact on grain filling in rice. This study integrates differential expression of micro-RNA during prolonged-shade (20-days) with their cleaved targets through degradome study and correlating it gene expression using the microarray analysis to reveals complex regulatory action of miRNA during low-light stress in Swarnaprabha rice. The study demonstrates that micro-RNA regulation for shade tolerance phenotype in Swarnaprabha is associated with activities girdling the cell wall, transport across membranes, ion channels, cellulose synthesis and secondary metabolism controlling responses such as decreased mechanical stem strength, pollen and panicle development, panicle number, endosperm and grain development; and meeting sugar demands. This study identifies cleavage-specific interaction of 16 miRNAs and 21 target pairs, whose actions contribute significantly to the shade tolerance phenotype and sustainable yield of Swarnaprabha rice under prolonged low-light stress. Prominent among them are: *miR5493-OsSLAC* and *miR5144-OsLOG1* for enhanced panicle size, *miR5493-OsBRITTLE1-1* for grain formation, miR6245-OsCsIF9 for stem mechanical strength, miR5487-OsGns9 and miR168b-OsCP1 for pollen development, and *miR172b-OsbHLH153* for hyponasty. The study demonstrates that the neutrally and uniquely expressed micro-RNAs can also contribute to molecular regulation of shade tolerance by differential binding and altering the differential expression of their targets, that are involved in light and different hormone signalling pathways. Few such target are *OsDELLA, OsTIFFY11D, OsLOG1* an, *OsSPA3-4*-like cleaved

by 5'UCGUGCCGGCGGGGGCCGGGCU3', *miR5810* and *miR5144-5p* respectively. Microarray expression analysis showed that significant up-regulation of *EREBP-2, MFT-1,* and *SP-1* genes and traits like higher rate of panicle emergence, panicle length and percentage of grain filling are associated with sustainable yield of Swarnaprabha under low-light stress.



Pictorial representation of method used for data analysis. The figure represents the analysis work flow for selection of candidate miRNA and target genes. It represents an integrative analysis in Swarnaprabha including miRNA sequencing, whose targets were validated using degradome sequencing, further filtered from microarray expression data and selected candidates were verified using qRT-PCR. The Red arrows indicate the sequential work flow. The criteria of selection are in smaller font, Boxed items are steps of analysis, Circled items are connections to the next procedure, numbers within brackets are no. of candidate miRNA or target transcripts.

Tabular list of miRNAs and their respective targets identified in this study. miR: micro-RNA, Target: Cleaved genes RAP-DB Gene ID, FC: Differential expression Fold-change (Log2)

miRNA	miR-FC	Target ID/ Name	Tar-get-FC	Gene Name, Gene ID	Function
miR5493	-1.26	Os06g0592500	+1.35	Ethylene respon-sive transcriptional coactivator	Heat stress re-sponse
miR5493	-1.26	Os01t0226600-01	+0.29	C4-dicarboxylate malic acid trans-porter, OsSLAC	panicle size and grain yield
miR5493	-1.26	Os02t0202400-01	+0.16	ADP-glucose trans-porter BRITTLE 1-1, OsBT1-1	grain formation by controlling starch synthesis
miR159c	+1.10	Os01t0812000-01	-0.27	Transcriptional activator of gibber-ellin-dependent alpha-amylase expression	Regulation of nu-trient mobilization in germination α-amylase expres-sion in aleurone cells of grains
miR160b-3p(-shade)	+3.02	Os04t0104900-01	-1.8	methyltransferase	methyltransferase
miR169-p (sun)	+2.34	Os01t0188400-01	+1.25	NADP-dependent malic enzyme	NADP-dependent malic enzyme
miR399b	+0.66	Os03t0761100-02	-1.53	protein phospha-tase 2C, OsPP2C	stress tolerance and ABA-mediated signalling pathway
miR1439	-0.38	Os01t0281000-01	+1.12	OsFbox6, OsFBX5, OsSTA12	cyclin F-box con-taining protein
miR414	+1.48	Os06t0561200-01	-0.086	Potassium/proton antiporter	Potassium/proton antiporter
miR414	+1.48	Os05t0146100-01	0.448	PDZ/DHR/GLGF domain containing protein	ion channel
miR414	+1.48	Os10t0503800-01	-0.318	Remorin, OsREM1.2	Membrane pro-tein, plant growth, development, sig-nal transduction, stress responses

miR6245	+1.39	Os07t0551600-01	-0.4	Cellulose synthase-like OsCslF9	mechanical Strength of stem
miR5075	-0.78	Os02t0285300-01	+0.89	OsDREPP2	plasma membrane protein
miR529a	-0.43	Os03t0787300-01	+0.86	co-chaperones, OsDjA5	co-chaperones
miR444.2	-0.17	Os05t0549800-01	0.98	OsEREBP96	transcription factor in ethylene signalling
miR5180	+0.06	Os10t0392400-01	+1.29	OsTIFY11D	jasmonate signalling
miR2275b	-2.40	Os05t0402700-01	+2.23	Fructose 1,5-biphosphate Aldolase OsFBA	formation of SBP and FBP, increase photosynthetic carbon flux by increasing RUBP regeneration, promote gibberellin mediated root growth
miR5487	-1.37	Os02t0771700-01	+2.89	β-1,3 Glucanse, OsGns9	glycoside hydrolase (GH) pollen development, seed germination, cold response, and plasmodesmata signalling
miR5144-5p	0.42	Os01t0588900-01	1.57	Lonely Guy Like1 OsLOG1	cytokinin activating enzyme known for controlling panicle size
miR5144-5p	0.42	Os01t0725800-01	0.86	SPA3-4 like OsWD40-24	repressors of photomorphogeneis light induced stomatal closure, mesophyll photosynthesis, sucrose breakdown

miR172	1.54	Os03t0171700-01	-0.38	OsbHLH153 OsE-NO2	Chloroplastic gly-colysis, regulation of grain size and weight, flag leaf angle
miR168b	-2.72	Os11t0255300-01	+1.04	cysteine protease OsCP1	pollen develop-ment
miR168b	-2.72	Os01t0104600-01	0.25	Homolog of Ara-bidopsis DE-ETIO-LATED1DET1	repressors of pho-tomorphogeneis

Biography

Dr Madhusmita Panigrahy is presently working as Assistant Professor in the department of Molecular Biology and Biotechnology at Institute of Agricultural Science, Siksha O Anusandhan deemed to be University, Odisha, India. She obtained her PhD from Albert Ludwig's University of Freiburg, Germany. She has 17 years of research and teaching experience. She has received many prestigious awards and fellowships like DFG fellowship from German Federal Government, SERB YSS Young Scientist, UGC PDF for women, DST WOS-A women scientist and Summer research Fellowship from Indian Academy of Science for Teachers from Government of India, Best Faculty Award from ESN Publications. She has 43 publications in reputed international peer-reviewed journals. Her work has been presented in <20 international and national conferences. Her profile H-index is 16, with 990 citations She has guided 8 integrated M.Sc students from NISER, Odisha and is guide of 1 M.Sc and 1 PhD student from SOADU. Her research expertise in the field of Photobiology, Circadian Clock, Abiotic stress and Nano-agriculture can be found at https://vidwan.inflibnet.ac.in/profile/287203

R & D in Plant Sciences with "Human Concern": Turn Globe Hunger-Free

D. Radhakrishnan Nair and **Justin Joy**

Christ (Deemed to Be University), India

Scientific growth and technological development have created a congenial ambiance to terminate hunger from the face of the earth. Hunger has been harming humans. We invite our brothers and sisters in the world to invoke human values and good initiatives to eradicate hunger. We exhort all to help our fellow humans to deprive of hunger.

The idea is to evoke the spirits of kind humans to find out ways and means to tide over the situation when hunger reigns supreme in some parts of the world. Our common intention shall be to produce more food materials using plant research, plant protection and plant sustenance. The whole world has come forward to renew, resuscitate strategies of research in plant development.

Websites fill the required information on humans who suffer from hunger in different parts of the world owing to their spatial locations devoid of fertility of land, scarcity of water and paucity of energy. Agricultural scientist shall take care of the interest in human requirements and find out a panacea for all the ills in agricultural production. The information is addressed by providing food to the "have-nots". The food from the 'haves' can be made available to the 'have-nots'.

We can together make an exhortation as detailed below. We are reminded of Rabindranath Tagore: to stop chanting and singing in praise of god and instead start tilling the land sowing the seed to produce food, here with the rare knowledge churned out for use from research in the plant sciences.

We will expand and develop agriculture, we will find the humans who suffer from hunger, we will make use of all possible resources in speedy supply chain to reach food materials to the needy. The only magic that can transform the unhappy humans happy is the state

where they enjoy food and make the earth a “heaven” out of hell.

