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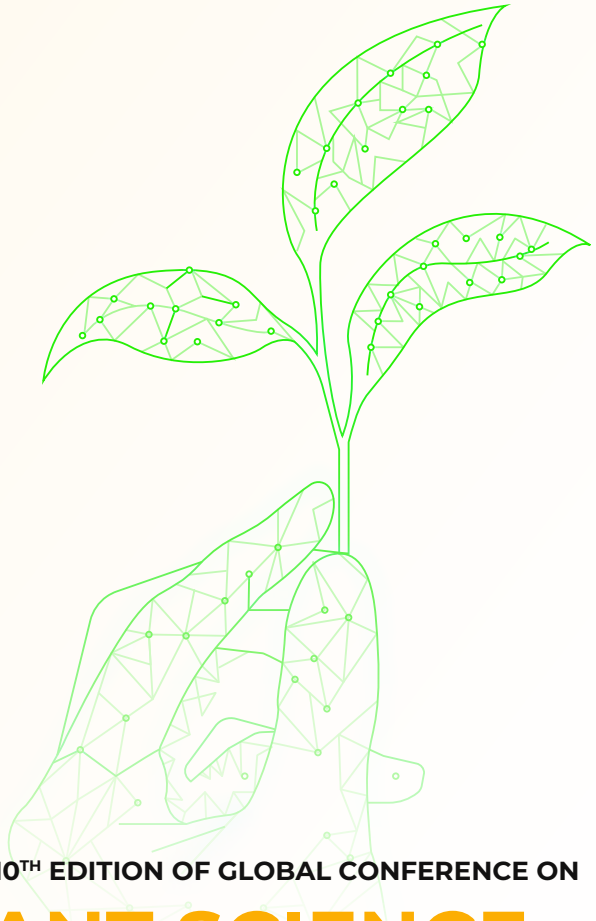

10TH EDITION OF GLOBAL CONFERENCE ON

PLANT SCIENCE AND MOLECULAR BIOLOGY

5TH EDITION OF GLOBAL CONFERENCE ON

AGRICULTURE AND HORTICULTURE

September 08-10, 2025

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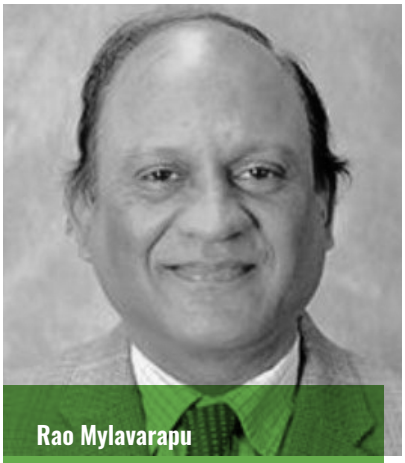

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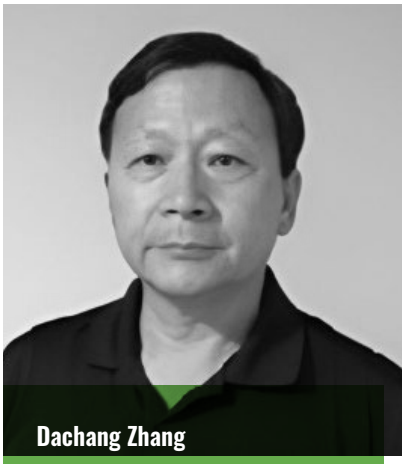

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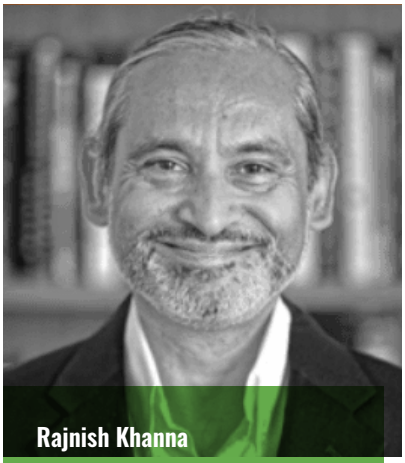

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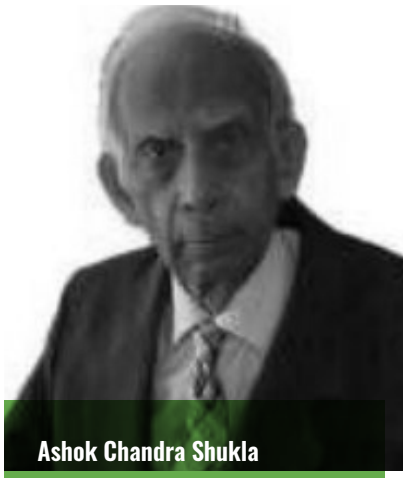

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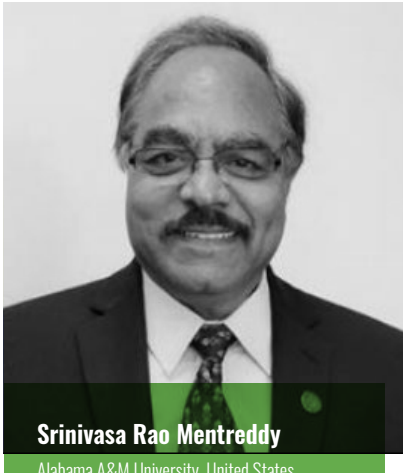

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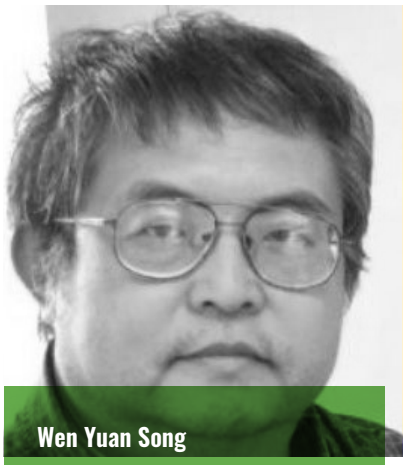

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Thank You All...

Welcome Message

Dear colleagues, innovators, entrepreneurs, policymakers, and friends,

As a member of the AGRI Scientific Committee, I warmly welcome you to AGRI 2025!

Agricultural and horticultural sciences are foundations of human sustainability. Today, we witness a paradigm shift: as information flows freely and AI empowers us to integrate knowledge beyond human limits, the focus of academic gatherings like AGRI is no longer just showcasing work results, but inspiring minds across disciplines.

At AGRI, 36 fields converge in an ecosystem of exchange. Here, cross-pollination of ideas fuels transformative innovation. As an old Chinese saying goes, Stones from other hills may polish jade—or in modern terms, Cross-pollination of Interdisciplinary thinking cultivates scientific revolutions.

As a case in point, I will introduce how Suitaiology, an emerging science of water strategy, builds a new cognitive paradigm to address the climate crisis with a systemic thinking of length, breadth, height and depth—from precise drought-flood control to designing ecological robustness—for sustainable agriculture and safe communities.

May the dialogues of these three days become a milestone on our journey beyond disciplinary boundaries and toward higher future successes.

Dachang Zhang, Ph.D.

Water & Eco Crisis Foundation, USA

Welcome Message

Dear Conference Attendees,

Welcome to GPMB 2025 at Valencia, Spain. As we gather at this conference, we face a critical need to upgrade the future of our global food system-for it to deliver healthy, nutritious foods under changing environmental pressures. Plant Science has an essential role to play, and it is paramount that scientists, industry, purveyors, and consumers come together. In collaboration, we can re-imagine the value chain from its current yield-driven motif to a design that values food quality and planetary sustainability. Plant Biology is poised to be at the core of this new paradigm, from innovation to impact. I look forward to meeting you in person or online and wish you a productive and enjoyable conference. I hope you also get some chance to explore Valencia during your visit.

Rajnish Khanna, M.Sc., Ph.D.

Carnegie Institution at Stanford University &
i-Cultiver, Inc.,USA

Welcome Message

Welcome to the 5th Edition of Global Conference on Agriculture and Horticulture, September 08-10, 2025 Valencia, Spain.

It is my pleasure and privilege to welcome each participant to the 5th Global Conference on Agriculture and Horticulture. Agriculture plays a vital role in feeding, clothing, and providing shelter to humanity, while horticulture enhances our health by supplying essential vitamins and minerals. Additionally, it beautifies our environment, creating aesthetically pleasing surroundings in which to live.

This conference brings together world-renowned scientists and experts from various fields of agriculture and horticulture on a single platform. With 36 technical sessions on agronomy, food science, aquaculture, horticulture, agri-business, clmate change, genetics, biotechnology and bioinformatics among many others. The conference aims to facilitate the exchange of scientific ideas and research findings, stimulate the development of research-based solutions for food safety and security. It also fosters networking opportunities, allowing researchers, scientists, students, and industry professionals to meet, interact, and build relationships.

Your participation and knowledge sharing are vital for ensuring food production, safety, security, and high-quality living. Together, we can expand the frontiers of science in our mission to feed the growing global population.

On behalf of the organizers and the program committee, I hope you find this conference both productive and enjoyable. I look forward to seeing you at the conference.

Srinivasa Rao Mentreddy, Ph.D.

Alabama A&M University, United States

Welcome Message

On behalf of the Scientific Committee, it is my distinct pleasure to welcome you to the 5th Edition of the Global Conference on Agriculture and Horticulture (Agri 2025), taking place in the vibrant city of Valencia, Spain.

This year's theme, Global Advances in Agricultural and Horticultural Science, serves as a dynamic platform for the exchange of cutting-edge knowledge, innovative practices, and critical discussions on the pressing issues facing the agricultural and horticultural sectors. The conference will encompass a wide array of topics, including Agricultural Engineering, Biotechnology, Precision Agriculture, Food Security, Climate-Smart Agriculture, and Sustainable Practices, among many others.

We are delighted to host a diverse gathering of researchers, practitioners, policymakers, and industry leaders from around the world. Whether you are attending in person or joining us virtually, we encourage you to take full advantage of the opportunities to connect, collaborate, and contribute to the advancement of global agricultural and horticultural science.

The Scientific Committee is eager to engage with you, learn about your inspiring work, and foster meaningful conversations that drive progress in our shared field. We hope your time at Agri 2025 is both intellectually rewarding and personally enjoyable.

We also encourage you to explore the rich cultural heritage and scenic beauty of Valencia, and to make the most of your visit during the pre- and post-conference days.

V P S Arora

Kumaun University, India

Welcome Message

Dear Conference Attendees of GPMB 2025,

It is my great pleasure to welcome you to attend 10th Edition of Global Conference on Plant Science and Molecular Biology (GPMB 2025) the session entitled Environmental Health Impact Assessment (EHIA) process for tobacco processing plants. Environmental health impact assessment refers the attempt to predict and assess the impact of tobacco development projects, programs, plans, policies, and legislative actions on the environmental health. A component dealing with human health is called an environmental health impact assessment. Environmental health impact assessment emphasizes opportunities for the protection and promotion of environment and human health. EHIA aimed to improve human health in the process of environmental impact assessment. It is recommended that there should be provision of dedicated EHIA education, planning and decision making, policy programs, training and development programs. This session will provide an opportunity for participants to gain knowledge of the challenges and potential solutions to problems that can arise with acute and chronic tobacco diseases in processing plants. Tobacco monitoring and control is suggested for prevention through influencing the four main behavioural risk factors such as tobacco use, unhealthy diet, physical inactivity and harmful use.

Dr. Vijayan Gurumurthy Iyer

Techno-Economic-Environmental Study and Check Consultancy Services, India

ABOUT
MAGNUS GROUP

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

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

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

ABOUT

CPD Accreditation

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

Some benefits of CPD credits include:

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

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

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

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

Note: Each conference attendee will receive 39+ CPD credits.

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KEYNOTE PRESENTATIONS

Ahmad Ali

Postdoc Research associate fellow, Center for Biological Control, College of Agriculture and Food Sciences, Florida A&M University, 1740 South Martin L. King, Jr. Blvd., 123 South Perry Paige Bldg., Tallahassee, FL 32307-4100

Development and application of biocontrol mechanism of cucumber fusarium wilt: Harnessing microbiome engineering for sustainable horticultural production systems

Horticulture production requires high inputs of pesticides to control destructive pathogens. However, the recent rules on plant protection are promoting alternative means to synthetic pesticides as a result of environmental pollution, residues in agricultural products and pathogen resistance to pesticides. Currently, the control of plant pathogens in horticulture is facing new challenges for adapting the new pathogen control strategies to meet consumer demand. Therefore, developing integrated biological methods and exploring microbial-mediated disease suppression have become crucial for sustainable production. In this context, soil microbial communities are fundamental drivers of ecosystem function, playing a crucial role in maintaining soil health, enhancing crop productivity, and managing soilborne diseases. In horticultural systems, particularly under intensive cultivation, these microbial assemblages can either suppress or support plant health depending on their composition and functional potential. With rising challenges in sustainable cucumber production—such as soil degradation, nutrient imbalances, and increased pathogen pressure—understanding and manipulating the soil microbiome has become increasingly essential.

This presentation explores the dynamic interactions between horticulture-associated microbial communities and their role in sustainable cucumber production systems.

Biography

Dr. Ahmad Ali earned his Ph.D. in Horticulture–Vegetable Sciences and currently serves as a Postdoc Research Fellow at Florida A&M University. He previously completed postdoctoral fellowship at Nanjing Normal University, China, and the University of Florida, USA. His research focuses on Improving the vegetable production through sustainable crop and soil management strategies, soil microbiome dynamics, plant–microbe interactions, and the biocontrol of soil-borne pathogens in vegetable cropping systems. Dr. Ali has published over 25 peer-reviewed articles and presented at several international conferences, contributing to sustainable agriculture through soil health improvement and microbiome-based disease management.

These integrative roles offer unique opportunities to steer soil microbial communities in favour of plant-beneficial traits. The research highlights how targeted soil management practices—such as organic amendments, biological amendment and microbial inoculants—can enrich beneficial microbial taxa and functional groups associated with nutrient cycling, disease suppression, and plant growth promotion.

By employing advanced soil microbiome analysis techniques, including high-throughput sequencing and quantitative PCR, we investigate the shifts in microbial diversity, structure, and function under different soil and crop management practices. Our findings reveal that specific microbial consortia are closely linked with improved cucumber yield, enhanced nutrient availability, and reduced incidence of soilborne diseases. Furthermore, we demonstrate how microbial indicators can serve as early predictors of soil health status and crop performance.

The presentation will provide a comprehensive overview of how manipulating microbial communities contributes to sustainable horticulture, particularly in high-value vegetable crops like cucumber. Special attention is given to the application of microbiome-based strategies for biological disease management, where promoting antagonistic microbes and disrupting pathogen niches offer eco-friendly alternatives to chemical controls.