Biography

Dr. D. Radhakrishnan Nair

Prof. D. Radhakrishnan Nair has a long, distinguished career as Professor of English Language, Literature, Cultural studies, and English Communication. He is the author of award winning book on Narratology, and other seminal books and papers. His latest book: Academic Journal: Editing and Publishing has been published by Notion Press. He has presented papers in international conferences, on narratology and literary comparatistics. Besides being a speaker for many academic and social causes. He was the editor of a double blind peer reviewed, scientific/academic journal in business and management studies, enlisted in Scopus. One of the leaders of popular movements like “Against Establishment of Atomic Reactor in Kerala” (1982-90), he is a teacher with five decades of experience in teaching English. He has led the workshop: “Train the trainers” organized by the British Council, Refresher Course in ELT at CIEFL, and training in English teaching given by CUP.

Dr. Justin Joy

Dr. Justin Joy is an Associate Professor at School of Business and Management, Christ (Deemed to be University). He has taken his B.Tech in Mechanical Engineering from Govt. Engineering College, Thrissur, Masters (MSc in Business Information Technology) from Newcastle Business School, University of Northumbria, U.K. and a second Masters (M.Tech in Manufacturing Management) from BITS Pilani, Rajasthan. He did his PhD in Management from the Department of Management Studies, Pondicherry University. Before joining Christ University, he was working as Assistant Professor in SCMS Cochin School of Business, Kerala. He has a total of 23 years of work experience - he was the Business Area Manager of Educomp Solutions Ltd. and Web and Business Development Manager cum Head of Computer Applications of IFCR India - a Canadian based Research Organization in Cochin. He has also experience working abroad in Newcastle Upon Tyne, UK. He has also published several articles, Scopus indexed.

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Optimizing Nitrogen Management through Nano N-fertilizer for Wheat Resilience under Salt Stress

Parvender Sheoran[1,2], Ashwani Kumar[1], Anita Mann[1] and **Ajay Kumar Bhardwaj[1]**

[1]ICAR-Central Soil Salinity Research Institute, India
[2]ICAR-Agricultural Technology Application Research Institute, India

Recent advancements in nanotechnology, especially in controlled release and targeted delivery systems for fertilizer N, is a promising strategy with its superior nutrient use efficiency while sustaining agricultural production and reducing the environmental impact. The hypothesis of this study posits that strategic substitution of nitrogen through Nano-urea could sustain morho-physiological response and wheat resilience in salt-affected areas compared to conventional fertilizers (prilled urea).This study examined the comparative performance of wheat varieties (KRL 210 and HD 3086) in response to variable N application through Nano-urea (0, 33%, 50% and 100% substitution) under saline, sodic and normal soil conditions. Results revealed that salt stress significantly reduced the morpho-physiological functions of plant growth (plant height, leaf area, CGR, AGR, and RGR), with reductions being more pronounced under sodic stress. Within varieties, plant height decreased by 11.3–12.4% in KRL 210 and 8.5–14.1% in HD 3086 under saline and sodic conditions. The CGR decreased by 18–25% in KRL 210 and 19–33% in HD 3086, with AGR showing similar reductions of 21–27%. Leaf area showed a reduction of 30% under saline and 17% under sodic conditions. N substitution through Nano-urea beyond 33% of the recommended N (RDN) led to significant declines in growth traits, realizing RGR reductions upto 47% under sodic conditions. Notably, leaf relative water content (RWC) was more stable in KRL 210 across variable soil conditions. With 33% N substitution through Nano-urea, membrane injury (MI) and Na+/K+ ratios were comparable with recommended N (prilled urea), demonstrating its potential in managing physiological performance under stress conditions. Better plant physiological performance culminated towards achieving similar yield attributes such effective tillers, spike length and grain weight with 33% N substitution through Nano-

urea, while higher nano-urea substitution led to a decline in wheat yield. These findings highlighted the need for optimizing nitrogen management strategies and improved wheat resilience in salt-affected agro-ecologies, with a balanced approach towards sustainable agricultural practices while ensuing food security and environmental sustainability.

Biography

Dr. Parvender Sheoran, presently working as the Director, ICAR-Agricultural Technology Application Research Institute (ICAR-ATARI), Zone-I, Ludhiana, Punjab is looking after the Coordination and Monitoring of Agricultural Extension Activities in 72 Krishi Vigyan Kendras (KVKs) of Zone-1 representing 3 states (Punjab, Himachal Pradesh, Uttarakhand) and 2 UTs (Jammu & Kashmir, and Ladakh). He did his Graduation (1993-97; College of Agriculture, Kaul), Post-Graduation (1997-2000; Agronomy; College of Agriculture, Hisar) and Doctorate of Philosophy (2000-2003; Agronomy; College of Agriculture, Hisar) from CCS Haryana Agricultural University, Hisar. His current areas of interest include developing location-specific best management practices (soil, water and crop) for sustainable crop production and exploring adaptation and mitigation strategies to enhance resource use efficiency in different agro-ecosystems. He has made research contributions in the field of natural resource management including weed management, oilseeds agronomy and salinity management.

Dr. Sheoran is the recipient of the ICAR-Swami Sahajanand Saraswati Outstanding Extension Scientist Award (2021), Dr. PS Deshmukh Young Agronomist Award (2018); Australian Award Fellowship (2017); AICRP Team Award on Rapeseed Mustard (2014); CSSRI Best Scientist Award (2018); Fellow of Indian Society of Weed science (2018) and Indian Society of Oilseeds Research (2019); and Academic Excellence (highest OGPA) and ASPEE Gold Medals.

Research/academic contributions are evident by his involvement in the development of agronomic package of 7 improved varieties/hybrids of the Oilseeds crops (mustard-RH 0749, RH 0406; sunflower-PSH 569, PSH 996, DK 3789; linseed-LC 2063 and sesame-RT 346) released at the National/State level and 25 farmers' worthy technological recommendations being included in the Package of Practices for Kharif/Rabi Crops of Punjab and Haryana state. Recently, a total of 15 technologies/concepts/process/methodology has also been certified by ICAR. The novel contribution in developing first herbicide-based farmers' friendly technology for management of parasitic weed 'Orobanche' in mustard is commendable one. His focused work in developing location-specific technologies (synergizing soil amelioration, balanced fertilization and crop tolerance, gypsum alternatives, farmer-based cavity type recharge structures, sodicity tolerance limit-based varietal selection, energy efficient and low-carbon footprint residue management etc.) are quite helpful in demonstrating ecosystem–based approach targeting optimal resource use, improved ecological resilience with socio–economic development, and eventually achieving the goals of national food security, land degradation neutrality, and environmental protection. Participatory research highlighting the agricultural use of environmentally benign organic materials like sugarcane pressmud, municipal solid waste compost helped in sustainable rehabilitation of degraded lands. An ICT-based initiative towards 'Digital India' in developing a farmers' friendly mobile-app 'Salinity Expert' helped to fast track the dissemination of doable salinity management practices.

He has also developed a mobile app, 'Salinity Expert,' to aid the traditional extension methods in disseminating salinity management technologies. Teaching experience of more than 12 years, publication of more than 150+ Research papers in high impact journals of National/International repute; documented 30 success stories, 4 books, 15 book chapters, 40+ extension articles, 10+ technical bulletins, 8 training manuals and associated in organization of Kisan Melas/Capacity Building Programme/Field days/Kisan Goshthies/exhibitions demonstrate the substantial efforts made towards teaching, research and extension activities in the field of Agronomy.

Anti-diabetic potential of *Exacum bicolour Roxb.* -an *in silico* study

Saisha Vinjamuri, Sharad S Achar and **Renu Pai**

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Diabetes is a metabolic disorder involving numerous pathogenic processes and pathways. Natural products from medicinal plants and their extracts have great potential as anti-diabetic agents. The presence of various phytochemicals in *Exacum bicolour Roxb*. has led to usage of this plant in traditional treatment of diabetes. This study reports a pathway analysis of the phytochemicals and their mechanism of action in diabetes. The key regulatory molecules were docked with phytochemicals and standard molecules using Autodock software. The binding affinity of phytochemicals were studied and compared to that of standard molecules. Finally, seven phytochemicals (1H-indole-2,3-dione1-methyl-3-hydrazone, Phthalic acid-di-((2-chlorocyclohexyl)methyl) ester, Photocitral B, Erethrocentaurin, Sulfurous acid-2-ethyl hexyl-iso-hexyl ester, Cyclohexanol 1-methyl-4-(1-methylethyl) and Geranyl isovalerate were identified to have better binding affinity to regulatory molecules compared to the standards. The results indicate that phytochemicals from *E. bicolour* are better than the commercial drugs currently being used in the treatment of diabetes.

Biography

Dr. Saisha Vinjamuri is an Associate Professor & HOD in the Department of Biotechnology at BMS College of Engineering, Bangalore. She has extensive experience in pharmaceutical biotechnology, having served as a research fellow at Andhra University and a senior research fellow at CSIR. Dr. Vinjamuri holds a Ph.D. in Pharmaceutical Biotechnology from Andhra University, where she was awarded the Desaraju Venkata Rao Shastyabdhapurthi Endowment Prize for her thesis. She has authored/co-authored 35 research publications and holds two patents. Dr. Vinjamuri is a member of several professional bodies, including PSI, SBCI, BRSI and ISCA, and has guided numerous students in their research projects. She is also a Microsoft Certified Educator and has been recognized for her contributions to engineering education. Currently, she is involved in several funded research projects and serves as a research guide for Ph.D. students at VTU and Mangalore University.

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Genomic Insight into the Major Foliar Maize Diseases of India

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[1]ICAR-Indian institute of maize research institute, India
[2]Dryland Agriculture Research Station SKUAST, India
+Hill Agricultural Research and Extension Centre, India
[4]All India Coordinated Research Project on Maize, India
[5]Zonal Agricultural Research Station, India
[6]All India Coordinated Research Project on Maize, India
[7]ICAR-Indian Institute of Agricultural Biotechnology, India

Turcicum leaf blight (TLB) and Maydis leaf blight (MLB) are two major foliar diseases limiting maize production worldwide. Identifying and utilizing TLB, and MLB resistant sources and genes are the most effective way to control and manage these diseases. Therefore, we conducted genome-wide association studies (GWAS) and quantitative trait loci (QTL) analysis in multiple environments, to identify key genomic regions and candidate genes (CGs) for TLB and MLB resistance, respectively. Initially, we screened 112 inbred lines under artificial epiphytotic conditions for MLB at multiple locations of which 25 were found resistant. Generation mean analysis revealed a predominantly dominance effects with additive x additive gene interaction for MLB resistance. Two contrasting [CML 269-1 (R); HKI PC4B (S)] lines were used to develop recombinant inbred lines (198 RILs) populations. These RILs were genotyped using 6527 SNP polymorphic markers spanning over 2,124.30 cM and phenotyped at 4 hot-spots locations (Delhi, Karnal, Ludhiana, Dholi) in India. Linkage mapping detected 10 QTLs located on 5 maize chromosomes (1, 3, 5, 6, 8) for MLB. LOD scores of these QTLs ranged from 3.4 to 5.8 and explained up to 16.9% of the phenotypic variation. Another set of 384 diverse association maize panel was evaluated for TLB disease at four hot-spot sites (Bajaura, Mandya, Dharwad, & Srinagar) of India and genotyped with

60227 polymorphic SNPs. Using GWAS, total 16 significant MTAs were found associated with TLB resistance distributed on all chromosomes except chr 1, 9 and 10, explaining 23-30% phenotypic variation. Further, 18 CGs and 5 Ortho-CGs were identified in the genomic regions of MTAs. These CGs were mainly associated with cellular anatomical entity, binding, and cellular processes and have been found responsible for TLB disease resistance in maize. These findings provide valuable resources for further implementations to develop varieties with resistance to TLB and MLB.

Biography

Dr BHUPENDER KUMAR, AFNAAS, FISGPB, FMTAI, Sr. Scientist, ARS (PB) (ICAR-IIMR Ludhiana). He has done his B.Sc. Ag from CSKHPKV, Palampur and M.Sc. and PhD. in Genetics with major field Plant Breeding from ICAR-IARI, New Delhi. Presently he is working as a maize breeder at the ICAR-IIMR office in New Delhi. Since 2011, he has developed 12 single cross maize hybrids as a lead breeder and 13 as a co-developer. So far hybrids released as lead breeder have been taken up by 20 different private seed companies through signing 32 MoUs. Continuously for the last four years, they also remained on top position in breeder seed demand from Govt. of India with their share ranging from 20 to 34 %. He has published over 55 peer-reviewed research papers and review articles in the Journals with impact factors of up to 7. He had worked on understanding the molecular basis of maize diseases resistance. He also published 12 book chapters, 10 technical bulletins/Newsletter, and edited 01 book. He is the recipient of several awards and recognitions such as NAAS Associateship, DST early career research award, twice ICAR-IIMR Best scientist recognition and appreciation awards, Dr NN Singh Young scientist and Dr SK Vasal award and fellowship of MTAI, Dr. Joginder Singh Memorial award and fellowship of ISGPB, & Prof Mahatim Singh Memorial Award of SAWBAR.

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Physiology of Flowering in Litchi *vs* Mango

Sanjay Kumar Singh[1], A K Trivedi[2], Anju Bajpai[1], Muthukumar M.[1] and **T. Damodaran[3]**

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[2]Division of Post Harvest Management, India
[3]Director ICAR-Central Institute for Subtropical Horticulture, India

Lychee or litchi (*Litchi chinensis Sonn.*) and mango (*Mangifera indica* L.) produces leaf flushes, flowers and fruit on terminals of new growth. In India, erratic flowering in mango (in *Dashahari*, *Langra* and *Chausa*) and litchi (in cultivar *China*) is reported. Litchi cv. 'Shahi' also show shy bearing tendency. The post harvest tip pruning, foliar application of KNO_3, thiourea, ethylene or PBZ (promote level of sugar and protein) promotes flowering in litchi and mango. Maturity of terminal shoots and accumulation of carbohydrate in the shoot apex are associated with the synthesis of the floral stimulus.

The litchi crop bearing, quality and yield is adversely influenced by external factors (too high or too low temperature, low humidity, strong winds, prolong rain), water stress, flushing during winter, lack of nutrients (especially B and Zn). The flushes maturing earliest (before the winter period) produce floral shoots. *Paclobutrazol* (PBZ) application during September month in litchi cv. China reduces gibberellic acid (GA_3) content almost by 20 percent with increased abscisic acid (ABA). 4.0 g PBZ or 1.0 % KNO_3 brings highest ABA and lower IAA contents and over all content of zeatin (Z), dihydro-zeatine riboside (DHZR), and zeatin riboside (ZR) marginally improved. The bearing in young trees of 'Shahi' litchi improved (with no. of cauliflorus shoots) a lot due to PBZ @ 2.0 g (which did not inhibit GA_3 but increased ABA level). Similarly, 100 % flowering in the alternate bearer 'China' litchi can be assured by spray of KNO_3 (1-2 %) with normal flushing in August and mild or no flushing during November-December. The endogenous hormones like IAA improved by > 80 %, GA_3 decline by 70 % in floral than in non-floral shoots. In 'Shahi' litchi there was sharp decline in

IAA (> 80 %) and enhanced GA3 (>30 %) in floral shoots over non-floral shoots. ABA played here major role for flowering as floral shoots recorded 20-30 % higher ABA over non-floral shoots in litchi cultivars. The floral shoots also had higher concentration of cytokinins in terms of Z, ZR, DHZR than in non-floral shoots. This means less GA_3, high IAA, ABA and cytokinins in terms of ZR, DHZR is conducive for flowering in litchi cv. China while in 'Shahi' litchi, high GA_3 with high ABA and cytokinins in terms of Z, ZR and IPa is necessary for flowering.

GA_3 prevents a mature mango tree to flower, the florigenic promoter (FP) that is continuously synthesized in mango leaves and carried to buds through phloem induces flowering. The high ratio of FP/VP favours floral induction, low FP/VP favours vegetative growth and intermediate ratios favours mixed shoots. Foliar N levels should not exceed 1.4% to discourage second vegetative flushes after pruning. The higher IAA, ABA and lower GAs are found in 'on' year of mango shoots. The higher level of ABA is conducive for flowering in mango and its manipulation by spray of synthetic substance or by pruning at appropriate time may be helpful to induced flowering during '*off*' season.

Biography

Having research experience of 17 years, he is working on breeding of Bael, Aonla, Karonda and Seedling mango for subtropical regions. Earlier worked on tree physiology of mango, guava and litchi, improvement of mango and pummelo, post harvest aspects of arid zones fruits and endogenous hormonal changes during flowering/ vegetative phase in guava, litchi and mango. He also handled DBT sponsored-*National Database* on *Mango* Project (for Bihar and Jharkhand), UNEP-GEF/TFT sponsored project for Mango and Pummelo, and Farmer's FIRST Programme (*Improved livelihood through good practices in an agricultural production system*) and NAIP Sponsored e-GRANTH project (*Strengthening of Digital Library and Information Management under NARS*). He was instrumental in handling Coca Cola India Private Limited (CCIPL), Gurugram, India sponsored '*Litchi Unnati*" project in collaboration of Dehaat.

At ICAR-Central Institute for Subtropical Horticulture, Lucknow, India, he is looking after the research on "*Evaluation of diversity and decline of indigenous seedling mango of Bihar and study for its conservation strategy*". He is taking care of research project on 'Improvement in *Aonla*, *Karonda*, *Jackfruit* and *Bael* for higher yield and neutraceutical value'. He is also working on development of DUS guidelines for Bael, Aonla and Karonda. Another project entitled *'Evaluation of diversity of underutilized fruits of bihar and study for its conservation and utilization strategy*' sponsored by Bihar State Biodiversity Project, Patna is also supervised by him.