Overall, this research contributes to a better understanding of the ecological functions of soil microbial communities in horticultural systems and provides practical insights into microbiome-informed management practices. These findings support the development of resilient, productive, and sustainable cucumber production systems by leveraging the power of beneficial microbes. The integration of soil microbiome science into protected cultivation has the potential to revolutionize how we approach crop management, making it more biologically driven and environmentally sound.

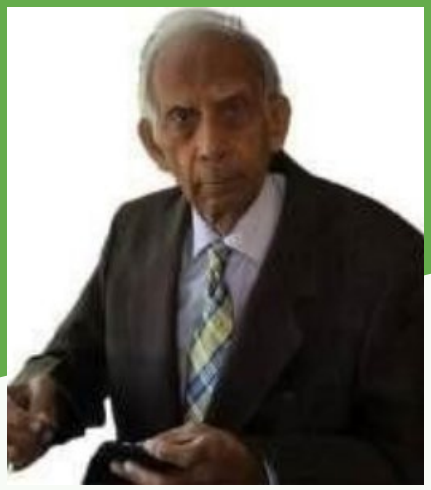
Ashok Chandra Shukla

Independent Scholar, Deo-Bhawan, Faithful Ganj, Kanpur-208004, U.P., India

Eternal Ganga riverine ecosystem: A marvel of self-purification of water

Ganga is the life line of Indo-Gangetic Plains. It's water is known for purity and spirituality and can be stored for long periods without getting stale or polluted. Ganga water is used in various religious rituals from birth of a child to demise, besides serving as a source of water for industry, agriculture and livelihood. The legends say Ganga water is known as Holy water and connects life of humans, forming a spiritual bridge leading to divine salvation in India. Naturally, what Volga is for Russians, Thames for Brits and Murray-Darling for Americans, Ganga is much more for Indians. The tremendous self-purification capacity of Ganga water is unique and has remained a mystery and a puzzle for environmental scientists. This paper discusses the role of algae and planktons together with other factors working in unison as X-factor in Ganga Eco- system bringing about such self-purification of water.

Biography



Dr. Ashok Chandra Shukla headed the Biopollution Study Centre at Christ Church College, Chhatrapati Sahu Ji Maharaj University in Kanpur, India. Shukla is a former Member and Chartered Biologist of the Institute of Biology in London. He is Senior Visiting Fellow of University of New England, Armidale Australia, at the Program in Arms Control, Disarmament and International Security at the University of Illinois at Urbana Champaign. He has evaluated project reports of NCOEB conference, AICHAE Women Conference, AIAPC conferences, India, report of GAP Government of India between Kannauj-Shuklaganj and various project evaluation reports. He Chaired Session of Environmental Politics, Wetland Millennium, Quebec, Canada. Shukla brings with him a vast experience of active engagement with NGOs and Civil Society. Shukla has collaborated and networked with several NGOs including Eco-Friends India as its founder President on issues of Ganga Water Pollution and its public health implications. He was Executive Conference Secretary of another NGO, Midas Touch, Delhi in India. He has traveled widely

in connection with participating, chairing sessions, and acting as discussant at international conferences. He was on the ISA delegation at the UN Prep Com Meet wherein he deliberated between GO and NGO delegations to prepare agenda for the meet. Shukla has completed a major project, the Ganga Action Plan, for the Ministry of Environment and Forests of the Government of India, and he was associated with a Ford Foundation-funded project of the Regional Center for Strategic Studies in Colombo, Sri Lanka, working on the India chapter of Environment and Security in South Asia. Shukla is credited with over 250 research publications and several original and edited books. His book Water Security of India: Hope, Despair and Challenges of Human Development is on the shelf, and Security Community in the Persian Gulf and South Asia, under publication. He is currently also involved writing a book entitled A Journey of a River: Ganges. Shukla Specializes in applied phycology, environment and environmental policy-planning.

Chow Kheong Keat

School of Life Sciences & Chemical Technology,
Ngee Ann Polytechnic, Singapore

Beyond high-tech: Finding the right solutions for sustainable vertical farming in Singapore

Singapore faces a pressing challenge in securing its food supply amidst rapid urbanization, climate change, and land scarcity. Historically reliant on food imports—constituting 90% of its consumption—the nation has aggressively pursued urban agriculture and vertical farming to bolster local food production. However, despite government incentives, high-tech farming faces persistent challenges, including high operational costs, limited scalability, and weak consumer demand. While local vegetable production fluctuated between 4.8% and 10% from 2000 to 2020, the economic contribution of local vegetable production remains minimal.

With only 1% of land allocated for agriculture, farms struggle with high rental costs. Energy expenses are another major hurdle, as indoor vertical farms rely heavily on artificial lighting and climate control, driving up electricity costs. Additionally, the sector faces labour shortages, requiring specialized expertise that further inflates operational expenses. Despite substantial government support, funding remains a challenge. With private investment in agritech falling, and along with regulatory barriers business viability has slowed. Moreover, weak consumer demand for local produce exacerbates the struggle, with imports often undercutting local prices.

An overreliance on technology without addressing business sustainability has led to mixed outcomes. Vegetable farms struggling under the weight of high-tech investments, fail to yield returns. The emphasis on cutting-edge farming fail to balance with practical, cost-

Biography

Mr. Chow Kheong Keat is a trainer, researcher, and consultant in urban agriculture, plant nutrition, and controlled environment agriculture. He holds a degree in Agricultural Science from La Trobe University, where he researched hydroponic strawberry cultivation for his Master's degree. He later earned a Master of Philosophy (Education) from the University of Durham, UK. With over 30 years of experience spanning academia, commercial farming, and industry collaborations, Mr. Chow has made contributions to the fields of hydroponics, vertical farming, and sustainable agriculture. In addition to his research and consultancy work, he is a certified adult learning trainer, regularly conducting hydroponic training courses.

effective strategies. To navigate these challenges, Singapore's agritech sector must focus on scalable solutions and energy-efficient innovations. The Northern Agri-Tech and Food Corridor exemplifies efforts to create an integrated ecosystem supporting vertical farms, aquaculture, and livestock operations. However, long-term success requires more than just infrastructure development and technological advancements—it demands a holistic strategy that considers economic viability and consumer engagement.

As Singapore pursues its ambitious 30x30 goal, will stronger public-private sectors collaboration and reliance on high-tech solutions, help it to overcome barriers and achieve sustainable vertical farming? The journey toward food resilience is complex, but with the right balance of innovation and practicality such as searching for the right technology, perhaps only then Singapore could build a sustainable vertical farming industry.

Costantino Paciolla*, Benedetta Bottiglione

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Thermal stress resilience in plant grown under LED lights

Plant growth is affected by different environmental factors, including spectral light and temperature. In the last few years, great attention has been paid to climate changes due to shifts in temperature pattern. The use of Light-Emitting Diodes (LEDs) is an interesting and useful approach in controlled environment such as greenhouses, if compared to conventional light sources. This technology enables choosing a specific wavelength and intensity and identifying spectral recipes that could help the plant to counteract temperature stress. In this study, two cultivars of tomato seedlings (Mola and Regina) grown under white and red LEDs were analyzed to evaluate if they were resilient to thermal stress. The following light and intensity combinations were selected: white light at 100 µmol m^{-2} s^{-1} and 200 µmol m^{-2} s^{-1}; red light at 100 µmol m^{-2} s^{-1} and 200 µmol m^{-2} s^{-1}. The selection of the best LED light and its intensity were made considering previous data obtained in the first year of the project, where the blue light treatment was excluded due to a poor germination rate, low visual quality, and lower biometric and biochemical parameters. By monitoring biometrical characteristics (root and aerial part growth) and antioxidative responses (ascorbate-glutathione cycle), significant differences were found between the two cultivars. This result underlines that narrow-band blue and red LEDs differently affect plant metabolism and strengthen defence responses. On the other hand, the obtained data will be further analyzed via analysis of variance, to evaluate the presence of single and interacting effects of the selected lights (red and white

Biography

Dr. Costantino Paciolla studied Biology at the Bari University Aldo Moro, Italia 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.

LED), their intensities, and the cultivars.

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Suitaiology: Technical goals and general concept designing for applications in mountain areas

Water is the source of life, but driven by natural forces, its natural characteristics manifest as a process of planation that reshapes the terrain. Therefore, the humanistic pursuit based on existing patterns inevitably leads to conflict with this process. As a complement to traditional hydrology, the core of Suitaiology lies in systematically understanding the dominant role of water within the WHE system composed of water-humans-environment, as well as the interactive situations among its members, seeking to turn adversaries into allies and transform disastrous situations into favorable ones harmoniously to achieve sustainable development beneficial to humanity. This discussion here primarily focuses on topics related to agriculture.

Mountainous areas serve as the water source for watersheds, but they are also the origin of water-related disasters. Taking this strategic location as an example, my previous speeches in ARGI have gradually uncovered how water, through dimensionality reduction strikes, undermines the ecological foundation, leading to secondary geological disasters and resulting in floods. From a suitaiologic point of view, the optimal engineering approaches must be system-centered, guiding actions based on circumstances, and transforming situations through dimensional elevation and dynamic adjustment to eliminate secondary geological disasters, create water resources, and protect and promote the environment and agricultural development of the entire watershed.

Biography

Dr. Dachang Zhang received his B.S. and M.S. degrees in hydrogeology & Engineering Geology from the Changchun Institute of Geology and Chinese Academy of Sciences in 1982 and 1985 respectively, then became a researcher at Chinese Academy of Sciences. After his PhD degree in geography from the University of Vienna in 1996 with significant contributions to a national water project of Austria, he was a postdoctoral fellowship and researcher at the University of Waterloo, Canada from 1997-2000. And then, he worked as a consultant in Canada and U.S.A. and become a License Professional Geologist of the State of California since 2007. He also worked for the University of Bijie, China, as a Professor and the Deputy Dean of the Academy for Bijie Experimental Region, focusing on water management and rural development in impoverished mountainous areas from 2008 to 2014. He is the Founder and President of the Water &Eco Crisis Foundation, USA, since 2010. Since 2012, Dr. Dachang Zhang and his team set out to create a new water science—Suitaiology, which was first officially released at the

Traditional reservoirs will act as CPUs, storing and distributing surface water resources on a large scale downstream. Traditional soil and water conservation facilities will evolve into part of a three-dimensional network of ultra-micro reservoirs. These ultra-micro-reservoir systems will play the role of GPUs, converting rainfall that would normally lead to soil erosion into underground micro-water sources, thereby alleviating the pressure and risks posed by extreme climate events on traditional reservoirs, and supporting the development of mountain ecology and agriculture. The entire engineering system can be regulated by AI to automatically adapt to climate change and take into account the complex needs of humans and the environment in temporal and spatial changes.

Keywords: Water Problems, Suitaiology, Situation, Water-Huma-Environment (WHE), Water Resource Creation.

1st Edition of Global Conference on Agriculture and Horticulture (AGRI 2021) in 2021.

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

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

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

Biography

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

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

Linas Balčiauskas*, Laima Balčiuskienė

Laboratory of Mammalian Ecology, State Scientific Research Institute Nature Research Centre, Vilnius, Lithuania

Micromammal diversity and health in agricultural landscapes: A focus on body condition

Agricultural habitats play a complex yet increasingly important role in maintaining small mammal diversity. Although they are traditionally considered biodiversity-poor due to intensive land use and fragmentation, long-term studies in mid-latitude regions, notably Lithuania, show that these landscapes can support a wide range of micromammal species. Meadows and disturbed agricultural areas often have high species richness and harbor individuals with relatively high body condition indices, especially generalist and granivorous species, such as striped field mouse (*Apodemus agrarius*) and common vole (*Microtus arvalis*).

These habitats provide essential food resources, seasonal cover, and ecological corridors that support population persistence and dispersal. However, the species composition of these habitats is sensitive to agricultural practices. Monocultures and pesticide use reduce diversity, while heterogeneous landscapes with fallow land, crop margins, and mixed crops promote it. Despite their human-made nature, well-managed agricultural habitats can serve as reservoirs of micromammal diversity and as buffer zones against habitat loss elsewhere, particularly when incorporated into broader landscape conservation planning.

This study examines the diversity and physiological state of micromammals in agricultural landscapes, with a focus on Body Condition Index (BCI) as an indicator of health and ecological fitness. Using long-term data from Lithuania

Biography

Linas Balčiauskas is a leading Lithuanian mammalogist and the head of Laboratory of Mammalian Ecology, Nature Research Centre, Vilnius, Lithuania. Over the course of his career, he has authored more than 90 research articles in SCI(E) journals and approximately 200 in other peer-reviewed publications, delivered over 200 presentations at conferences and leaded over 50 commissioned research and experimental development projects. His research interests encompass various aspects of mammalian ecology, human dimensions of mammals, and citizen science. He serves as an expert in several IUCN specialist groups, mentors doctoral students, and actively participates in the editorial processes of several scientific journals.

(1980–2024) covering over 28,000 individuals from various habitats, we examined BCI differences among species, sexes, ages, and reproductive statuses. We observed significant variation in BCI among habitat types. Disturbed and agricultural areas often supported individuals in better condition, while fragmented and shrub habitats were associated with individuals in poorer condition. Our findings demonstrate that reproductive stress consistently reduces BCI in adult females and males. Granivorous and omnivorous species, particularly those that consume animal matter, tended to maintain higher average BCIs. Several species, including shrews, exhibited rare cases of extreme BCI values and the Chitty effect. These results provide the first multi-species, habitat-wide insight into micromammal body condition at mid-latitudes. They highlight the utility of BCI as a metric for monitoring ecosystem health in agricultural environments.

Michael Davidson PhD

ChucaoTech Asia-Africa/President, Pasadena, CA, United States

The efficacy of nano bubble technology to improve plant production across all crop types

Nano bubbles are oxygen-filled particles of water with a diameter less than 200 nanometers, are electrically charged with a hard shell and provide an exponentially larger surface area than 0.1 mm bubbles. Oxygen-nanobubble significantly increase the dissolved oxygen concentration of water. Nano-bubbles are hydrophobic, do not precipitate out, and can be applied in every water delivery system and every crop. This session will unpack the science and benefits and cost points of using nano-bubbles for irrigation and explain how the technology reduces pathogens in the root zone, reduces surface compaction, mobilizes salts below the root zone, and reduces surface tension of water molecules for improved water and nutrient efficiency. In addition, this session will present peer-reviewed literature showing evidence that nano bubble technology reduces GHG methane, carbon, and nitrogen emissions in cattle feed and manure, and in all crops. Nano bubble technology increases crop yields and, importantly, horticultural caliber such that a significantly and positively increase in quality of fruit is produced.