Received Fellow Award-2013 and JSIL Fellowship Award 2019 from Confederation of Horticulture Association of India, New Delhi and Overall Young Agricultural Scientist Award 2021 conferred by University Institute of Agricultural Sciences, Chandigarh University, Mohali, India.

He has published 40 research papers, 50 popular articles, 60 book chapters, 4 books and awarded with 5 best oral presentations, 4 best poster paper and visited country like Vietnam, Malaysia and Thailand, participated in > 40 international and national conferences/symposia/seminars.

Sensing Nature's Alarm: SnO_2/MXene Gas Sensor Unveils Methyl Jasmonate Signatures of Plant Insect Stress

Prem Kumar and **Vijayakumar Shanmugam**

Institute of Nano Science and Technology, India

The incorporation of artificial intelligence into agriculture presents challenges, particularly due to hardware limitations, especially in sensors. Currently, pest detection relies heavily on manual scouting by humans. Therefore, the objective of this study is to create a chemoresistive sensor that enables early identification of the characteristic volatile compound, viz., methyl jasmonate, released during pest infestations. Given the lower reactivity of esters, we have fine-tuned a composite consisting of SnO_2 nanoparticles and 2D-MXene sheets to enhance adsorption and selective oxidation, resulting in heightened sensitivity. The optimized composite demonstrated a notable response even at concentrations as low as 120 ppb, successfully confirming pest infestations in tomato crops.

Biography

Prem Kumar is currently doing his Ph.D. under the guidance of Dr. P.S. Vijayakumar in Chemical Biology Unit, Institute of Nanoscience and Technology, India. Prem Kumar has received his Master degree in Zoology from Maharaja Ganga Singh University, Bikaner. He is currently working on the detection of stress signature volatiles with the help of metal oxide-based gas sensor.

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Hydroponic Cultivation Enhances Morpho-Physiological Traits and Quality Flower Production in Three Cultivars of French Marigold (*Tagetes patula* L.)

Bhavya Bhargava[1,2], Ujala1, Diksha Sharma[1], Mahinder Partap[1,2] and **Ashish R. Warghat[2,3]**

[1]Floriculture Laboratory, Agrotechnology Division, Council of Scientific and Industrial Research (CSIR)-Institute of Himalayan Bioresource Technology (IHBT), India
[2]Academy of Scientific and Innovative Research (AcSIR), India
[3]Biotechnology Division, Council of Scientific and Industrial Research (CSIR)- Institute of Himalayan Bioresource Technology (IHBT), India

In soil-less agriculture, hydroponics is recognized as a promising farming system for producing uniformly high-quality plant material in significantly less time. This investigation, for the first time, examines the effects of different cultivation conditions—open-field, poly-house, and hydroponic on morpho-physiological traits, phenolic content, and essential oil components in three French marigold cultivars (scarlet red, orange, and yellow) of *Tagetes patula* L. The results demonstrated that hydroponic systems produced the highest plant height, number of secondary branches, number of flowers, photosynthesis rate, stomatal conductance, and transpiration rate compared to other conditions. However, the open-field conditions yielded the highest content of gallic acid (0.82 mg/g dry weight), syringic acid (3.98 mg/g dry weight), epicatechin (0.48 mg/g dry weight), p-coumaric acid (7.28 mg/g dry weight), protocatechuic acid (0.59 mg/g dry weight), ferulic acid (2.58 mg/g dry weight), and luteolin (8.24 mg/g dry weight). Under hydroponic conditions, higher levels of vanillic acid (0.43 mg/g dry weight), caffeic acid (0.49 mg/g dry weight), and quercetin (0.92 mg/g dry weight) were observed. Additionally, a total of nineteen volatile components were identified in the essential oil of the different marigold cultivars, with the major components being (-)-caryophyllene oxide, trans-β-caryophyllene, trans-geraniol, 3-methyl-benzyl alcohol, and 2,2':5',2"-terthiophene. The volatile component percentage ranged from 70.85% to 90.54% in open-field conditions, 59.03% to 77.93% in poly-house conditions, and 68.78% to 89.41% in hydroponic conditions. In conclusion, this research highlighted that

hydroponic cultivation resulted in superior morpho-physiological performance and higher flower production per plant. However, open-field conditions maximized phenolic content and volatile components. The study concludes that hydroponics presents a significant potential strategy for quality flower production in *T. patula*.

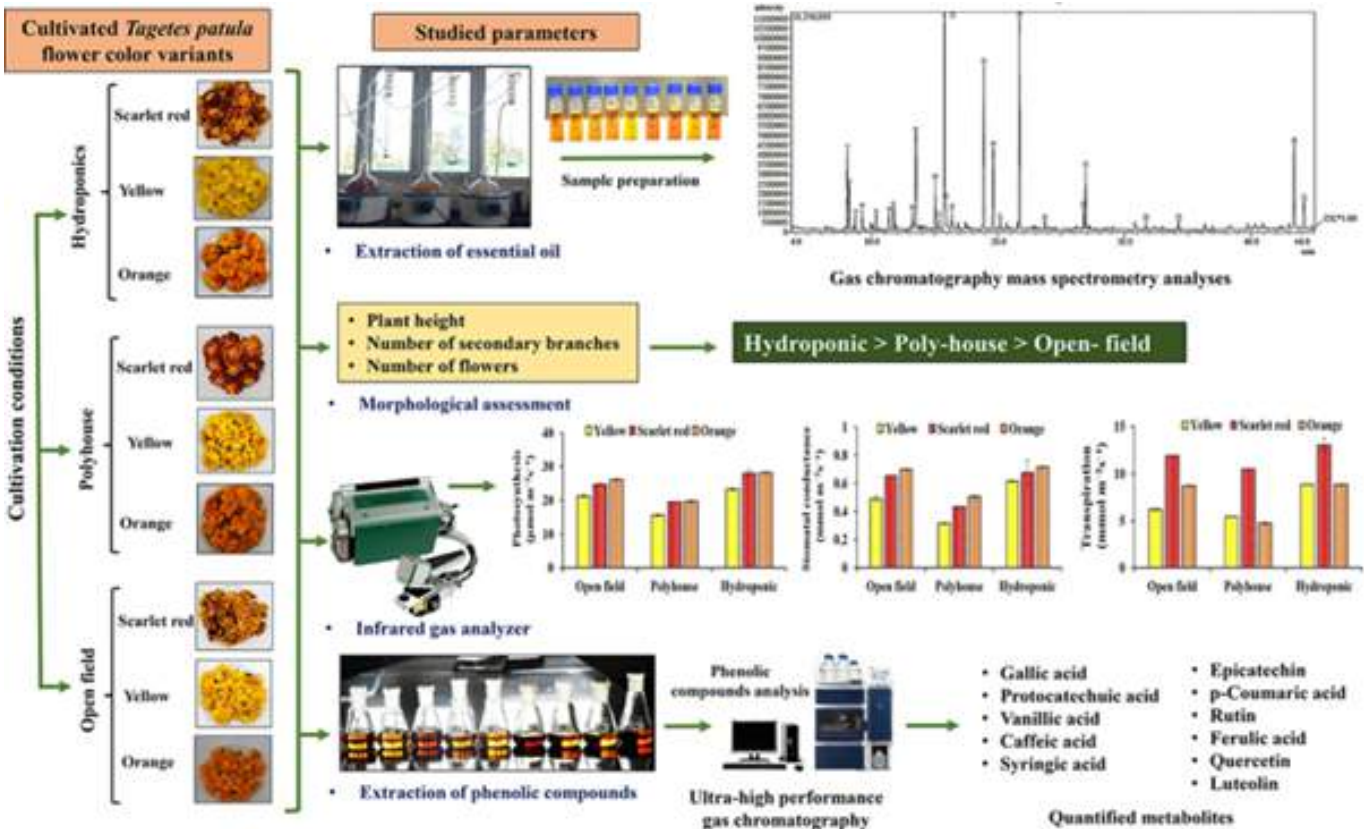

Fig. 1. Graphical representation of studies on Hydroponic cultivation of *Tagetes patula* L.

Table 1. GC–MS based analysis of volatile oil components in three cultivars (marigold scarlet red, marigold orange, and marigold yellow) of French marigold (Tagetes patula L.) under different cultivation conditions.

GC–MS based analysis of volatile oil components in three cultivars (marigold scarlet red, marigold orange, and marigold yellow) of French marigold (*Tagetes patula* L.) under different cultivation conditions.