Biography

Michael Davidson is a senior expert and practitioner in climate-smart agriculture (CSA), having worked for more than 40 years as a farmer, teacher, researcher, scholar, irrigation consultant and business owner. He currently is the Global Manager for ChucaoTech Asia-Africa. He hold a PhD in Public Policy with an emphasis on policy interventions to enhance irrigation efficiency in semi-arid and arid regions. He served as a CSA consultant for the International Finance Corporation of the World Bank in sub-Asia and West and East Africa, the German Development Fund in Palestine, the Sustainable Trade Initiative in Viet Nam, and the Inter-American Development Bank.

Rajnish Khanna*

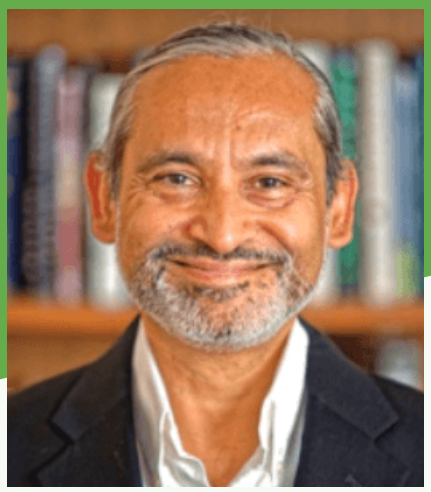
Founder & CEO, Research and Development, i-Cultiver, Inc., Manteca, CA, USA

Senior Investigator, Department of Plant Biology, Carnegie Science, Stanford, CA, USA

Deciphering the mechanism of action of complex agricultural inputs for the future of a nutritious and globally sustainable food system

There are many products in the market, and each product claims to be superior to all the other products in performance–but how do we know that is true? The agricultural marketplace is driven through marketing capabilities rather than actual product efficacy or sustainability. Better performing products may eventually stay longer in the market, but most of the product claims are exaggerated, which inevitably fail in broad-acre applications, causing severe loss-of-income for farmers and undesired environmental consequences. It is difficult to regulate product claims, leaving a gap in the industry. On the other hand, high level basic research capabilities exist in institutes and universities, but it is largely out of reach for commercial product verification and peer-reviewed publication. A new model to bridge the research gap between the two sectors will be presented. Developed and established in the past six years, it allows industry access to independent research for product verification and provides a unique platform for technology transfer from academia to market. Examples will be shared on mode-of-action research (with commercialized products), and on technology transfer (with new inventions). The need for implementing a new independent research paradigm is urgent to identify beneficial technologies methodologically for building actionable portfolios to overcome pressures on plant performance, like disease and drought stress,

Biography



Rajnish Khanna, M.Sc. Ph.D., is a Senior Investigator at Plant Biology, Carnegie Institution for Science, Stanford. Rajnish is the founder and CEO of i-Cultiver, Inc and co-founder and Executive Director of Urban Green Project. He is a strategic biotechnology consultant applying multidisciplinary approaches for research and development. Known for empowering the industry through strategic partnerships with academic institutions, facilitating technology transfer into real world applications, and deploying advanced technologies at global scale for agro-eco projects. Rajnish is the host of TerreScience podcast/ YouTube channel focused on soil and planetary health.

and improve nutrition and productivity in broad growing systems. Academia and industry collaborations together will lead the emerging trends in plant science. This is an essential step for achieving positive impact on society, local and global economies, and collectively on our planet for generations to come.

Jalpa L[1], Sharma, S[2], Dr. Rao Mylavarapu[3*]

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Nitrogen release rates from controlled release fertilizers

Controlled-Release Urea (CRU) fertilizers are increasingly adopted in horticultural systems to improve nitrogen-use efficiency and minimize environmental losses. Nitrogen (N) release rates through the crop growth period dictates the uptake efficiency of applied CRF formulations. This study investigates the N release dynamics of two CRU formulations, CRU-60 and CRU-75, across three growing seasons.

N release rates and patterns were quantified and compared using a field and a laboratory method. Through biweekly samplings of buried mesh bags with the mix of formulations in the field, rates of release were determined using the weight loss method all through the three seasons. The data were analyzed to evaluate seasonal trends and formulation differences. Results indicate that CRU-60 consistently demonstrated faster N release compared to CRU-75, a trend that aligns with their respective design durations (60 vs. 75 days). By the end of each growing season, cumulative N release for CRU-60 ranged from approximately 55.8% to 86.7%, while CRU-75 ranged from 26.7% to 83.5%, depending on the season. These differences were statistically significant ($p<0.05$) across all three seasons.

In the laboratory method, the formulations were subjected to high-temperature (100°C) and incubated to determine

Biography

Dr. Rao Mylavarapu is a Professor, and the state lead for Sustainable Nutrient Systems program in Soil, Water & Ecosystem Sciences at the University of Florida, with >35 years of research, teaching and extension experience in enhancing crop productivity and environmental quality. His work focused on crop use efficiencies of both N and P, along with other nutrients. He received >$22 million in collaborative grant support and has authored 8 book chapters, >80 refereed and >50 research articles and 200 extension publications. He chaired nearly 30 graduate student committees, mentored ten post-doctoral researchers and >200 undergraduate students in his programs.

the maximum potential release rates under accelerated conditions. Under these conditions, CRU-60 reached nearly 80% N release within 73 hours, while CRU-75 achieved approximately 40% over the same period. Notably, the cumulative release of CRU-60 reached nearly 80% in laboratory conditions and ranged from 55.8% to 86.7% in the field, indicating that both methods captured comparable total N release, with field variability primarily influenced by seasonal temperature differences across seasons. On the other hand, CRU-75 showed a slow and steady release pattern in both environments. Polynomial regression analysis was used to model the N release trends over time for each treatment. Despite environmental differences, both field and lab methods showed strong polynomial fits (R^2>0.94), highlighting consistency in formulation-dependent release behavior.

The comparison between methods underscores the importance of both environmental factors and formulation design in determining nutrient availability. These findings support more informed selection of CRU formulations tailored to specific crop cycles and production systems, particularly in high-input vegetable systems where timing of nutrient release is critical.

Biography

Richard Dick

School of Environment and Natural Resources, Ohio State University, Columbus Ohio, USA

Shrub-intercropping hydraulic lift: Bio irrigating crops and driving soil microbial functions in semi-arid West Africa

Recurring in-season drought, exacerbated by climate change, threatens food security for the majority rural small farm holder households of the Sahel, West Africa. Furthermore, the region is plagued with degraded soils due to population growth and concurrent intensification of crop and livestock production. Our team has discovered an innovative and appropriate system to address this challenge for the Sahel–the Optimized Shrub-intercropping System (OSS) that utilizes *Guiera senegalensis* or *Piliostigma reticulatum* as companion plants to crops that are found in farmers' fields and native to the Sahel. Our previous research found that OSS significantly reduced drought stress from which we hypothesized that this response could be due to Hydraulic Lift (HL) (movement of water via deep roots from wet sub-to dry surface-soil at night). Water balance studies supported HL of OSS but to confirm that HL was beneficial for crops, an in-season simulated drought experiment where pearl millet (*Pennisetum glaucum*) was grown (in the presence or absence of *G. senegalensis*) with sufficient irrigation until early flowering and then water was withheld for 41 days until harvest. At the same time the fate of enriched deuterium (2H) water applied to G. senegalensis roots (1 m depth) was tracked into shrub and millet leaves. Twelve days after irrigation was stopped, water potential in both plus and minus shrub plots was <-3.0 Mpa. Sole millet produced no panicles whereas millet plus shrub produced panicles and had 900% greater biomass than sole millet. More profoundly, G. senegalensis transferred isotopically labeled HLed water to adjacent millet plants-meaning shrubs are bioirrigating crops. Our

Richard Dick is an Ohio Eminent Scholar and Endowed Professor of Soil Microbial Ecology at Ohio State University. His research focuses on microbial communities in controlling biogeochemical processes and delivering ecosystem services for agricultural and environmental applications. The research program discovered enzyme assays that are sensitive soil health indicators. Dr. Dick has authored 161+ journal articles, 17 invited book chapters, and 2 books as the editor-in-chief. He was elected as President and held other positions for the Soil Science Society of America (SSSA) and served as editor for several journals. He worked as an agronomist for 3 years in Bangladesh, and has lead research and development projects for >20 years in West Africa.

other research has shown that the microbial community is maintained and active throughout the dry season in soil influenced by shrubs, which is attributed to HL, and litter and root turnover of C inputs. This is a very practical outcome because decomposition proceeds throughout the long (>9 mo) dry season, mineralizing and accumulating available nutrients accumulates for the subsequent crop, changing the paradigm that organic matter decomposition can only occur during the rainy season of a semi-arid environment. These findings are very significant as they open up a whole new avenue of bioirrigation for semi-arid crops. This is of particular importance for subsistence farmers because *G. senegalensis* is locally available throughout the Northern Sahel and that it can co-exist in cropped fields because farmers use animal traction and manual labor.

Prof Shashi Vemuri*

Food Hygiene Bureau of Jamaica

Food allergens and intolerance

Adverse reactions to foods, aside from those considered toxic, are caused by a particular individual intolerance towards commonly tolerated foods. Intolerance derived from an immunological mechanism is referred to as Food Allergy, the non-immunological form is called Food Intolerance. IgE-mediated food allergy is the most common and dangerous type of adverse food reaction. It is initiated by an impairment of normal Oral Tolerance to food in predisposed individuals). Food allergy produces respiratory, gastrointestinal, cutaneous and cardiovascular symptoms but often generalized, life-threatening symptoms manifest at a rapid rate-anaphylactic shock. Specific food intolerance needs to be distinguished as those who are affected have an aversion to numerous foods. Even in cases where specific food intolerance can be demonstrated, the diagnosis of food allergy depends on additional evidence that the patient's reaction is based on an abnormal immunological response. It is difficult to show a connection between individual foods and an allergic response--as in patients with urticaria provoked by food additives--one of the reasons for diagnostic difficulty is that the offending substances may be present in a wide range of common foods. If the diagnosis is to be firmly established in such cases, it is necessary to show that symptoms remit on an elimination diet and recur after a placebo-controlled challenge.

Biography

Prof Shashi Vemuri studied Insect toxicology and pesticide residues in Agricultural University, Hyderabad India for the doctoral programme in 1980-83. He then joined the Teaching and research group of the University. He has published more than 150 research articles and was Senior Professor and Head of Entomology. Since last 10 years he is with food hygiene bureau of jamaica and working on food safety security, food wastage and hunger etc.

Srinivasa Rao Mentreddy[1*], Mei Wang[2], Charles L. Cantrell[2], Suresh T. Mathews[3], Pradeep Paudel[4], Joseph Lee[4]

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Inter-and intra-species variation for agronomic, chemical, and anti-diabetic properties among Ocimum species

Plant products have long been used for diabetes prevention and treatment worldwide. Among them, Ocimum species have shown effectiveness in clinical trials for their antidiabetic properties. However, knowledge of these species, their antidiabetic activity, and chemical profiles in the USA remains limited. This study evaluated 16 accessions from six Ocimum species (*O. aficanum, O. americanum, O. bailicum, O. campechianum, O. gratissimum*, and *O. tennuiflorum*) for growth, chemical composition, and antidiabetic activity. Growth variables included plant height, number of branches, and above-ground biomass. Antidiabetic activity was assessed using an α-glucosidase inhibitory assay with methanolic leaf extracts, using acarbose, a popular medicine for treating Type-2 diabetes, as a positive control. Chemical

Biography

Dr. Srinivasa Rao Mentreddy, an Indian-born American citizen, is a Professor of crop science at Alabama A&M University, Alabama, USA. Dr. Mentreddy earned a BS in Agricultural Science, an MS in Agronomy from the Andhra Pradesh Agricultural University, India, and a Ph.D. in Agronomy from the University of Tasmania, Australia. His research focuses on developing cover crop-based sustainable crop management practices for field, 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.

profiles were analyzed by quantifying fourteen compounds, including flavonoids, phenols, and terpenoids.

Significant variations ($p \leq 0.05$) were observed in growth among the accessions. Plant height ranged from 24.5 cm (*O. basilicum* PI 172996) to 54 cm (*O. gratissimum* PI 21171), while above-ground biomass ranged from 141.5 g (O. basilicum PI 652071) to 365.8 g/plant (*O. basilicum* PI 358472). The *O. basilicum* and *O. campechianum* accessions displayed mild α-glucosidase inhibition (14% and 19%), whereas *O. gratissimum* PI 500952 showed 80% inhibition, comparable to acarbose. Key compounds in *O. africanum* and *O. americanum* included ursolic acid, oleanolic acid, and rosmarinic acid, while *O. basilicum* and others showed higher levels of syringic acid and eugenol. Notably, rosmarinic acid (5.7%) and caffeic acid (0.6%) were significantly higher ($p < 0.0001$) in *O. gratissimum* PI 500952, correlating with its maximum α-glucosidase inhibition.

This study highlights the potential of *O. gratissimum* for its antidiabetic properties and introduces methods for assessing the chemical composition and agronomic performance of different Ocimum varieties. The findings support the development of sustainable organic production systems for commercially viable *Ocimum* species with known bioactivity.

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Low-temperature plasma: A novel technology for improving productivity and seed safety of horticultural crops

Low-Temperature Plasma (LTP), a weakly ionized noble gas or ambient air consisting of free electrons and positively charged ions, has been shown to break seed dormancy, enhance plant growth and yield, and ensure seed safety by mitigating seed-borne pathogens. This study evaluated LTP at 7 kV, with a pulse width of 1 µs and a frequency of 5 kHz, for the purposes: i) to enhance seed germination, growth, and nutrient quality of microgreens, and ii) to mitigate seed-borne pathogens on pepper and spinach seeds.

In Experiment 1, seeds of fifteen microgreen species were exposed to either Argon (Ar) or Helium (He) LTP for 0 (Control), 30, 60, or 90 seconds. The treated and untreated seeds were then assessed for moisture imbibition rates. Additionally, a greenhouse experiment assessed mustard greens' seeds exposed to either He or Ar LTP for 0 (Control), 30, 60, or 90 seconds for seedling growth and nutrient profiles.

In Experiment 2, pepper seeds coated with bacteria *Xanthomonas campestris pv.* vesicatoria and spinach seeds, with and without infection from *Stemphyllium botryosum*, were treated with He LTP for 0 (Untreated Control) or 15 seconds. Similarly, fungal conidia of *S.*

Biography

Dr. Srinivasa Rao Mentreddy, an Indian-born American citizen, is a Professor of crop science at Alabama A&M University, Alabama, USA. Dr. Mentreddy earned a BS in Agricultural Science, an MS in Agronomy from the Andhra Pradesh Agricultural University, India, and a Ph.D. in Agronomy from the University of Tasmania, Australia. His research focuses on developing cover crop-based sustainable crop management practices for field, 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.

botryosum strain 406 were either exposed to LTP or not and then cultured on V8 juice agar. Both treated and untreated seeds were incubated at 25±2°C for germination.

Results from Experiment 1, radish, buckwheat, and scallion seeds treated with He LTP for 90 seconds exhibited significantly improved moisture imbibition, while spinach and Pac Choi showed similar response in the 30-second treatment with Ar. Cilantro, scallion, and mustard greens responded positively to both Ar and He LTP. Broccoli, cabbage, and fenugreek showed no response. In the greenhouse trial, the Ar 30-second treatment increased plant height by 98% compared to the Control, while the He 60-second treatment increased the growth rate by 94.3%. Biomass improved by 78.2%, 63.2%, and 51.6% for Ar 60 seconds, He 60 seconds, and Ar 30 seconds treatments, respectively. The He 90 seconds, Ar 60 seconds, and He 60 seconds treatments enhanced total phenolic content by 32.6%, 27.6%, and 24.8% over the Control.

Antioxidant power increased by 24.3%, 23.6%, and 23.2% with Ar 90 seconds, Ar 30 seconds, and He 90 seconds treatments, respectively, compared to the Control.

Results from Experiment 2, whether infested with the pathogen or not, the treated seeds showed a higher germination percentage, though not statistically significant. More pronounced effects of LTP were observed on the pathogens. The *S. botryosum* conidia exposed to plasma germinated but did not exhibit significant mycelial growth compared to the untreated conidia, which grew normally. The LTP treatment suppressed mycelial growth, preventing conidia production in the treated fungus. Additionally, X. campestris pv. vesicatoria exposed to He LTP displayed distorted and damaged cell walls, leading to bacterial death. In contrast, the untreated bacteria remained rod- shaped and intact.

The research concludes that low-temperature plasma is a novel green technology for improving crop seed germination, plant growth, yield, and nutritional value. Furthermore, LTP effectively sanitizes seeds by destroying seed-borne pathogens.

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Dr. Tara Devi Sen

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Harnessing the potential of wild edibles for sustainable agriculture, livelihood and food security

Wild edible plants, long recognized by indigenous communities for their nutritional and medicinal value, offer untapped potential to enhance food security and promote sustainable agriculture. In the face of climate change, biodiversity loss, and declining soil fertility, these resilient species can serve as a viable alternative to conventional crops. Therefore, the present study aimed to document the diversity, use pattern and livelihood linkage of WEPs in Western Himalaya. Study explores the role of wild edibles in diversifying food systems, enriching diets, and supporting ecological balance. Extensive field survey was conducted in different areas of Western Himalaya covering an altitudinal range from 500 to 4000 m. Following the collection of plant species, detailed information about habits, habitat altitudinal range, harvesting techniques, seasons of availability, and ethnobotanical uses were documented through photographs, semi-structured interviews/group discussions with local tribal peoples, rural peoples, self-help groups, farmers, priests, local sellers, and traditional healers. This study documented and analysed 240 Wild edible plants which includes 137 Herbs; 44 Shrubs; 46 Trees; 5 Fern; 8 Mushrooms species belonging to 92 families, 184 genera, and 240 Species. Fabaceae is the most dominant family represented by 17 genera followed by Rosaceae, Asteraceae and Lamiaceae represented by 14 and 11 genera. Among genera Dioscorea and Ficus were found to be the most dominant genera represented by 5 spp. each followed by Amaranthus, Arisaema, Lepidium, Euphorbia, Indigophera, Rumex, and Prunus represented by 3 spp. each. By integrating

Biography

Dr. Tara Devi Sen Thakur, Senior Assistant Professor of Botany at Vallabh Government College, Mandi, HP, excels in ethnobotany and biodiversity conservation. With a Ph.D. from Kumaon University, she has co-authored and authored six reference books, published 18 research papers, contributed 6 chapters and over 350 newspaper articles. Dr. Sen leads significant research projects and has delivered 25+ invited talks at prominent conferences, seminars and training programmes. She runs featuring 240+ articles, and hosts a YouTube channel, Dr. Tara Devi Sen with over 900 videos. She has filed six patents for her value-added recipes. Her work of conservation of traditional knowledge, biodiversity conservation and livelihood promotion has earned her 9 honours and 8 awards.

traditional knowledge with modern agricultural practices, communities can revive underutilized species, reduce dependency on chemical inputs, and foster local self-reliance. The study also highlights successful models of wild food domestication, value addition, and community-based conservation efforts. To enhance the palatability and economic value of these wild food plants, value-added cuisines have been developed, tested in the lab, and introduced to the market. A key component of this study was mass awareness. Global access to this knowledge is made possible via the website, which hosts a digitized collection of 240 wild edible plants. Additionally, outreach through YouTube, social media, and print media has expanded the reach of this critical work. The integration of these age-old traditions into modern sustainable practices offers a pathway to enhance food security, support ecological balance, and preserve cultural heritage in an increasingly globalized world. Emphasizing policy support, awareness, and research, this work advocates for the mainstreaming of wild edibles as a sustainable solution for achieving nutritional security and resilient farming systems.

Keywords: Wild Food Heritage, Nutritional Diversity, Climate Resilience, Sustainable Agriculture, Value-Added Cuisines, Mass Awareness.

Dr. V P S Arora Professor Emeritus

Former Vice Chancellor, Kumaun University, Uttarakhand, India

Founder Dean, College of Agribusiness Management, Pantnagar, India

Future Indian hortibusiness

Horticulture plays a crucial role in India's agricultural sector, encompassing the cultivation of various crops such as fruits, vegetables, spices, and ornamental plants. India is bestowed with varied agro climate, which are highly favourable for growing many horticultural crops such as fruits, vegetables, spices, root tubers, ornamental, aromatic plants, medicinal species, and plantation crops like coconut, areca nut, cashew, and cocoa. Presently, these crops occupy about 10 per cent of the country's gross cropped area and produce about 330 million tonnes (2021). India is the second largest producer of fruits and vegetables. The total production of fruits has been estimated at 102 million tons from 6.8 million hectares of land. Vegetables occupy an area of 10.8 million hectares and produce 196 million tons. Given India's varied agroclimatic conditions, it has emerged as a vital and productive branch of agriculture, contributing significantly to the country's food security and economic growth.

Horticulture sector in India facilitates a major chunk of the population to consume a different and balanced diet to enjoy a healthy living and assist in maintaining the ecological balance. The key features of horticulture sector are.

- Horticulture sector has become a significant factor in the economic progress and accomplishments in most Indian states.
- The horticulture sector in India renders more opportunities in the sphere of employment across primary, secondary as well as tertiary sectors of

Biography

Professor Emeritus Dr. V.P.S. Arora is a AERA (Agricultural Economics Research Association) Fellow, is a distinguished academician renowned for his extensive contributions to agricultural economics, agribusiness management, and project management. An alumnus of G B Pant University of Agriculture and Technology in Pantnagar, he dedicated over three decades to the institution as a faculty member and academic administrator, playing a pivotal role in its academic growth. Dr. Arora made history as the founding Dean of the College of Agribusiness Management—the first of its kind under the ICAR-SAU system—marking a significant milestone in agricultural education. Over a career spanning 49 years, he has enriched both national and international academic institutions. His leadership as Vice Chancellor at Kumaun University and Shri Venkateshwara University in Uttar Pradesh was instrumental in fostering academic innovation and enhancing university governance. On the international stage, Dr. Arora has been a key figure in agriculture, project management, and consulting. He has lent his expertise to prestigious international organizations such as APO, IRRI, OECD, FAO, and ADB. As a

agriculture.

- This sector has emerged as one of the rapidly expanding markets of advancement as it turned out to be more beneficial and productive than the agricultural sector (food grains).
- Horticulture crops (fruits+) are more arduous to transform in ungracious and unfavourable weather conditions. The vegetables exponentially boost the income of small and marginal farmers.
- The demand for water usage is at a low level, drastically lessens the crop failure risk.
- Heaps of crops are planted concurrently to get more yields and make the most out of the organic fertilizers, and the crop field stays to be full of nutrients.

The Way Forward

- The core areas of horticulture must revolve around research and development, matching pace with the latest technologies and innovations, and assisting institutional changes.
- Diversification in the field of horticulture has become a significant source of efficacious growth not only for the sector but also for the nation.
- The sector has sound forward and backward linkages and developing the horticulture as an organized industry will galvanize growth in the agriculture sector.
- India is all set to become a major producer as well as exporter of horticultural products.
- Advancement of horticultural domain would ensure three much-needed significant transformations in the nation-promotion of exports, poverty diminishment, and employment generation.

dedicated mentor, he has supervised 24 PhD scholars and contributed significantly to research through numerous projects and publications. His leadership in various professional societies further cements his legacy in the fields of agricultural economics, agricultural marketing, project management, and agribusiness management. Dr. Arora's remarkable achievements have been recognized with numerous awards and honours, including Dr. Rajendra Prasad Award, Lifetime Achievement Awards (2009 and 2020), the Uttarakhand Ratan Award (2011), the Higher Education Leadership Award (2016), and Outstanding Alumnus Awards from both Pantnagar University (2020) and the College of Agriculture (2019), in addition to several Best Paper Awards. He has also served as Conference President of the Indian Society of Agricultural Marketing (2010) and the Agricultural Economics Research Association (2013).

Biography

Dr. Vijayan Gurumurthy Iyer M.Tech., Ph.D., PDF, D.Sc., LL.D., DL

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Prediction and assessment of environmental health impacts on the Plant Science and Molecular Biology (PSMB) environment

Prediction and assessment of environmental health impacts on the Plant Science and Molecular Biology (PSMB) environment are discussed. The EHIA process is to protect the environmental health. Three of the significant terms while complying with the requirements of PSMB process are environmental health inventory, environmental health impact assessment process, and environment health impact statement. EHIAs of sustainable design were undertaken in order to protect environmental health. The purpose of the EHIA process is to encourage the consideration of the environmental health in PSMB organizational planning and decision-making process. Historically, the choice of proposed PSMB environmental projects, policies, plans, programs, permits, procedures or legislations was primarily based on only one criterion called economic viability. It is required to consider three criteria of economic, environmental and social viabilities. PSMB project planning and decision-making should include the integrative consideration of technical, economic, environmental, ethical and social factors.

Environmental Health Impact Assessment (EHIA) process is systematic identification and evaluation of potential environmental health effects of proposed PSMB environmental projects, plans, programs, policies, plans

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or legislative actions relative to the physical- chemical, biological, cultural and socio-economic components of the total environmental health.

Steps to Conduct Environmental Health Impact Assessment:

Step-1: Identification of quantity and quality characteristics of concerned environmental health of proposed project.

Step-2: Preparation of description of existing environmental health conditions.

Step-3: Procurement of relevant environmental health quantity and quality standards.

Step-4: Environmental health impact predictions,

Step-5: Assessment of environmental health impact significance,

Step-6: Identification and incorporation environmental health mitigation measures.

Conduct of Environmental Health Impact Assessment (EHIA) Study and check;

1. Prediction and assessment of impacts on surface water environmental health,
2. Prediction and assessment of impacts on soil and ground environment,
3. Prediction and assessment of impacts on the air environment,
4. Prediction and assessment of impacts on the noise environment,
5. Prediction and assessment of impacts on the biochemical environment,
6. Prediction and assessment of impacts on the biophysical chemical environment,
7. Prediction and assessment of impacts on the radioactive environment,
8. Prediction and assessment of impacts on the ecological environment,
9. Prediction and assessment of impacts on the visual

The Yorker International University, Italy, 2011, Honorary Doctorate of Literature, 2017; Master of Arts, 2014 , International Biographical Centre, Cambridge, Great Britain; Master Diploma with honour in Literature, 2012; The Letter of the Law, World Academy of Letters, ABI, 2010. Appointments: Supervisor , Indo-Matsushita Carbon Company Limited , Tada , ACE CBE, 1982-; Technical Officer, Indian Council of Agricultural Research Service, Central Institute of Agricultural Engineering, Bhopal, 1985-; Central Institute for Research on Cotton Technology, -1998; Professor, Hindustan College of Engineering, Rajalakshmi Engineering College, MNM Jain Engineering College; Professor, Dr M G R University, Chennai, -2006; Principal, Prince Dr K Vasudevan College of Engineering and Technology, Chennai, -2011;Diploma in Entrepreneurship and Business Management Counsellor and Co-ordinator, Entrepreneurship Development Institute of India,2007-; Professor Haramaya University, Ethiopia, East Africa, 2014-; Prof. in Civil Engg. and Dean , Narasaraopeta Engineering College Affiliated to Jawaharlal Nehru Technological University-K,-2017; Professor, KLEF University, Vadeswaram, -2018; Principal on Ad hoc , Central Reserve Police Force (CRPF) Integrated Technical Institute, Chennai, 2019; P.E., ECI 2020.Guest Lecturer University of Madras. Principal, Arunai Engineering College -2022. Bihar Institute of Public Administration & Rural Development, Patna/gaya, India 2022-, Publications and Praxis: Over 362 SCI / ISI indexed publications, 60 multiligual eBooks , Index Scopus(16),Sabinet(65), and Web of Science (WoS) Indexed Publications (18) Not indexed Publications(44) ; Citations (19) ; h.index 50; Researcher ID : F-7375-2018 indexed publications of high

environment,

10. Prediction and assessment of impacts on cultural environment,
11. Prediction and assessment of impacts on archaeological environment,
12. Prediction and assessment of impacts on architectural environment
13. Prediction and assessment of impacts on historical environment
14. Prediction and assessment of impacts on anthropological environment
15. Prediction and assessment of impacts on socio-economic environment.