Volatile components	Relative retention indices*	Open field cultivation			Poly-house cultivation			Hydroponic cultivation		
		Yellow flower	Scarlet red flower	Orange flower	Yellow flower	Scarlet red flower	Orange flower	Yellow flower	Scarlere flower	Orange flower
		Peak area percentage								
dl-Limonene	1022	0.21	5.17	4.55	0.10	4.16	4.23	0.10	5.05	4.39
Trans-β-ocimene	1037	0.22	1.79	4.43	0.12	1.77	4.06	0.12	2.80	4.22
Di-hydrotagetone	1090	0.33	1.45	1.96	0.21	1.01	1.05	0.23	0.97	1.18
3-methyl-benzylalcohol	1104	3.69	2.29	11.44	3.01	0.31	7.11	3.11	2.33	9.31
L-Linalool	1109	1.62	1.11	0.87	1.45	1.26	0.97	0.62	1.02	0.88
1,8-menthadien-4-ol	1176	0.56	1.49	1.55	0.47	2.33	1.33	0.33	1.12	1.57
Ocimenone	1203	1.57	3.01	2.12	1.44	2.89	1.88	1.35	3.32	1.99
trans-Geraniol	1220	16.89	19.88	16.98	12.21	14.34	11.34	14.94	16.63	14.73
Citral	1234	2.18	0.59	1.54	2.03	1.66	0.66	2.06	0.97	0.79
Piperitenone oxide	1346	1.16	5.77	0.02	1.06	4.55	3.57	1.01	5.87	3.12
Neryl acetate	1367	1.75	0.87	0.06	1.33	0.49	0.02	0.64	0.47	0.03
Trans-β-caryophyllene	1422	12.88	17.19	26.06	10.33	13.03	21.45	10.72	15.35	26.65
Germacrene-D	1476	0.35	0.38	1.14	0.11	0.56	0.92	0.23	0.44	1.02
1H—Cycloprop[e] azulen-7-ol	1532	3.22	1.33	2.04	2.86	0.69	1.35	3.18	1.56	2.44
(-)-Caryophyllene oxide	1583	30.54	6.51	9.98	24.56	7.08	11.67	30.61	9.12	11.86
Geranyl hexanoate	1656	3.39	1.19	2.29	3.39	2.17	2.45	1.31	1.09	2.20
2-Pentadecanone	1689	2.48	0.68	0.82	0.19	0.48	0.98	2.19	0.56	0.89
Neryl (*S*)—2-methylbutanoate	1789	1.03	0.14	2.69	0.41	0.25	2.89	0.12	0.11	2.14
2,2':5',2''-terthiophene	2232	13.97	3.26	3.46	13.97	2.87	3.19	10.79	3.26	3.54
Total identified (%)		84.07	70.84	90.54	65.28	59.03	77.93	72.87	68.78	89.41

*Relative retention indices to C9 to C24 n-alkane mixture.

Biography

Dr. Bhavya Bhargava is presently working as Sr. Scientist (Floriculture), at Department of Agrotechnology, Council of Scientific & Industrial Research- Institute of Himalayan Bioresource Technology, Palampur, Himachal Pradesh, India. He has a Ph.D. in Horticulture (Floriculture and Landscaping) from Dr. Y S Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh, India (2013). As a faculty of Agrotechnology, he is involved in teaching of different courses and also guiding the PhD students. He has published 36 research/ review papers in various journals of International and National repute, contributed 14 book chapter, several popular articles, and 8 institutional publications. He has attended 7 (International and National) conferences. He is leading various projects as Principal Investigator funded by various National funding agencies like CSIR, DST, MSME, MOEF&CC etc. He has delivered various lectures related to floriculture on TV and radio. Dr. Bhargava has received many awards from various societies and scientific organizations for his scientific contribution.

Starch Wall of Urea: Facile Starch Modification to Residue-free Stable Urea Coating for Sustained Release and Crop Productivity

Kanchan Swami and **Vijayakumar Shanmugam**

Institute of Nanoscience and Technology, India

A stable coating for urea fertilizer that impedes quick leaching, without the use of toxic linkers, remains a significant challenge. This study addresses achieving a stable coating without toxic linkers by employing starch, a readily available bio-polymer. The starch was modified with phosphates to enhance its properties, and eggshell nanoparticles (ESN) were added to reinforce the coating. The ESN offers a calcium ion binding site for the phosphate to cause bio-mimetic folding. The resulting coating exhibited a stable structure, with hydrophilic ends retained in the core and an excellent hydrophobic surface, as evidenced by a water contact angle of 123°. Moreover, the phosphorylated starch combined with ESN enabled the coating to release only around 30% of the nutrient content within the initial 10 days. This controlled release continued for up to 60 days, with approximately 90% of the nutrient being gradually released. The stability of the coating was attributed to its resistance to major soil factors, such as acidity and amylase degradation. Additionally, the incorporation of ESN increased elasticity, helped control cracking, and enhanced self-repairing capabilities, acting as buffer micro-bots. The application of the coated urea resulted in a notable improvement in rice grain yield, with an increase of approximately 10%.

Biography

Kanchan Swami is currently pursuing her Ph.D. under the supervision of Dr. P.S. Vijayakumar in Chemical Biology Unit, Institute of Nano Science and Technology, India. Kanchan Swami has received her Masters degree in Biotechnology from Maharishi Dayanand University, Rohtak. She is currently working on the coating of fertilizer with agricultural waste material for efficient controlled release and to improve the crop yield.

Electrical Study of Plants for Biosensing and Communication in Precision Agriculture

Lee Bar-On[1,2], **Yosi Shacham-Diamand**[1,2] and **Adi Avni**[1]

[1]Tel Aviv University, Israel
[2]IDC, Israel

Electronics and electrical conduction-based approach is introduced as a key for plant sensing. We suggest to incorporate a sensing method that follows the behavior in the plant vascular cambium, mounted onto the plant stem. Measurements are collected in a continuous manner, and changes examined in relation to induced external stress factors. The approach suggests examining the plant`s basic anatomy and physiology and applying physics and engineering modeling methods and measurement techniques that are adapted to the plant structure. This application is expected to allow a more rigorous assessment of plant physiological status in a quantitative manner that can be adapted for a complete electronic system of sensors in the future. Four-point-probe impedance spectroscopy has been suggested, modelled and employed in this research for ongoing measurements of *Nicotiana tabacum* plants in different environments. Results show that the method can be successfully applied to plant monitoring and integrated into a field system. The advances that this offers for improving plant and crop monitoring are expected to be extremely significant, thus providing a new approach to field monitoring and data collection.

Biography

Dr. Bar-On acquired her B.Sc. in Electrical and Computer Engineering–Electronic and Photonic Devices, and M.Sc. in Applied Physics from the Hebrew University of Jerusalem and her doctorate in Electrical Engineering at Tel Aviv University. During 2019 she was a visiting researcher at the Department of Electronics and Telecommunication at the Politecnico di Torino, Italy. She is currently a post-doctoral researcher at the IDC in the field of biosensor development. She has industry experience in the field of semiconductor devices as well. Nowadays Lee`s research focuses on new sensors for improving agriculture and introducing new technologies into the field of precision crop monitoring.

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In Vitro Regeneration and Bulbil Multiplication of *Squilla maura*: An Endemic Species of Morocco

Ibtisam Chakrane[1,2], Omar Chlyah[3], Said Boughribil[2] and **Meriem Mdarhri Alaoui[1]**

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[3]Laboratory of Plant Physiology and Biotechnology, Department of Biology, Faculty of Sciences, Mohammed V University of Rabat, Morocco

A high-frequency bulbils regeneration protocol was developed for Squilla maura, an endemic and endangered bulbous plant with significant ornamental and medicinal potential. Given its slow natural propagation rate, an efficient in vitro regeneration system was established to support conservation and large-scale production. Leaf explants were cultured on Murashige and Skoog (MS), half-strength MS (½MS), and B5 media, each supplemented with varying concentrations of auxins (naphthaleneacetic acid [NAA], 2,4-dichlorophenoxyacetic acid [2,4-D], indole-3-butyric acid [IBA]) and cytokinin (6-benzylaminopurine [BAP]). Callus induction rates ranged from 65% to 100%, with direct bulbils formation observed under specific conditions. The highest bulbils regeneration rate (85.5%) was obtained on ½MS medium supplemented with 2.22 µM BAP + 2.69 µM NAA. The multiplication phase on MS medium (8.88 µM BAP + 1.08 µM NAA) enhanced bulbils proliferation, yielding up to 104.33 bulbils per explant. The regenerated plantlets were successfully acclimatized, demonstrating high survival rates. This optimized protocol provides a sustainable approach to the conservation and commercial exploitation of this species, ensuring its availability for horticultural and medicinal applications.

Biography

Ibtisam Chakrane is a PhD student in Plant Biotechnology at the National Institute of Agricultural Research (INRA) and Hassan II University of Casablanca, Morocco. With four years of research experience, she specializes in *in vitro* culture techniques to enhance plant productivity and quality. Her research, conducted in collaboration with experts and research teams, focuses on optimizing micropropagation methods for large-scale plant production and extracting bioactive compounds from various species. Currently, she is developing *in vitro* regeneration protocols for ornamental and medicinal bulbous plants to support their conservation and sustainable use. She has presented her findings at scientific conferences and published in an international journal. Passionate about biodiversity conservation and plant biotechnology, she aims to contribute to sustainable agriculture and environmental preservation.