Keywords: Biology, Environment, Health, Impacts, Molecular, Plant.

quality in the last thirty years in the field of environmental science and mechanical engineering and education, impaction , 60 in journals, 103 e.book chapters, 100 digital flip books ISSUU and SCRIBD, Editor of fifteen Books series . Over 2000 citations; Over 600 citation indexed database in CPCI, Web of Science, Scopus, Index Copernicus ; Worldcat; ; h.index 50; Plenary Invited Lectures in Shanghai , Keynote Speaker-I, China-Beijing Municipality, 2021-; .Athens- Gr.; Bangkok-Thailand; Haramaya, East Africa. Editorial Board Member of 4D Four Dimensions Publishing Group, Inc & Reviewer: Institute of Physics , DStech Publications Inc., Atlantis Press-Springer Nature ,World Journal of Textile Engineering and Technology, IOPScience Publishing , Journal of Environmental and Waste Management, David Publishing Company, World Scientific Engineering Academy and Society(WSEAS) publications and American Society for Agricultural and Biological Engineers Journals, Honours: Kendriya Sachivalaya Hindi Parishad, 1988; Bharat Jyothi, 2000; Prominent citizens of India and Best Citizen of India, 2001; Rashtriya Ratna, 2001; NCERT Special Education Award, 2003; Rashtriya Gaurav, 2004, 2010; Tamil Nadu Government Best Environmental Research Essay Award, 2005; Sr.Reviewer Sina,World Biographical Hall of Fame, Dictionary of International Biography, 2012, 2000 Intellectuals of the 21st Century, 2011; Great Minds of the 21st Century, 2012; Enlistee in Marquis Who's Who LLC in Asia,2007, 1 st Edition ; Who's Who in Asia,2012, 2 nd Ed; Who's Who in Science and Engineering -2016-2017,12 th Ed; Who's Who in Science and Engineering -2011-2012, 11 th Ed; Who's Who in the World- 2016 , 33 rd Ed;, -2015, 33 nd Ed; - 2014 , 31 st Ed; - 2013, 30 th Ed; - 2012, 29 th Ed; - 2011,28 th Ed.; - 2010, 27 th Ed.; - 2009,26 th Ed; -2008, 25 th Ed, 2023 . Who was Who in America 1985-Present, Registered Valuer Plant and Machineries; Competent Person under Factories Act, Registered Engineer Grade-I/Licensed Surveyor Class-I Greater Chennai Corporation, Chartered Public Administrator (AIPA), DSC_1142, Chartered Engineer, Licensed Surveyor, Arbitration Engineer, Professional Engineer. Memberships: International Society of Development and Sustainability; American Assn. for the Advancement of Science, Indian Society for Technical Education; Aeronautical Society of India; Bioinformatics Institute of India; Mining Engineers' Association of India; Assn. of Scientists, Developers and Faculties. Indian Society for Training and Development; Fellow: Institution of Engineers, India; Institution of Valuers, India; Textile Assn, India; All India Management Assn, International Society for Research and Dev. , Bioinfo Publications, American Chemical Society. Address: A-2/31 III Floor, Kendriya Vihar 2, Poovai Road,Paruthipattu,Avadi,Chennai-71,India.

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Environmental Health Impact Assessment (EHIA) process for agricultural and horticultural processes-case study as ginning of Indian seed-cotton (or Kapas)

In this research, investigations are provided in context to entitled Environmental Health Impact Assessment (EHIA) Process for Agricultural and Horticultural Process-Case Study is Ginning of Indian Seed-Cotton (or Kapas).

The EHIA process for agriculture and horticulture has to protect the environmental health. Three of the significant terms while complying with the requirements of Agricultural and horticultural process are environmental health inventory, environmental health impact assessment process, and environment health impact statement. EHIAs of sustainable design of roller gin rollers for seed-cotton (or kapas) ginning were investigated undertaken in order to protect environmental health. The purpose of the EHIA process is to encourage the consideration of the environmental health in seed-cotton ginning organizational planning and decision-making process. Historically, the choice of proposed projects, policies, plans, programs, permits, procedures or legislations was primarily based on only one criterion called economic viability. It is required to consider three criteria of economic, environmental and social viabilities. Agricultural and horticultural project planning and decision-making should include the integrative consideration of technical, economic, environmental, ethical and social factors.

Biography

Dr. Vijayan Gurumurthy Iyer studied Environmental Science and Engineering at the Indian School of Mines, Dhanbad, India and graduated as M. Tech in 1998. He has served as Technical officer (Ginning) in Indian Council of Agricultural Research at Central Institute of Agricultural Engineering, Bhopal and Central Institute for Research on Cotton Technology, Bombay during 1985-1998. He then joined as external Ph.D scholar and received Ph.D. in Environmental Science and Engineering in 2003 at the same institution. After three years as postdoctoral fellowship (PDF) supervised by Prof. Dr. Nikos E. Mastorakis, WSEAS, Athens, Greece and published 67 PDF elaboration research papers in WSEAS transactions and proceedings. He has served as Professor of Environmental Science and Engineering at Haramaya University, Haramaya, Ethiopia during 2014-2015. He has published more than 400 research articles in SCI journals sand proceedings. He has published more than 90 books. There are more than 4000 citations in his credit. His h.index is 54.

Environmental Health Impact Assessment (EHIA) process is systematic identification and evaluation of potential environmental health effects of proposed agricultural and horticultural projects, plans, programs, policies, plans or legislative actions relative to the physical- chemical, biological, cultural and socio-economic components of the total environmental health.

Steps to Conduct Environmental Health Impact Assessment:

Step-1: Identification of quantity and quality characteristics of concerned environmental health of proposed project.

Step-2: Preparation of description of existing environmental health conditions.

Step-3: Procurement of relevant environmental health quantity and quality standards.

Step-4: Environmental health impact predictions,

Step-5: Assessment of environmental health impact significance,

Step-6: Identification and incorporation environmental health mitigation measures. Conduct of Environmental

Health Impact Assessment (EHIA) Study and check;

1. Prediction and assessment of impacts on surface water environmental health,
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7. Prediction and assessment of impacts on the radioactive environment,
8. Prediction and assessment of impacts on the ecological environment,
9. Prediction and assessment of impacts on the visual environment,
10. Prediction and assessment of impacts on cultural environment,
11. Prediction and assessment of impacts on archaeological environment,
12. Prediction and assessment of impacts on architectural environment
13. Prediction and assessment of impacts on historical environment
14. Prediction and assessment of impacts on anthropological environment
15. Prediction and assessment of impacts on socio-economic environment.

Keywords: Agriculture, Seed-Cotton, Environment, Health, Horticulture, Impact, Medical.

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Biography

Dr. Song studied Molecular Genetics and Plant Pathology at the Institute of Genetics, Academia Sinica, Beijing, China (Prof. Lihuang Zhu lab) and at the University of California-Davis, USA (Prof. Pamela Ronald lab) in early 1990s and received his Ph.D. degree in 1994 at the Institute of Genetics, Academia Sinica. After four years postdoctoral fellowship supervised by Dr. Pamela Ronald at the University of California- Davis, Dr. Song joined the faculty of the Department of Plant Pathology, University of Florida in 1999. He has published 39 research articles in various scientific journals. According to Google Scholar, his publications have been cited over 7,000 times by researchers all over the world.

Rhomboid-mediated cleavage of the immune receptor XA21 protects grain set and male fertility in rice

To maintain growth and to successfully reproduce, organisms must protect key functions in specific tissues, particularly when countering pathogen invasion using internal defensive proteins that may disrupt their own developmental processes. The rice immune receptor XA21 confers race-specific resistance against *Xanthomonas oryzae pv. oryzae (Xoo)*, which causes the deadly disease bacterial leaf blight. Here, we demonstrate that XA21 is cleaved by the rhomboid-like protease OsRBL3b, likely within its transmembrane domain. OsRBL3b mRNA transcripts are preferentially expressed in rice spikelets. Rice plants expressing Xa21 but lacking a functional OsRBL3b displayed impaired anther dehiscence and pollen viability, resulting in male sterility and yield reduction with high levels of XA21 protein present in spikelets during anthesis. In leaves, osrbl3b mutants expressing XA21 had normal levels of this resistance protein and disease immunity. This balance between reproduction and disease resistance through the specific expression of a rhomboid protease may be key to limiting the detrimental effects of an active immune response and may be useful in future for genetic improvement of crops.

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ORAL PRESENTATIONS

Alejandro Moreno Reséndez[1*], José Luis Reyes-Carrillo[1], Selenne Yuridia Márquez-Guerrero[2], Edgar Omar Rueda Puente[3]

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Application of vermicompost mixed with inert materials during the growth of vegetables and cucurbits in protected systems

Based on the need to reduce or eliminate the use of synthetic fertilizers, used to generate high yields in the face of the high demand for food, a constantly growing population, and less available arable land, without considering their efficiency, their significant polluting potential, their impact on biological diversity, and soil degradation, the need has arisen to promote alternatives that help mitigate these harmful effects. The alternative we have promoted is related to the application of Vermicompost (VC) or earthworm humus. This organic fertilizer is obtained from the decomposition process of various organic wastes under the action of Microorganisms present in the digestive tract of earthworms, is rich in essential nutrients, applied to soil or plant growth substrates, the following benefits stand out: it improves its structure, increases its moisture retention and aeration, favors its microbial activity, releases nutrients gradually and facilitates their absorption, generating a healthier environment for the roots of plant species. In attention to the elements described, and as a result of the use of VC in various crops, we intend to share the experiences achieved, as well as the results obtained, with respect to the substrates and proportions used, their impact on the development of plant species, savings in water consumption and, finally, its impact on the phytochemical composition of the fruits harvested in each crop evaluated.

Biography

Alejandro Moreno Reséndez is a Chemical Engineer, Autonomous University of Coahuila (FCQ-UAC), Master's degree in Soil Science and PhD in Agricultural Sciences, Antonio Narro Autonomous Agrarian University. Professor-Researcher, Department of Soils, UAAAN-UL. Level II Researcher at SNI-Secihti. Coordinator of the Academic Body Sustainable Systems for Agricultural Production, UAAAN-CA-14. He has published 58 scientific articles in national and international journals, authored and co-authored 40 book chapters. He has advised 48 undergraduate theses and 15 graduate theses. He has given 15 keynote addresses at national and international conferences. He is a member of the Arbitration Committee of 10 national and international journals.

Alene Tesfamichael Alemu[1*] M.Sc; Svein Solberg[2] PhD; Hesam Mousavi[2] PhD; Trine Hvoslef-Eide[3] PhD; Svein Andre Kolltveit[3]; Rodmar Isak Rivero[3] PhD; Dereje T Asefa[1] PhD

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Vermicompost-derived liquid organic fertilizers as effective replacements for chemical fertilizers in spinach production

There is an increasing demand for environmentally friendly organic fertilizers that can replace conventional chemical fertilizers for organic agricultural production. A pot experiment was conducted in growth rooms to evaluate the performance of four different liquid organic fertilizers-Cermaq 1 (T1), Cermaq 2 (T2), Mjøsa (T3), and HRA (T4). These were extracted from vermicompost of fish sludge (Cermaq), cow manure (Mjøsa) and food waste (HRA) digestates from biogas reactors. The objective of the experiments was to evaluate the potential of stable liquid organic fertilizers from vermicompost to replace conventional chemical fertilizer (T5) using spinach (Spinacia oleracea L.) as a test plant production. The experiment was conducted in growth chambers of Edelmark (a private research organisation) and the Norwegian University of Life Sciences (NMBU) by employing a completely randomized experimental design with three replications per treatment. The growing chamber at Edelmark was a simple greenhouse that relied on natural temperature and light conditions. In contrast, the growth chamber at NMBU was maintained at a constant temperature of 16 °C, with light provided by Heliospectra LED lamps at an intensity of 186 µmol m^{-2} s^{-1}. Plant height, fresh weight and dry biomass of shoots and roots were measured and analysed using ANOVA. The results showed no significant differences in plant height among the treatments (F=2, 1 α=0, 05). The yield obtained from mineral fertilization (T5) was significant different, (F=27, 02 α=0, 05) from the yields obtained by the fertilization of organic fertilizers of vermicompost from cow manure (T3) and food waste digestate (T4). However no significant difference was observed in in fresh and dry matter weights of spinach plants treated with mineral fertilization (T5) and liquid organic fertilizer of digestate of fish sludges, T1 and T2. The organic fertilizers from digestates of fish sludge (Cermaq 1 and 2) showed superior or equivalent performance to mineral fertilizer across all measured parameters, making it the most viable replacement option. The experiment has demonstrated that there is a potential to develop stable liquid organic fertilizers from vermicompost, which effectively can replace traditional mineral fertilizers without compromising spinach growth and yield. Such research results will be valuable for further investigation of the development of sustainable and circular liquid organic fertilizers that fully can replace mineral fertilizers in horticultural production systems without compromising yield.

Biography

Alene Tesfamichael is an experienced researcher with over 30 years of expertise in soil science, plant production, and sustainable agriculture. He holds MSc. degree in Natural Resources Management and Sustainable Agriculture from the Norwegian University of Life Sciences (NMBU) since 2003. Alene works as a CEO and researcher at Edelmark AS, a company specialized in vermicomposting technology to transform organic waste into stable organic fertilizers. His has extensive research background in agronomic and horticultural practices, hydroponic cultivation systems, soil health, sustainability, circular economy and has worked as educator both in Norway and Ethiopia.

Ana Claudia Pacheco[1*], Mateus Modesto Bosisio[1], Tiago Benedito dos Santos[1], Hélida Mara Magalhães[2], Silvia Gracielle Hulse de Souza[2], Alessandra Ferreira Ribas[3], Cícero Deschamps[3], Roger Cipriano Raupp[3]

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Elicitation alters the concentration of carnosic acid and carnosol and increases essential oil production in rosemary plants

Research on elicitation in rosemary has mainly focused on increasing the yield of Essential Oil (EO). However, there is little information addressing the impact of elicitation on the levels of Carnosic Acid (CA) and its derivative, Carnosol (COL) in rosemary leaves. In this study, we investigated the effects of Salicylic Acid (SA) and Seaweed Extract (SWE) on growth, biosynthesis of secondary compounds and antioxidant activity in rosemary plants grown in a greenhouse. Two experiments were performed, in which SA and SWE were sprayed at four regular intervals and leaves were collected at different times after the last application of the elicitors. Plants treated with SA and SWE showed significant increases in EO concentration, without altering their morphology. The EO of plants treated with SWE presented higher contents of α-pinene, β-myrcene and 1,8-cineole. The leaf extract of the elicited plants showed higher antioxidant activity by analysis of β-carotene. The elicitation of plants with SA and SWE promoted inhibition of CA biosynthesis and stimulation of its oxidation into COL. However, this response was observed at 24 and 48 h after spraying the plants. Plants at harvest point showed no differences regarding CA, yet a higher concentration of COL in the leaf extract was observed. Additionally, there was a decrease in Rosmarinic Acid (RA) in plants treated with SWE, both in samples taken 24 and 48 h after spraying and in samples taken from plants at harvest point. In the second experiment we also investigated the expression of the key genes related to CA biosynthesis. Both elicitors provoke changes in the transcriptional profile of the CPS1 and KSL2 genes in leaves collected 24 and 48 h after spraying. These results indicate the potential of elicitation with SA and SWE as a strategy for obtaining rosemary plants with higher EO and COL foliar concentrations.