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LEDs Lighting as a Modulatory Key of the Temperature Stress Responses in Tomato Plants

Costantino Paciolla[1], Benedetta Bottiglione[1], Alessandra Villani[2], Martina Loi[2], Giuseppina Mulè[2] and **Angelo Parente[2]**

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[2]Institute of Sciences of Food Production, National Research Council of Italy (CNR), Italy

Light and temperature are environmental factors affecting growth and development processes in plant. Seedling quality is strongly influenced by environmental stress, including the important shift in temperature patterns determined by climate change. In the last decade, in addition to the different and conventional lighting types in greenhouses, the light-emitting diodes (LEDs) technology, including the possibility to choose the quality and quantity of lighting, has been very exploited. Under temperature stress conditions, the use of LEDs could allow to evaluate as the single monochromatic wavelength affects the plant defence responses identifying molecular targets involved in plants' resilience to temperature stress. In this study, seedlings of two varieties of tomato grown under thermal stress were analysed for some biometrical parameters and oxidative and antioxidative systems when specific monochromatic LEDs at different light intensities were applied. The analyses were carried out at the early growth stages of the seedlings. The study highlights how quality and quantity of the LEDs light differently affect biometrical, biochemical parameters and morphological characteristics. Plant growth was inhibited by blue-LEDs with respect to white and red-LEDs. No variation was observed with the light intensity increasing, and patterns were similar in the two tomato varieties. In blue light-treated seedlings, the biochemical analysis suggested the presence of oxidative-state. Future studies are needed to better understand how light conditions could potentiate the defense responses in tomato plants grown under temperature stress useful to improve crop productivity and stress resilience through a sustainable approach.

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Biography

Dr. Costantino Paciolla studied Biology at the Bari University Aldo Moro, Italy, and graduated as MS in 1987. After two years fellowship of Accademia Nazionale dei Lincei in Agricultural Genetics Studies, he obtained the position of permanent researcher and then of Associate Professor in Plant Physiology at the same institution. His research concerns the study of the redox homeostasis in plant cell under biotic and abiotic stress and the influence of light on antioxidant activity and photomorphogenic growth in plants of food interest. He has published more than 70 research articles in journals with impact factors present in Scopus database.

Biopiracy and Development of Plant Genetic Resources: Domestic Appropriations and Impacts on Women in the Global South

Irekpitan Okukpon

School of Law, University of Bradford, United Kingdom

The international framework for plant genetic resources such as the Convention on Biological Diversity (CBD) 1992, the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRA) 2001 and the 2022 Kunming-Montreal Global Biodiversity Framework embody various strategies for the conservation, development and utilization of biological resources and traditional knowledge. Despite this framework and State-wide implementation of these strategies, biopiracy remains a key challenge to the development, conservation of plant genetic resources and traditional knowledge systems. The exploitation of these traditional knowledge systems impact various indigenous communities, with women being the most affected by such exploitation in the Global South. Using a qualitative approach, with the scope of the paper focusing on selected country case studies in sub-Saharan Africa, this paper will examine how biopiracy affects plant genetic resources and the legal regulation of plant genetic resources. The paper will focus specifically on the causes, impacts and challenges which greatly affect women that influence traditional knowledge systems in consideration of plant genetic resources. The paper will conclude with the consideration that, whilst existing international strategies provide a basis for the regulation of biopiracy, the impact of biopiracy on women must be considered alongside equity and benefit-sharing considerations. The paper also recommends and expounds on the effects of the proposed draft UN biopiracy treaty on women in sub-Saharan Africa.

Biography

Dr. Okukpon is an Assistant Professor and Director of Research at the School of Law, University of Bradford, United Kingdom. With over 14-years of experience in higher education and research, she is an expert in the field of wider international environmental law, sustainable and inclusive waste management and development, and a global scholar. She has a PhD degree in International Environmental Law from the University of Cape Town

Dr. Okukpon has been involved in various research projects and curriculum development roles with international organizations such as the Kofi Annan International Peacekeeping Centre (KAIPTC), MacArthur Foundation, UNESCO, Open Society Foundation, International Labour Organisation and the United Nations Development Programme (UNDP).

She is currently an Academic Advisor to the Commonwealth Scholarship Commission (CSC), a founding member of the International Law Association Nigeria – Women in International Law and Development (ILA-WIELD).

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Optimization of Growth Media on the Yield of two Carrot (*Daucus Carota* L) Varieties Grown with Plastic Water Bottles in Nsukka Southeast Nigeria

Anozie C.C[1], Simon, T.C[2] and **Madu K[1]**

[1]Faculty of Agriculture, University of South Bohemia, Czech Republic
[2]Department of Crop Science, University of Nigeria, Nsukka

An innovative approach to utilizing waste plastic bottle containers as a production system was explored through a field experiment conducted from June to August 2024. The study aimed to ascertain the effect of different growth media compositions on the performance of two carrot (*Daucus carota*. L) varieties. The experiment was carried out at the Department of Crop Science, University of Nigeria Nsukka, and was laid out as a 2 x 3 factorial in a Completely Randomized Design (CRD). Factor A comprised two carrot varieties (Touchon Mega and Kurado), and factor B consisted of three media formulations; 2:3:1 soil-base, 2:3:1 Rice-husk base, and 3:3:0 Rice-husk base. A total of 60 containers made from 150cl Nestle water plastic bottles were used for the experiment. The data collected were subjected to analysis of variance (ANOVA) according to the CRD experimental design. The results revealed that the growth media significantly influenced yield ($p<0.05$), with the 2:3:1 soil-base formulation yielding the highest. Additionally, the carrot varieties exhibited significant differences, with the Kurado variety displaying a higher plant biomass yield than Touchon Mega. The study concluded that repurposed plastic bottles can be an effective container system for carrot production. Furthermore, the Kurado variety grown in either the 2:3:1 soil-base medium or the 3:3:0 Rice-husk base medium can be recommended as a suitable combination for optimal carrot cultivation in such containerized systems. These findings contribute to developing sustainable urban agriculture practices and promoting food security while addressing plastic waste management challenges.

Biography

Chukwunyere Chineche Anozie is a Research Assistant at the University of South Bohemia, Czech Republic, specializing in the application of artificial intelligence in crop production. He holds a Master of Science in Horticulture specializing in vegetable production, from the University of Nigeria Nsukka where his research

focused on agronomic and biochemical analysis of carrot varieties. His academic journey also includes a Bachelor of Agriculture in Crop Science. He is a senior Lecturer at the Department of Crop Science University of Nigeria Nsukka, With extensive research experience in ecological modeling, postharvest management, and precision agriculture, Chukwunyere has contributed to multiple peer-reviewed publications and conference proceedings. His current research explores AI-driven solutions for weed detection in crop production. A member of the Crop Science Society of Nigeria and the Horticultural Society of Nigeria, he actively participates in international scientific collaborations.

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Biodiversity and Sustainability: The Crucial Role of Mangroves in Coastal Protection

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[2]Department of Applied Geology, Guindy Campus, University of Madras, India

India's Biodiversity is a comprehensive framework aimed at conserving the country's rich biological diversity while promoting sustainable use of its resources and ensuring equitable sharing of benefits derived from them. It encompasses a wide range of strategies and initiatives, including habitat conservation, species protection, and the involvement of local communities in biodiversity management to foster an inclusive approach towards environmental stewardship. Mangroves play a crucial role in maintaining coastal ecosystems, providing habitat for diverse marine life and acting as natural barriers against erosion and storm surges. In Tamilnadu, the preservation of mangrove forests has become a focal point for conservation efforts, as these vital ecosystems support fisheries, protect coastlines, and enhance carbon sequestration, thereby contributing to climate change mitigation. These conservation efforts are not only vital for the health of marine and coastal environments but also serve as a foundation for sustainable livelihoods for local communities that depend on these resources. The mangroves are extremely beneficial to the local population because they produce beeswax, honey, and an abundance of seafood. They also prevent saltwater intrusion onto arable land, accumulate sediment as sea levels rise, and lessen the effects of seasonal droughts and monsoon floods. It is the main source of food and money for a large number of the impoverished residents that live in and around this forest, mostly from farming and fishing. The negative effects of climate change are becoming more pronounced, threatening the delicate balance of this ecosystem and jeopardizing the livelihoods of those who depend on it. Various steps are being taken to engage local populations in conservation initiatives, including community education programs and sustainable fishing practices that empower residents to take an active role in protecting their natural surroundings. These efforts not only aim to preserve the mangrove ecosystem

but also foster a sense of ownership among the community members, ensuring that they can continue to benefit from its resources while contributing to its sustainability. WWF is actively collaborating with local organizations to implement innovative strategies that enhance resilience against climate change, such as restoring degraded mangrove areas and promoting alternative livelihoods that reduce pressure on marine resources

Biography

Dr. M. Kanimozhi is currently serving as an Assistant Professor in Botany at Ethiraj College for Women in Chennai, Tamil Nadu. She has a total of 11 years of teaching experience at the postgraduate level and 3 years at the undergraduate level. Over the course of her career, Dr.M. Kanimozhi has published numerous research papers in esteemed journals and holds one patent publication. She possesses extensive expertise in the fields of Plant Physiology, Environmental Biotechnology, and Ecology. Additionally, she successfully completed TNSC ST projects and the Ethiraj College ECRIC project. Beyond her academic responsibilities, She actively contributes as the Convenor of the Enviro Club at Ethiraj College and as a volunteer in mangrove conservation efforts in collaboration with WWF.