Biography

Dr. Ana Claudia Pacheco studied Agronomy at the São Paulo State University (USP), Brazil and graduated as MS in 1999 and as PhD in 2007 at the same institution. Her research area is Plant Physiology and Biochemistry. Since 1999 she is a Titular Professor in the University of Western São Paulo (UNOESTE). She studies the effects of elicitors and abiotic stresses in plant metabolism and production of secondary compounds. She has published more than 50 research articles in SCI (E) journals.

Miora Lalaina Rarrinirina[2], Bénedicte Julia Rasoamalala[1], Irinomenjanahary Randrianjafy[3], Andriantiaray Solofoniaina Razafimahefa*[1,2]

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Innovative approach to practicing alternative agriculture in eastern Madagascar

Early depletion of food reserves, low incomes and the problem of rainwater management are seriously affecting the food security of the population in certain parts of Madagascar. Three districts of the Eastern Region (Toamasina, Vatomandry, Brickaville) are classified as being in a state of stress (IPC Phase 2). This humid region of Madagascar is notorious for its destructing farming methods, particularly slash-and-burn cultivation, which is environmentally disastrous.
The main objective of this project is to implement alternative agricultural techniques on an experimental site in eastern Madagascar and study their economic, social and environmental impact. A new approach to alternative agriculture, using local agronomic resources, has been adopted to meet the challenge of long-term food security. To ensure proper management of rainwater, fish ponds have been created in certain marshy areas of the experimental site, enabling rainwater to be treated and stored while enhancing local biodiversity.
Following an ethnobotanical survey, four endemic medicinal and/or aromatic plants from Madagascar with high economic potential were introduced to this agricultural system. *Doratoxylon littorale* and *Homalium albiflorum* are medicinal plants used by a national institute to prepare phytomedicines for treating gout and skin infections. *Neobrochoneura accuminata* and *Citrus voangiala* are useful sources of essential and vegetable oils and their derivatives. The waste from hydrodistillation use as an organic fertilizer. This new approach to farming techniques significantly improves the financial situation of the population studied. It enables them to store their agricultural produce, ensuring supplies during the lean season. The application of this technique considerably reduces the practice of slash-and-burn farming in the region. This new approach to farming is an integral part of biodynamic agriculture, one of the agricultural techniques that enable people to meet the challenges of sustainable development, integrated and respectful of the environment.

Keywords: alternative agriculture, medicinal and aromatic plants, organic fertilizer, fish ponds

Biography

Dr A. Solofoniaina Razafimahefa studied pharmacology and the chemistry of natural products at the University of Antananarivo in Madagascar. From 2007 to 2015, he worked as an assistant researcher at the Malagasy Institute of Applied Research with Prof. Philippe Rasoanaivo. He completed his PhD at Uppsala University under the supervision of Prof. Jarl Wikberg, receiving his PhD in Chemistry in 2015. Since 2018, he has worked at the University of Antananarivo and the University of Vakinankaratra as a lecturer. He has published ten research articles in Science Citation Index Expanded journals and holds three Malagasy and three international patents.

Anukriti Srivastava*, Dr. Girish Chandra Pandey

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Analyzing the shift from initial to productive tillers in wheat (*Triticum aestivum L.*) under terminal heat stress

Vegetative growth in the form of tillers is crucial to final yield wheat (*Triticum aestivum L.*) Terminal heat stress, occurring during flowering and grain-filling stages, significantly impacts tiller development, a crucial determinant of grain yield. Understanding tillering mechanisms is pivotal for wheat breeding efforts. In a recent study conducted during the 2022-23 and 2023-24 crop seasons at Krishi Vigyan Kendra, Banasthali Vidyapith, Rajasthan, India, we meticulously planted 16 wheat (*Triticum aestivum L.*) genotypes in timely and late sown conditions, collecting tiller data from experimental plots. Each genotype was replicated thrice, and tiller counts were recorded for four central plants per plot. Notably, no prior research has explored the transformation of initial tillers into productive ones.

Through our analysis, we calculated the transformation percentage of initial tillers to the productive tillers under both timely and late sown conditions. We have also recorded temperature to co-relate the transformation percentage. Among the genotypes observed DBW 90 has 85% and 80% transformation in timely and late sown respectively, DBW 107 has 20% transformation in both conditions and UP301 has 86 % and 84% transformation in timely and late sown respectively. These genotypes exhibited exceptional tolerance to terminal heat stress. Conversely, DBW222 has 77% and 65% transformation in timely and late sown respectively, HD2501 has 73% and 60% in timely and late sown respectively and GW173 has 60% and 49% transformation in timely and late sown respectively. These genotypes were highly sensitive to heat stress. These findings underscore the importance of tillering dynamics in wheat resilience to temperature fluctuations, providing valuable insights for molecular breeding endeavours.

Keywords: Tillers, Transformation Percentage, Wheat, Molecular Breeding, Yield.

Biography

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

Caroline van der Weerdt[1*], Julia Broderick-Hale[1], Dianne van Hemert[1], Sabine Verdult[2]

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Beyond the frontrunners: Understanding adoption of digital agricultural technologies

Despite the potential of Digital Agricultural Technology Solutions (DATSs) to increase farm viability, sustainability and farmer wellbeing, only a minority of frontrunners seems to structurally embed these on the farm. Average European adoption figures point to a rate of around 60% of European farms that are currently using or planning to use at least one DATSs within a few years. For precision DATSs, this is less than 50%. These figures represent the larger farms; for smaller-sized farms these figures are even lower. As the range of possibilities is wide, and the potential advantages encouraging, this gives rise to the question: why does adoption of DATSs amongst farmers lag?

Most research on the motivations for adopting DATSs has been methodologically limited and narrowly focused. They have predominantly relied on questionnaires or structured interviews, curbing the scope of the research. Also, these studies tend to emphasize farmers' lack of knowledge and expertise in making informed decisions, while prioritising the essence of a rational cost-benefit calculation. We find that motivations are shaped by far more complex interdependencies, however, involving psychological, social, contextual and economic factors, knowledge, experience, and biases. Moreover, adoption is widely treated as a binary event, a yes or no decision, while it is in fact a process in which intricate interactions between farmers, advisors, DATSs providers and policy makers influence the farmer’s decision-making and the prominence and valence of the above-mentioned factors.

In the Horizon Europe project QuantiFarm we analysed technology adoption, treating it as this multi-step process involving various actors. We have explored not only why new digital technologies are adopted on farms but also when, how, and who is involved in doing so. We did this by employing innovative human-centered research approaches, for different DATS across multiple countries and contexts, immersing in genuine daily farm practice to collect data. Our analysis reveals similar stories of adoption all over Europe, but also very distinctive features that are related to farmer type, culture, and gender differences. The results are brought together in a framework of DATSs adoption and subsequent guidelines for farm advisors, DATSs providers and policy makers.

Biography

Caroline van der Weerdt (F), MSc has a background in International Business and Marketing. She started her career at KPN (Dutch telecom incumbent) where she was responsible for the adoption of new ICT services in the business market. She then joined TNO in 2008 to focus primarily on adoption of innovative digital solutions. She is active mostly in the agri-food sector, where digitalisation is considered essential to become more sustainable and futureproof. She often leads the behavioural research and resulting work on behavioural innovation in European research projects.

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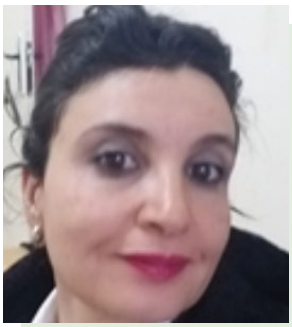
Effects of feeding pomegranate peel silage on feed intake and growth performance of Turkey bred sheep

The experiment was conducted to determine the effects of feeding pomegranate peel silage with beet top silage, wheat straw, alfalfa hay, barley, cotton seed cake and mineral plus on feed intake and growth performance of Turkey bred sheep in research farm of Agriculture Faculty, Kabul University. Twelve, two and half years old Turkey bred sheep with (57.240±5.28) kg average initial body weight were used in a Completely Randomized Design (CRD). Animals were caged individually in 3 groups and 4 replications. Groups included in this experiment were, first group (Control) or T1 Pomegranate Peel Silage (PPS) 0%, second group or T2 (5% PPS) or 106 g and third group or T3 (10% PPS) or 211 g. In addition, animals were fed with 633 g barley, 633 g alfalfa hay, 211 g cotton seed cake, 106 g beet top silage, 4 g mineral plus with the same amount and wheat straw for control group or T1, T2 and T3, 528 g, 422 g and 317 g in Dry Matter (DM) basis, respectively once in a day at around 8 am. According to statistical analysis, there was a highly significant difference between groups in feed intake and significant difference in growth performance of sheep. Results of this study suggest that feeding (5%) pomegranate peel silage with wheat straw, alfalfa hay, cotton seed cake, barley, beet top silage and mineral plus affects the feed intake and growth performance of Tukey sheep.

Biography

Assistant Professor Faiz Rahman Rahmani at Kabul university completed his MS in 2017. He work as Assistant professor since 9 years at Kabul university. During his studies, he participated in various educational Agricultural conferences. he has worked in the country's environmental and greening programs with the (Green Club) projects. In the field of book and articles publication compilation and translation, he is author of 5 books in the field of agriculture and published one international and 7 national articles.



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Assessment of the chemical, antioxidant, and antimicrobial properties of various solvent extracts from wild olive leaves (*Olea europaea subsp. europaea var. sylvestris*)

Recently, the extraction, separation, and determination of phenolic compounds has become a challenging and important analytical task due to the large number of phenolic compounds with similar structures as well as the complexity of the samples involved. We recall that the main objective of this work is the extraction, separation, phytochemical screening. To determine the total phenolic levels and antioxidant activities carried out by two methods of ABTS and DPPH and antimicrobial assays of different solvent extracts of the leaves of the wild olive tree harvested at different sites of Constantine region-Algeria, to discover new natural antioxidants.

The method of extraction and the solvent used are the main factors that determine the extraction yields of plant extracts. Where, the three methanol (65.31%), hydromethanol (62.7%) and ethanolic (60.18%) extracts represent the best extraction efficiencies followed by chloroformic (42.05%), acetonic (37.09%), hydroacetonic (35.38%) and ethyl acetate (34.26%).

Phytochemical screening and CCM demonstrated the presence in significant quantities of flavonoids, tannins and sterols. As well as the presence of coumarines, free quinones, glycosides and saponosides. However, alkaloids were absent in all extracts of the various solvents used. We obtained the separation of the spots for chloroformic, ethyl acetate and methanol extracts with only the second and third solvent system before and after UV revelation.

The ethyl acetate, ethanolic extracts from the Soxhelt extraction of wild olive leaves have the highest levels of phenolic compound, flavonoids and the greatest antioxidant activity in the DPPH and ABTS assays followed by the hydroacetonic, hydromethanol, methanol extracts then the acetonic, hexanic, petrol ether extracts and last the chloroformic.

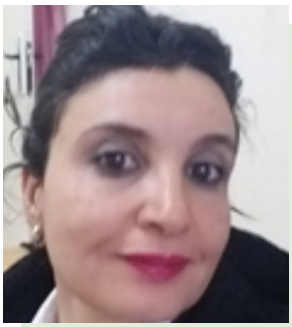
The most certified antibacterial extracts are methanol, ethanolic, petrol ether and ethyl acetate respectively. This shows that the nature of the solvent influences the effectiveness of the antibacterial activity. It seems that our extracts are more effective on bacterial Gram+(Staphylococcus aureus, Bacillus cereus), than bacterial Gram-(*Pseudomonas aeruginosa, Escherichia coli, Enterobacter cloacae et Klebsiella pneumoniae*).

Wild olive leaves could be a potential natural source of antioxidants and could be of greater importance as a natural antioxidant capable of slowing down or preventing oxidative stress.

Keywords: Wild Olive Tree, Leaves, Different Solvents, Extracts, Phytochemical, Activity, Antioxidant, Antimicrobial, Algeria.

Biography

Dr. Wahiba Falek, born on January 12, 1984, in Khenchela, Algeria, is a prominent researcher and educator in food sciences and biotechnology. She holds degrees in Nature and Life Sciences, Nutrition, Agro-Food Technologies, and Food Sciences from the University Fr. Mentouri Constantine and a PhD in Biotechnology from the National Higher School of Biotechnologies (ENSB). Dr. Falek has over 14 years of teaching experience, specializing in food characterization, biochemistry, and analytical chemistry. Her research includes food biotechnology and wild plant conservation, with notable publications on corn germ valorization and wild olives conservation. She is fluent in multiple languages. Her ORCID ID is 0000-0002-6132-5250.



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Contribution to the phytochemical study, evaluation of the antioxidant and antimicrobial activities of different solvent extracts from the leaves of the *Pistacia lentiscus L*. plant collected from Eastern Algeria

Pistacia lentiscus L., an evergreen shrub from the Anacardiaceae family, is found in Mediterranean countries. Its leaves contain therapeutic metabolites, traditionally used for anti-inflammatory and antiseptic effects, and to treat conditions like gastralgia. Phytochemical compounds are extracted using conventional, energy-and solvent-intensive methods. This study focuses on extracting, separating, and screening phytochemicals from leaves of *P. lentiscus L.* harvested in two regions of Eastern Algeria. The research includes determining total phenolic levels, antioxidant activities (using ABTS and DPPH), and antimicrobial assays to identify new natural antioxidants.

The extraction yields vary according to the method of extraction and the solvent used. Where the methanoic extract obtained by maceration gives the best yield (53.75%), followed by the aqueous extract by the infusion extraction method (38.035%).

Phytochemical screening reveal a high richness in tannins, alkaloids, terpenes and saponosides whatever the extraction method and the solvent used.

The chemical screening of the contents extracted by thin-layer chromatography, we obtained separation of the spots for the extract chloroform, ethyl acetate and methanol with the four solvent systems before and after the revelation under the UV radiation.

The methanol, ethanolic and aqueous extracts obtained by the three methods of extraction of the leaves of *Pistacia lentiscus L*. had the highest levels of phenolic compound, flavonoids and the highest antioxidant activity in the DPPH and ABTS assays.

The antibacterial activity in vitro has revealed the strong antibacterial power of the extracts against the five pathogenic strains (*Staphylococcus aureus, Enterococcus faecalis*) are more sensitive than bacteria (*Klebsiella pneumoniae, Escherichia coli, Pseudomonas aeruginosa*).

P. lentiscus L. leaves may be a potential natural source of antioxidants and may be of greater importance as a natural antioxidant capable of slowing down or preventing oxidative stress.

Keywords: *Pistacia lentiscus L.*, Different Solvents, Extracts, Antioxidant, Antibacterial, Algeria

Biography

Dr. Wahiba Falek, born on January 12, 1984, in Khenchela, Algeria, is a prominent researcher and educator in food sciences and biotechnology. She holds degrees in Nature and Life Sciences, Nutrition, Agro-Food Technologies, and Food Sciences from the University Fr. Mentouri Constantine and a PhD in Biotechnology from the National Higher School of Biotechnologies (ENSB). Dr. Falek has over 14 years of teaching experience, specializing in food characterization, biochemistry, and analytical chemistry. Her research includes food biotechnology and wild plant conservation, with notable publications on corn germ valorization and wild olives conservation. She is fluent in multiple languages. Her ORCID ID is 0000-0002-6132-5250.

Fatma Mostafa
Plant Pathology Research Institute, Agriculture Research Center, Egypt

The role of artificial intelligence in sustainable agriculture

Artificial intelligence is one of the most important modern technologies in agriculture that helps in facing the challenges occurring due to climate change. Due to reducing manual labor, saving time, and achieving the best agricultural economic returns. Smart agriculture technologies can be used to predict the occurrence of epidemics and diseases that can wipe out many crops. This is achieved by receiving future meteorological data on sensors and entering it into mathematical equations and calculations. These can give imaging to identify suitable weather conditions for plant diseases, which can then be used to develop preventative programs for potential diseases. Artificial intelligence technology is also used to eliminate weeds, which serve as intermediate hosts for plant pathogens and compete with plants for food. It is also used in crop harvesting, reducing waste and thus maintaining food security.

Hector R R Laurence
Presidency of Mclaren holdings SA, City of Buenos Aires, Capital District, Argentina

Sustainable food supply for a global population

We will discuss and highlight the key issues related to food production in general and the growing need for sustainability, both in terms of production itself and the quality and healthiness of food for different cultures and evolving global needs.

The discussion on production will include references to fundamental aspects such as soil, water, climate, legal regulations, and nature in general, including elements like trees, among others, as part of the usual debates and developments.

We will also cover the next phase, which involves industrial processes, commercial and legal aspects (including key regions such as Europe), and the case of Argentina as an example within Latin America, among others.

Then, we will analyze the current state of climate change, its impacts, and key discussions among different groups, including some environmentalists. Additionally, we will address crucial technological aspects such as genetic reserves and biotechnology, all of which impact the global food supply for the present and future.

In this context, we will highlight an essential issue—among many others—that is often overlooked or not even considered, but which is crucial for food supply. This serves as an example of the many actions and considerations needed to tackle current challenges. I will include information on some innovative technologies and activities in Argentina that have been recently applied on a large scale, though not widely known, yet useful for addressing these challenges. This is particularly important given the country's size, land area, production volume, and the significance of its food exports, both direct and potential, to various parts of the world.

Of course, in all cases, I hope we remain open to analysis, new ideas, and creative thinking, with one key goal: ensuring that we will have enough quality and healthy food for our growing global population.

Biography

Dr. Laurence studied law at the University of Buenos Aires, earning degrees as a procurator, public notary, and lawyer. He pursued postgraduate studies in finance, tax, and tribute law. He built his career in the private and public sectors, focusing on agribusiness, particularly in the seed industry and food supply. He was President of Pioneer Hi-Bred International Argentina and led Latin American operations, later serving as a Global Relationship Manager. He also presided over the Argentine Seed Industry Chamber, Fundación Vida Silvestre Argentina member of WWF, IFAMA (Int. Food and agribusiness management association) and Mclaren Holdings SA.

Hellen Maina
Forbrs Mentorship Kenya, Nairobi, Kenya
Royal Media Services, Nairobi, Kenya

Sustainable agriculture: Innovations for a greener future

Sustainable farming focuses environmentally friendly, socially responsible, and economically viable farming practices. Innovations such as precision farming, organic methods, agroforestry, and water-efficient techniques are key to achieving a greener future. These approaches promote efficiency, productivity, and resilience while minimizing negative environmental impacts, helping to address challenges like food security, climate change, and environmental degradation.

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Agricultural professionals' perspectives on the adoption of responsible human-centred AI in smart agriculture: A comparative study of the UK and Malta

The integration of Responsible Human-Centred Artificial Intelligence (RHCAI) into agricultural practices presents both opportunities and challenges, particularly in regions with diverse agricultural landscapes and regulatory environments. This study explores how agricultural professionals in the United Kingdom and Malta perceive and respond to the adoption of RHCAI within the context of smart agriculture. It aims to understand how awareness, regulatory frameworks, and professional attitudes influence the adoption of AI tools in everyday agricultural practice.

AI remains at an early stage of adoption within the agricultural sector, especially in small and medium-scale farming systems. While policy discussions around responsible AI have intensified across the UK and the European Union, there remains a gap in understanding how such principles translate into practice at the farm level. By comparing the UK and Malta, two countries with contrasting climates, economic structures, and policy landscapes, this research provides a nuanced understanding of how RHCAI is interpreted and operationalised in different national settings.

This study employs a structured literature review methodology, focusing on peer-reviewed publications, policy documents, and institutional reports published between 2020 and 2025. Sources were drawn from databases such as Scopus, Web of Science, and Google Scholar, and were analysed thematically to identify patterns related to awareness, policy alignment, ethical concerns, and barriers to adoption.

Findings suggest that while there is growing interest in the potential of AI to enhance productivity and sustainability, awareness and understanding of RHCAI among agricultural professionals remain limited. Differences in digital infrastructure, regulatory clarity, and sector-specific guidance contribute to uneven levels of adoption. The study highlights the need for clearer, context-sensitive policies and support mechanisms that align technological innovation with ethical and practical considerations in agriculture.

This research contributes to the wider discourse on digital transformation in agriculture by

centring the perspectives of professionals directly affected by AI integration. It offers insights for policymakers, researchers, and practitioners seeking to develop inclusive, responsible, and effective pathways for implementing AI in agriculture across varied regional contexts. The findings also lay the groundwork for the development of practical guidance materials and policy recommendations tailored to the UK and Maltese agricultural sectors.

Biography

Henrietta Farrugia is a second-year PhD student at the University of Northampton, UK. She holds a BA (Hons) in Business Entrepreneurship (First Class, 2020) and an MSc in International Marketing Strategy (First Class, 2021). Her doctoral research focuses on the adoption of Responsible Human-Centred AI in UK and Maltese agriculture. Henrietta is particularly interested in ethical innovation, smart farming practices, and stakeholder engagement in agri-tech policy development.

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Integrated metabolomics and transcriptomics analysis of exogenous arginine-mediated sucrose accumulation in sugarcane

In order to clarify how Arginine (Arg) regulates sugar metabolism in sugarcane and identify key genes associated with sucrose accumulation. A screening experiment was conducted by spraying L-arginine hydrochloride on the leaves and leaf sheaths of YZ05-51, YZ08-1609, and YT93-159 sugarcane varieties, which represent differences in sucrose metabolism. We found that YZ05-51 had a relatively higher effect of increasing sugar content. After spraying arginine with different pH values and concentrations on YZ05-51, transcriptome and metabolome experiments demonstrated that the optimal application of 20g/mu Arg at a pH of 7.0 significantly increased the sucrose content in stems of YZ05-51. We also identified key metabolites and related genes associated with starch and sucrose metabolism, glycolysis/gluconeogenesis, amino sugar, nucleotide sugar metabolism, and ATP-Binding Cassette (ABC) transporter pathways. Metabolomics analysis detected 32 sugar metabolites across three major categories, of which 25 were identified as Differentially Abundant Metabolites (DAMs), including glucose, galactose, fructose, mannose, ribose, xylulose, and arabitol, and these metabolites increased efficiency of sucrose synthesis and accumulation in 'YZ 05-51', which promotes the conversion of other sugars into sucrose. Through integrated metabolomics and transcriptomics analysis, Key genes such as SBEs (Starch Branching Enzymes) and TPS1 (Trehalose-6-Phosphate Synthase) were identified, which may regulate sucrose synthesis by modulating carbon flux from starch metabolism and hexose allocation, and at the same time, GTs, RBSK, α-amylasses, LPH, MGAM, PGAM2, GH28, TPI, TIM10/TIM12, and peptide transporters genes, were identified as putatively involved in Arg-mediated sucrose conversion and transport in YZ05-51. This study provides valuable insights into the molecular mechanisms and critical role of Arg-mediated sucrose accumulation in sugarcane.

Biography

Hongbo Liu worked in Sugarcane research institute, Yunnan academy of agriculture sciences, Associate Professor, deputy director of sugarcane germplasm centor, and graduated as MS in 2008. He then joined the research group of Prof. Jianping Wang at the Institute of genetic of Florida university (UF) in 2019-2020, USA. In 2023, as an international science and technology attache, he went to Egypt to carry out an investigation and exchange program for the revival of the sugar industry. He is mainly engaged in research related to sucrose metabolism, comprehensively improving sucrose yield by using genetic engineering methods and exogenous administration. He has published more than 20 research articles in SCI (E) journals.

Indira Singh
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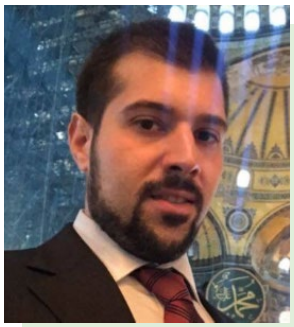
Soil bacterial and fungal communities augmented by regenerative agriculture nurturing soil quality and plant health

Population, climate change, deteriorating soil conditions, increasing crop-pests, poor crop productivity, adverse impacts on environment and human health due to conventional-chemical-agriculture are among the wide-array of problems faced by India's agriculturists. It is therefore imperative to identify and move towards agricultural methodologies that can help to overcome these situations. Regenerative Agriculture (RA) which relies on environment-friendly practices for boosting soil and plant health holds this promise. There are limited reports from India on the impact of RA on crop and soil health. In recent times, few Indian farmers have adopted RA using modern and traditional methods to support soil and crop health and productivity. This study compared the soil under RA with conventional agriculture, barren soil and eucalyptus containing plots, for their bacterial, fungal and chemical profiles. We used 16S and ITS amplicon sequence-based analysis of soil DNA to respectively characterise the soil's bacterial and fungal community structures and well-established assays to determine the soil's chemical profile. We considered two crops–Vegetables (Tomato/beans) and finger-millet for this study. We also recorded the effect of (≤3 years) short-term and (>5 years) long-term RA application on soil health. We found that RA, irrespective of the treatment used, enhances soil's bacterial diversity and the levels of Plant Growth Promoting Rhizobacteria (PGPRs) in the soil. All RA plots showed adequate amounts of potassium, phosphorus, and all minor nutrients, except nitrogen. In a plot following>5 years of RA practice we observed Soil Organic Carbon (SOC) levels within the ideal range whereas all other plots showed lesser than ideal SOC levels. Interestingly, we also report the poorest soil bacterial profile in eucalyptus containing plots suggesting towards the detrimental impact of eucalyptus plantations on soil health. Fungal community in finger millet and vegetable RA plots showed high level of diversity as well as species evenness. In addition, RA plots in both crops showed a significant reduction in plant pathogenic fungal genera-Bipolaris and Pyrenochaetopsis. Further, the RA finger millet plots contained specific Plant Growth Promoting Fungi (PGPF) Rhizophlyctis and Agrocybe (saprotrophs) and Acrocalymma (biotic and abiotic stress tolerance and plant growth and yield inducer), which were absent in finger millet CA and BL plots. Similarly, in RA vegetable plots we found PGPFs including-Mortierella (a biocontrol agent and plant nutrient solubilizer), Phoma (bioherbicide and plant growth promoter) and Pseudorobillarda and Torula (saprotroph) which were absent in the vegetable CA plots and BL plots. We conclude that extended period of regenerative agriculture use is effective in supporting a more robust and heterogeneous

population of bacteria and fungi which together improve the soil's nutritive and plant health. Additionally, regenerative agriculture also boosts the soil's SOC levels forming a significant means to mitigate climate change.



Ioannis Ladas
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From lab to field: Bioethical dimensions of plant genomics and biotechnology

The rapidly advancing field of plant genomics and biotechnology holds the promise of revolutionizing agriculture by offering solutions to food insecurity, enhancing crop resilience, and increasing yield. However, the transition of these technologies from lab to field introduces complex bioethical challenges that must be addressed to ensure that these innovations benefit humanity while minimizing harm to ecosystems and respecting cultural and socio-economic contexts. The first bioethical concern is the environmental impact of Genetically Modified Organisms (GMOs). The release of GMOs into the environment raises questions about potential unintended consequences, such as gene flow to wild relatives, the emergence of superweeds, and the reduction of biodiversity. Therefore, rigorous risk assessments and long-term ecological monitoring are essential to understand and mitigate adverse effects. These studies must be transparent and inclusive, involving not only scientists but also local communities and indigenous populations whose lives and livelihoods could be affected by these changes. Another significant dimension is the socioeconomic impact of adopting plant biotechnological innovations. While the promise of GMOs to increase agricultural productivity is attractive, there is a concern that these technologies may disproportionately benefit large-scale, industrial farms, potentially widening the gap between them and smallholder farmers. Issues such as patenting of biological resources and the proprietary nature of biotechnological tools can lead to monopolies and raise the cost of seeds, making it difficult for smaller farmers to afford the new technologies. Bioethical frameworks must advocate for equitable access to biotechnological advances and ensure that intellectual property laws do not overshadow the welfare of the farming community. Furthermore, there are ethical considerations regarding consumer rights and public acceptance of biotechnology products. The public's right to know and choose should be safeguarded through clear labeling of GMO products, allowing informed consumer decisions. Additionally, there should be ongoing public engagement and dialogue to educate consumers about the benefits and risks associated with plant biotechnology, addressing misconceptions and fostering a more informed understanding of the technology. Bioethics also intersects with regulatory landscapes. Different countries have varied regulatory frameworks governing the use of GMOs, reflecting diverse cultural, ethical, and political perspectives. An international consensus, or at least a harmonization of standards, would be beneficial to oversee the development and deployment of GMOs globally. This approach should respect local and regional differences but strive for agreements that prevent unethical practices and promote responsible research and development. Finally, the promise of plant

genomics and biotechnology cannot be realized without considering the ethical implications of biotechnological research. This includes maintaining high standards of scientific integrity and transparency in research, ensuring that studies are conducted ethically, and results are reported honestly. Researchers must be vigilant against biases that might skew the interpretation and use of scientific data, especially when such data guide global food policies. In conclusion, the bioethical dimensions of moving plant genomics and biotechnology from the laboratory to the field are multifaceted and require a balanced approach of scientific enthusiasm with ethical prudence. By fostering a dialogue among scientists, policymakers, and the public, and by ensuring that ethical considerations are integrated into the research and deployment of new technologies, plant biotechnology can be developed in a way that respects the planet and its inhabitants, ensuring equitable and sustainable use of genetic innovations.