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Proteomic Analysis Reveals the Molecular Pathways Responsible for Solar UV-B Acclimation in High-altitude Malbec Grapes

Germán Murcia[1], Leonardo Arias[2], Federico Berli[2], Flavio Muñoz[2], Ariel Fontana[2] and **Patricia Piccoli[2]**

[1]Fundación Instituto Leloir, Argentina
[2]Instituto de Biología Agrícola de Mendoza, Argentina

High-altitude grapevine cultivation offers a promising strategy for producing premium wines in the face of climate change; however, the proteomic modulation underlying solar UV-B acclimation in field-grown grapes remains unexplored. This study examines the effects of contrasting solar UV-B radiation (exclusion vs. fully exposed) on Malbec grape berries and leaves at different developmental stages in a high-altitude vineyard in Mendoza, Argentina (1350 m a.s.l.). By employing quantitative proteomics, we provide the first comprehensive analysis of proteomic changes in response to UV-B in high-altitude field-grown grapevine plants, uncovering novel molecular mechanisms of acclimation. We identified a highly tissue- and stage-specific proteomic response to UV-B, highlighting the dynamic nature of UV-B acclimation. At veraison, UV-B reduced photosynthetic activity in leaves while enhancing it in pre-veraison berry skins. Additionally, UV-B downregulated the abiotic stress response in pre-veraison berry skins but upregulated it at veraison. Notably, UV-B consistently altered primary and flavonoid metabolisms across tissues and developmental stages, enhancing the biosynthesis and accumulation of polyphenols with high antioxidant capacity. Furthermore, UV-B increased the abundance of UVR8 isoforms, leading to elevated levels of phenylpropanoid pathway proteins associated with anthocyanins biosynthesis in veraison berry skins. Chalcone isomerase emerged as a critical regulator of flavonoid biosynthesis under UV-B stress. Finally, we observed a shift in berry skins from a non-enzymatic to an enzymatic antioxidant defense strategy as they matured from pre-veraison to veraison. This study not only presents the first proteomic analysis of high-altitude field-grown grape berries but also provides insights into the molecular mechanisms driving UV-B acclimation.

Biography

Germán Murcia holds a degree in Agronomic Engineering from Universidad Nacional de Cuyo and a Ph.D. in Agronomy from Universidad de Buenos Aires. His academic journey includes serving as a professor of Biochemistry at both Universidad Nacional de Cuyo and Universidad de Buenos Aires. During his doctoral research, He focused on field-grown grapevine plants and the role of plant hormones in the transport of photoassimilates. Currently, He is a researcher at the Plant Molecular Physiology Lab at Fundación Instituto Leloir, under the leadership of Dr. Jorge Casal. Now, his principal area of interest lies in temperature and light signaling, where he explores the intricate ways that plants perceive and respond to environmental cues.

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The Role of Non-Crop Vegetation on the Diversity of Parasitoids in Irrigated Rice Fields

Simone Mundstock Jahnke and **Gisele de Souza da Silva**

Departament of Plant Heath, Faculty of Agronomy, Federal University of Rio Grande do Sul, Brazil

Farmers often see wild vegetation or protected areas such as forests as wasted areas, where they could be planting and producing, generating products and income. The vegetation in these areas, however, can act as a reservoir of natural enemies, capable of controlling pest populations in the crop. Irrigated rice fields can be suitable environments for establishing a high biodiversity of plants and animals, as aquatic and terrestrial habitats surround them. This work presents and discusses data on the influence of non- crop vegetation on the diversity of parasitoids, considering the distance of rice-growing areas from natural fragments, the management of the levee vegetation, and the management of the crop (organic – OM and conventional -CM). On the levees, there are several species of herbaceous plants from different families, such as Asteraceae, the most frequent, followed by Poaceae, Cyperaceae, Pontederiaceae, Convolvulaceae, and Malvaceae. The vegetation near the irrigated rice area is a riparian forest with many native tree species such as *Mimosa bimucronata, Erythrina falcata, Ficus luschnatiana Parapiptadenia rigida, Eugenia uniflora, Sebastiania commersoniana,* and *Luehea divaricate*. Comparing an area where the wild vegetation from the levees was cut (C) with another in which the wild vegetation was not cut (NC), the richness and abundance of parasitoids were greater in the NC area. The richness of parasitoids of the Scelionidae family was higher in the OM area, compared to the CM area. There was a negative correlation between the number of insects captured and the distance from the forest area for the C.M. which was not observed for the OM area. Possibly due to the role of the levee in the second area. The results show the importance of vegetation in non-crop areas in the presence of parasitoids associated with insect pests in rice cultivation.

Biography

Dr. Simone is a biologist (Universidade do Vale do Rio dos Sinos - UNISINOS), with a master's and a doctorate in Plant Science (Universidade Federal do Rio Grande do Sul - UFRGS). She received a pro-doc scholarship in 2006, at the Department of Zoology of the Institute of Biosciences of UFRGS (CAPES). Post-doctorate at the Leibniz-Institut für Agrartechnik Potsdam, ATB, Germany in 2017 (CAPES); Julius-Kuhn Institut, Dossenheim, Germany in 2022 (DAAD). She is a Full Professor in the Department of Plant Health of the Faculty of Agronomy at UFRGS. She is a permanent professor in the Postgraduate Program in Plant Science (UFRGS). Her areas of activity include the study of biology, ecology, and biological control of insects, especially parasitoid hymenoptera, and studies of diversity in agrosystems and natural systems aiming at conservative biological control.

On the Morning Appetite of Maize

Bruce B. Hicks and **Neal S. Eash**

Institute of Agriculture, University of Tennessee, USA

In 2010 the University of Tennessee Institute of Agriculture started a study of maize agriculture, initially in Lesotho but subsequently in Zimbabwe, Ohio and Tennessee. The focus was on fields of maize in the circumstances of local farmers, involving plots smaller than would permit reliance on eddy covariance methods for flux determinations. The classical Bowen ratio energy partitioning technique was adapted to avoid its major problem – its assumption of a local surface heat energy balance. Results include the following.

1. Biomass heat storage increases after dawn to 30 to 50 W m-2 shortly before noon. Most stored heat is returned through dusk.
2. Soil CO_2 effluxes accumulate in the surface stratification occurring at night. At sunrise concentrations can exceed 1000 ppm.
3. The accumulation of CO_2 is sporadically interrupted by incursions of air and/or turbulence from aloft.
4. In the morning, after PAR exceeds about 40 µmol m-2 s-1, photosynthesis commences. Respiration typically starts about an hour later, indicated by the switch of the surface layer from stability to instability.
5. Following sunrise, accumulated CO_2 is slowly drawn down until CO_2 concentrations equilibrate between the input from soil and the air above and the photosynthetic uptake. The CO_2 concentrations in the lowest daytime atmosphere are then below “background” and remain so until air temperature increases sufficiently to limit photosynthesis, at about 30 C.

6. CO_2 pools extend to 2 or 3 times crop height. This indicates that edge effects could be severe, with limited crop productivity in a band extending from the plot boundary to an inside distance of 2 to 3 times the crop height. Hence, decreases in the size of the plots of subsistence farmers will result in a reduction of net productivity.
7. Edge effects for maize should exceed those for soybeans. Stand by.

Biography

Bruce Hicks started using eddy covariance in field applications in 1961, while the methods were still in development. In the subsequent decades, he has continued his involvement in related agricultural and micrometeorological field studies, both as a participant and (in post-retirement) as an advisor to new experimental campaigns. Among other contributions, he initiated the adaptation of the infrared gas analyzer developed in Australia for water vapor flux measurement into the fast-response carbon dioxide sensor now commonplace. This work was done while he served in a leadership role in the NOAA Air Resources Laboratory.

The need for optimization of agricultural procedures associated with maize cropping in Africa was a focus of Prof. Neal Eash, who initiated the present series of field investigations. Upon review of the limitations of eddy covariance techniques, it was decided to employ a modification of classical Bowen ratio energy balance methodology rather than the more advanced, more widely promoted and more expensive eddy covariance technology. His decision in this regard has been justified in all of the studies of this long campaign.

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Low Temperature Plasma: An Emerging Green Technology for Seed Priming, Improving Plant Growth and Yield, and Food Safety

Srinivasa Rao Mentreddy[1], T. Pham[1], Sravan K. Sanathanam[1], Leopold Nyochembeng[1], Manikanta S. S. Kunisetty[1], L. Kassama[1], Armitra J-Davis[1], and **K.G. Xu[2]**

[1]Alabama A&M University, USA
[2]University of Alabama in Huntsville, USA

Low-temperature plasma (LTP) is a weakly ionized noble gas or ambient air comprised of free electrons and positively charged ions. It is increasingly used in agriculture for microbial disinfection of foods, enzymatic inactivation, enhancing seed germination, and plant growth, among many others. Three experiments were conducted to 1. evaluate low-temperature plasma (LTP) on seed germination, seedling growth, and biomass of microgreens using mustard greens as a test crop; 2. assess the effects of LTP on sprouting and plant growth of turmeric varieties known for poor stand establishment; and determine the optimal time of exposure of chicken skin and cold-smoked salmon to Helium LTP. **Experiment 1:** The mustard greens seeds were treated with Ar or He LTP for 0, 30, 60, and 90s and assessed for germination in Petri dishes with germination paper. Seeds treated with Ar or He APP germinated earlier and faster than Control. While Ar gas LTP-treated seeds germinated earlier than those treated with He LTP, the total percentage germination was greater in He gas APP treatment. **Experiment 2:** The plasma-treated rhizomes sprouted six to ten days earlier and achieved 100% sprouting nearly two weeks earlier than the untreated Control; they grew faster and were taller (37 – 39 cm) than the untreated Control (26-33cm) at 67 days after planting. The study showed that cold or LTP improves turmeric plant stand establishment and crop performance in open-field production. **Experiment 3:** Chicken skin treated with He LTP for 15 min reduced microflora and Salmonella by .98 log CFU/ml and 2.29 log CFU/cm2, respectively. A significant change in the lightness (L*) and yellowness (b*) after 10 min (6.22, -6.71) and 15 min (7.02, -10.88) of He LTP treatment. This study demonstrates

the feasibility of low-temperature plasma as a potential safe antimicrobial for the poultry industry. **Experiment 4:** The cold-smoked salmon (CSS) samples were inoculated with L. monocytogenes serovars: NADC 2045 serotype 4b, H7969 serotype 4b, and H7962 serotype and then treated with LTP at 4 kV for 0 (Control), 3, 6, 9, and 12 min. Exposure to LTP for 12 min significantly reduced L. monocytogenes population by 1.13 (± 0.15) CFU/g compared to Control [8.9 (± 0.1) CFU/g] (Fig. 3). The log reduction in pathogen populations increased with exposure time. The study demonstrated that LTP can be used to improve crop productivity and food safety which lead to food security and sustainability of agriculture. **This research project was supported by NSF EPSCoR OIA-2148653 and NASA EPSCoR 80NCCS21M0139.**

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 management 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 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 teaches agricultural science courses at the undergraduate and graduate levels.

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An Effective Integrated Approach for Managing Phytophthora blight (*Phytophthora capsici*) of Cucurbits

M. Babadoost

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Phytophthora blight, caused by *Phytophthora capsici*, is an important disease of cucurbits crops worldwide. Crop losses of 100% by P. *capsici* have been recorded in commercial cucurbit fields in Illinois. P. *capsici* can infect cucurbit plants at all growth stages, causing seedling death, vine infection, leaf spot, and fruit rot. No resistance in any of cucurbit crops to P. capsici has been reported. Therefore, management of this pathogen in cucurbit production is limited to cultural practices and applications of effective fungicides. Illinois produces approximately 14,000 ha of cucurbit crops annually and is the leading state in pumpkin production in the United States. *Phytophthora capsici* is the most important pathogen of cucurbit crops in this state. By using the following methods, we have reduced the losses of cucurbit crops from up to 100% to less than 3%. (i) Crop rotation with nonhosts for four years. (ii) Seed treatment with mefenoxam (Apron XL LS) prevents plant infection for five weeks from sowing seed. (iii) Removing infected plants (usually in low areas) in early growing season can prevent or slow down inoculum buildup of P. capsici. (iv) Using effective fungicides for preventing vine and fruit infection is essential. We have tested more than 50 potential fungicides for managing *P. capsici* in cucurbit crops. The following fungicides are effective against P. capsici isolates from Illinois: ametoctradin + dimethomorph (Zampro 525F), cyazofamid (Ranman 400SC), dimethomorph (Forum 4.16 SC), ethaboxam (Elumin 4SC), fluopicolide (Presidio 4SC), mandipropamid (Revus 2.09SC), and oxathiapiprolin + mandipropamid (Orondis Ultra). (v) Disinfestation of hands by washing with soap or wiping with ethanol after touching an infected fruit prevents spread of the pathogen to uninfected fruits.

Biography

Mohammad Babadoost is a professor of plant pathology and extension specialist at University of Illinois, Urbana-Champaign, United States of America. His program focuses on improving production of food crops for establishing food security in the world. In the past 20 years, Dr. Babadoost has participated in teaching, research, and extension/outreach programs in 43 countries; provided more than 4,000 publications to 127 agricultural institutes/centers in 71 developing countries; provided more than 120 invited presentations to scientists in more than 100 countries; trained/mentored 36 graduate students from 9 countries who are now servings at universities, research centers, and extension/outreach programs throughout the world; and supervised 17 visiting scholars in his program and assisted supervising more than 30 visiting scholars in other programs.

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World Congress on
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March 31-April 01, 2025

The Future of Pink Pine Nut Production in Mexico

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Mexico is a center of diversification of the genus Pinus, with pine nut stands out for its ecological, economic and food relevance. Among these, *Pinus cembroides* and *Pinus orizabensis* stand out for producing edible seeds of pink color, with a high nutraceutical value. These species start seed production at about 15 years of age.

Although the grafting technique is widely used in fruit, vegetable, ornamental and forest species for various purposes, it has not been applied to pine trees in Mexico with the aim of advancing seed production. This study was designed to evaluate the grafting and growth of *P. cembroides* (PC) and *P. orizabensis* (PO).

In April 2020, four species were used as rootstocks: *Pinus patula* (PP), *Pinus teocote* (PT), *Pinus greggii* (PG) and PC. The PP, PT and PG rootstocks were 2.5 years old, while the PC rootstocks were 4.5 years old. One month after grafting, the percentage of grafting success evaluated, and 12 months later, height and survival. The average of grafting success was 77.8% for PO and 85% for PC. Regarding height and survival, the average values for PO and PC were 17.82 cm and 14.21 cm, with a survival of 77.8% and 75.8%, respectively

Based on the results of 2020, in June 2023 grafts were again performed, this time exclusively from PC to PC. The scions were semi-ligneous. A cleft graft was used, with 90.6% of grafting success.

These results show that it is possible to obtain 70% of grafting success, and the use of rootstocks of the same species is recommended, as they produce more vigorous plants.

Biography

Engineer in Forest Restoration in 2012, by Universidad Autonoma Chapingo. Master in Forest Sciences with focus on nursery plant in 2016, by Colegio de Postgraduados and Doctor of Science in Plant Physiology by Colegio de Postgraduados in 2021. Honorary Doctorate for research work, focused on anatomical and physiological aspects in grafts of *Pinus greggii* var. *australis*. Seven years of experience in conventional and in vitro vegetative propagation in various species (blueberry, agave, avocado, citrus, vanilla, blackberry) of productive importance, plant production on nursery conditions, physical and chemical characterization of substrates.

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Differences in Growth and Survival of two Varieties of *Ochroma pyramidale* in Rustic Plantations in Southern Mexico

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Ochroma pyramidale (Cav. Ex Lam.) is a rapidly growing pioneer tree native to the Americas. This species is important for rehabilitating degraded areas as well as commercially due to the wood`s low density and high resistance, making it useful for producing structural cores and lightweight plywood, as well as in the wind energy industry. For at least 50 years, two varieties of this species have been recognized by botanists as well as the Lacandon people of Chiapas, Mexico. This study provides comparative data regarding three years of growth of the white and red varieties of *Ochroma pyramidale*, indicating ideal soil and climatic conditions for commercial plantations. The white variety had a greater rate of growth and thrives with a high average annual precipitation (2330–3236 mm) and Luvisol or Leptosol with a neutral pH and a high P content. The red variety appears to be the most widely used in other regions of the world, while the white variety is rarely used commercially.

Biography

His research is oriented towards the rescue of traditional ecological knowledge and its application for the rehabilitation and restoration of degraded agricultural areas and forest conservation, as well as the management and use of native species of economic interest. This approach is based on ethnobotanical research, traditional and commercial forms of forest use and management, the autoecological, synecological and successional study of plant communities, the landscape perspective and formal experimentation. He has 40 years of experience and has worked with Mayan peasant groups in southeastern Mexico.

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