Biography

Ioannis Ladas is an adjunct professor of Bioethics at Antiochian House of Studies. He studied Theology at the Department of Social Theology at the University of Athens and Philosophy at the University of Patras. He holds master's degree in Philosophy from the Faculty of Philosophy at the University of Athens and master's degree in Theology from the School of Theology at the University of Thessaloniki. He holds PhD in Philosophy from the Faculty of Philosophy at the University of Athens and PhD in Theology from the School of Theology at the University of Thessaloniki.

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Farm safety day camp programming for youth

In response to the youth agricultural related injury statistics and public concern, the Ohio State University has coordinated annual Farm Safety Day Camps for 3rd grade students, reaching over 13,000 youth since its inception. The goal of the day camp is to bring farm safety issues to the forefront. Even though many of today's children do not live on farms, most will have the opportunity to visit a friend's or relative's working farm sometime in their young life and are often unaware of the precautions that need to be exercised while there. Youth need to be made aware of the unique dangers present on the farm. The Farm Safety Day Camp concept aims to raise awareness about rural and farm-related safety for youth, particularly for those who may visit farms or live in agricultural communities. By educating children about potential hazards and safety protocols, the program helps prevent accidents and fosters careful behavior around farm equipment and facilities. It is particularly relevant in rural areas heavily focused on agriculture. Presenters will highlight a farm safety curriculum and day camp strategies to engage community partners, families and youth. Presenters will share how the Farm Safety Day Camp Program is designed and research results of impact over the last two decades of programming.

Biography

Jason A. Hedrick is a Professor with The Ohio State University works as a 4-H Youth Development Educator and administrative leader. He has 31 years of experience leading and directing youth programs, volunteer training, and conducting youth development research. He specializes in youth safety, youth retention/workforce issues and 4-H programming.

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Sub-surface heating of farmland to promote early harvest and increase productivity in Northern Sweden

During the last decades, farmers in the North of Sweden have been struggling with declining profits of their produce forcing many family farms into liquidation or closing. As a result, the farmed land area in the North has been shrinking continuously with about 1% each year since the turn of the new millennium and the self-sufficiency for food in the region has dropped from 50% in 2000 to 25% in 2023.

One major disadvantage northern farmers face in comparison to their colleagues in the south is the late seed and planting date due to the frozen ground in the beginning of the growing season, and the consequential lower ground temperature over the early part of the summer. The cool ground slows root development, which is vital for the growth rate of the rest of the plant. As a result of this delayed start, crop production per hectare will be lower in the North.

But there are also advantages to growing food in the North. For example, the farmland is of very good quality and relatively cheap, and there is generally no lack of irrigation water. The cold winters kill off many of the common pests, which minimizes the need for pesticides. Most importantly however, the region receives more sunlight hours with optimum photosynthesis than most locations in Sweden, which increases the nutrition value and flavour of the crop, especially noticeable in fruits and berries.

The aim of this research project is to provide the existing farmers in the North with methods for increasing their profits by adding in some high value crop on the farm. In this field study, waste heat from the farm in the form of warm air is supplied to underground drainage pipes that are buried horizontally at 10-20 cm depth in the planted field. The warm air thaws the frozen ground around the plant roots and supplies heating from below so that planting can be advanced from end of May to middle of April, when the sunlight hours already exceed 16 hours per day.

During the initial tests 2025-2026, field-cultivated strawberries are being planted to investigate how the onset of flowering and maturation, and volume and quality of the berries in a heated field compares to a reference field. The ground heating and thawing will commence in March

2025. Future research plans include diversifying the pre-heated research field with crops such as asparagus, artichoke, and grapes for white wine production, which have a higher sell price than conventional produce from the North.

Biography

Dr J. Lindblom studied Energy and Environmental Engineering at Luleå University of Technology (LTU) and graduated as MSc in 2000. After a few years working in the industry, she started her PhD studies about water management and renewable energy in agriculture. She received her PhD in Water Resources Engineering at LTU in 2012 and has since then been working at the Department of Civil, Environmental, and Natural Resources Engineering at LTU.

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A step forwards in making Italian biodiversity globally accessible: The NBFC molecular biodiversity platform

Italian biodiversity is remarkably rich and varied due to the geographical and eco-climatic peculiarities of the country. Protecting, conserving, and enhancing this wealth must be a priority, starting with the morphological and molecular categorization of species. Genetic analysis are essential for the conservation, management, and valorization of biodiversity, with several diagnostic, commercial, and forensic implications.

The National Biodiversity Future Center (NBFC) is developing a molecular platform for biodiversity identification by creating a DNA barcode reference library of Italian flora and fauna and by collecting eDNA data. The project aims to barcode over 4,000 species, including endemic, vulnerable, and rare taxa, as well as species essential for ecosystem functioning, such as pollinators. Moreover, NBFC is aggregating existing data produced by Italian researchers and has created a biobank containing genomic samples from Italian flora and fauna. Additionally, several tools for genomic analysis have been implemented.

This platform aims to support biodiversity research by creating thematic databases, including species such as dragonflies, birds, Italian flora, pollinators, and alien species. These databases will facilitate research on biodiversity restoration, conservation, and regeneration, while also providing critical tools for industries, such as supply chain monitoring in the food sector, customs control, and the prevention of invasive species spread in cities.

Finally, to promote the NBFC's efforts in an international context, connections with the International Barcode of Life (iBOL) and the BIOSCAN consortia, as well as their international databases (BOLD and GenBank), will be activated. This strategy will align NBFC with numerous European projects aimed at creating national biodiversity databases, such as ABOL (Austria), GBOL (Germany), NorBOL (Norway), CroBOL (Croatia), and SwissBOL (Switzerland). The active participation of NBFC researchers in populating the platform will contribute to greater visibility for their projects on an international scale and will represent a legacy of NBFC's considerable efforts.

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Heterozygous rice versus arabidopsis thaliana protein-protein interactome profiling by TDOP-seq

Protein-Protein Interactions (PPIs) play a crucial role in understanding molecular mechanisms in plants such as rice (Oryza sativa) and Arabidopsis thaliana. However, traditional methods for PPI network analysis often face limitations in accuracy and coverage. Here, we present an integrated approach combining Touch-down overlapping PCR with HiFi long-read sequencing (TDOP-seq) to enhance the detection and validation of PPIs. This strategy improves the assembly of complex DNA constructs, reduces amplification errors, and enables high-fidelity sequencing of interaction domains. Applying this method to rice and Arabidopsis interactome studies, we achieved comprehensive PPI mapping with enhanced resolution and reliability. We identified novel rice sodium tolerance gene OsST204, bacterial blight resistance genes OsDIR19 and OsDIR22, as well as blast resistance gene OsTPP1 by screening their protein-protein interactions with functionally characterized Arabidopsis proteins. Our results demonstrate that this synergistic technique offers a robust platform for large-scale plant interactomics, facilitating deeper insights into signaling pathways and functional genomics in crops and model plants.

Keywords: Protein-Protein Interactions, Rice (Oryza Sativa), Arabidopsis Thaliana, TDOP-seq.

Biography

Dr. Jie Huang studied Horticulture at the Shenyang Agricultural University, Shenyang China and graduated as MS in 2013. He then joined the research group of Prof. Jianmin Wan at the Institute of State Key Laboratory of Crop Genetics and Germplasm Enhancement, Province and Ministry Co-sponsored Collaborative Innovation Center for Modern Crop Production, Nanjing Agricultural University, Nanjing, China. He received his PhD degree in 2022 at the same institution. He then joined Zhang Jian research team at the China National Rice Research Institute as an assistant researcher. He has published more than 10 research articles in SCI(E) journals.

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Weed management in husk tomato (*Physalis* ixocarpa Brot. Ex Horm.) in Penjamo, Guanajuato. I. diagnosis of weeds and their effect on performance

The husk tomato or green tomato is a solanaceous plant native to Mexico, considered one of the main vegetables in the mexican territory. Its production is affected by pests, diseases and weeds, which reduce fruit yield and production quality. The experiment was conducted in a commercial plot located in the town of La Estrella, in the municipality of Penjamo, Guanajuato, Mexico, with the purposes of identifying the main weeds associated with husk tomato, describing their population behavior throughout the phenological cycle of the crop and evaluating their effect on fruit yield. A randomized complete block design using four replications was used. Six treatments were evaluated with one application: agroecological herbicide in doses of 1 and 1.5 liters·ha-1; Isoxaflutole in three doses 37.5, 75, 112.5 g·ha-1 of a. i.; Halosulfuron methyl in doses of 45 g·ha-1 of a. i., plus a clean control and a weed control. The number of individuals per weed species was sampled and quantified in the absolute control at 17, 24, 38, 52, and 66 days after transplanting (dat). Total yield (t·ha-1), was determined at 87 dat. Twenty-three species of weeds associated with husk tomato belonging to 14 families and 21 genera were identified; 86.95 % (20) were broadleaf species, 8.69 % (2) narrowleaf and 4.34 % (1) cyperaceae. The presence of weeds reduced up to 90% of the yield of tomato fruit. The knowledge of the weeds present in the cultivation of husk tomato and their type, allows for better planning of their agronomic management.

Keywords: Weeds, Alternative Weed Management, Tomatillo, Green Tomato.

Biography

Professor Santiaguillo is an Agricultural Engineer and Master of Science from the Autonomous University of Chapingo (UACh) and a Doctor of Science from the Colegio de Postgraduados, in Mexico. His lines of research are: plant genetic resources, plant genetic improvement and vegetable production. In his career, the execution of various state and national projects stands out; the supervision or guidance of 24 undergraduate and graduate theses; 62 conferences and 52 technical and scientific publications. He is currently a Professor-Researcher at the Western Regional Center of the Autonomous University Chapingo in Guadalajara, Jalisco, Mexico.

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Sustainable weed management: The effects of applying pre- and post-emergence herbicides to *Medicago ruthenica*

Medicago ruthenica is a forage legume crop that is widely used as fodder and for ecological restoration in arid and semi-arid areas in Northcentral Asia. During the seedling stage, weeds challenge the growth and development of *M. ruthenica,* especially in fields sown for seed production. However, strategies to effectively control weeds in crops of *M. ruthenica* using herbicides have not been investigated. We evaluate the efficacy of different herbicides that control pre- and post-emergence of weeds in *M. ruthenica*. The results indicated that the most effective pre-emergence herbicides, imazethapyr (1530 mL ha-1) and flumetsulam (120 mL ha^{-1}), resulted in crop safety and soil microbial community equivalent to a weed-free check. The most effective post-emergence herbicides are imazethapyr+haloxyfop-P (1800+600 mL ha^{-1}) and 2,4-DB haloxyfop-P (2250+600 mL ha^{-1}). These herbicide treatments demonstrate effective control of most weeds (*A. retroflexus, C. album,* and grasses) while ensuring crop safety. Application of these herbicides to control weeds in *M. ruthenica* prior to or after their emergence represents a viable strategy for their control and also improve agricultural viability and crop yield and quality. Our research contributes to sustainable agriculture and ecological restoration in arid regions.

Biography

Dr. Li studied forage science at Shanxi Agriculture University, China and graduated as MS in 2011. He received PhD degree in 2014 at Chinese Academy of Agricultural Sciences. After graduate, he obtained the position of research associate in Chinese Academy of Agricultural Sciences (CAAS), Institute of Grassland Research. Begin 2021, he work at Inner Mongolia University, school of life sciences. He has published 9 research articles in SCI journals.

Kailey Lin
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Multi-fluorescent silk as a minimally invasive indicator of surgical recovery

The precise and effective evaluation of surgical recovery presents significant challenges in the medical field, and current methods for evaluating recovery can be invasive, subjective, and expensive. Fluorescent silk, produced by an altered silkworm diet, has been proposed to have biomedical applications due to its desirable biocompatible, biodegradable and strong mechanical properties. In this study, silkworms will be fed a diet supplemented with different fluorescent chemicals such as Rhodamine B, Rhodamine 110 and Copper for approximately 5-14 days and the cocoons from these silkworms will be analyzed to determine whether it is possible for silk fibers to contain a combination of different fluorescent properties. The silk threads will then be immersed in synthetic blood to determine how bodily fluids may impact the fluorescent properties. Results show silkworms can produce multi-fluorescent silk that is similar in size and strength to commercially available surgical sutures, the green fluorophores showed around 50% reduction in fluorescence intensity after one week immersion in synthetic blood while the red fluorophores remained persistent and the concentration of chemicals the silkworms were fed affected their growth rate. From a mechanical silk test, experimental silk was approximately 70% the strength of commercially available surgical sutures, sustaining a minimum of 420 g and maximum of 480 g. The silk produced through the methods described in this study is comparable to that of synthetic sutures in size and function with the additional property of being multi-fluorescent. By providing a more efficient way to evaluate recovery, this study makes post-op monitoring more cost-effective, provides immediate feedback, and increases time in a doctor's day enabling them to provide care to more patients.

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Autonomous climate-resilient farming: How AIIoT and renewable energy integration enable net-zero aquaponics at scale

As global agriculture faces unprecedented climate challenges, our research presents an innovative AIoT framework currently undergoing patent review that transforms aquaponics operations. The system's proprietary edge computing architecture processes real-time data from 12+ sensor inputs - including water chemistry, fish biometrics via computer vision, and plant micronutrients - to maintain optimal growing conditions with 92% operational accuracy. Early field implementations across three climatic zones have demonstrated compelling results: a 40% reduction in fish mortality rates and 30% yield improvements in leafy greens compared to conventional aquaponics setups.

Central to this advancement is the AquaECO decision-support platform, an AI assistant that provides growers with: (1) predictive alerts for system imbalances 12-48 hours before critical thresholds are breached, (2) prescriptive maintenance recommendations tailored to local conditions, and (3) continuous carbon footprint monitoring. Our presentation will feature an interactive demonstration of this interface, showcasing its ability to reduce energy waste by identifying and correcting suboptimal pump schedules in real-time.

The integrated renewable energy module, another key innovation currently in the patenting process, combines adaptive solar/wind harvesting with intelligent battery cycling to achieve energy autonomy. Pilot installations have consistently delivered 40% energy cost savings while maintaining uninterrupted operation during grid outages. Designed for accessibility, the system's multilingual voice/SMS interface has reduced skilled labor requirements by 70% in test deployments, making advanced aquaponics management accessible to non-technical operators.

This work aligns with multiple UN Sustainable Development Goals by addressing both food security (SDG 2) and climate action (SDG 13). We will present validated performance data from operational pilots in Nigeria and the UK, along with a practical adoption framework for different farm scales. The session will conclude with an open discussion on scaling pathways for this technology, including our ongoing collaborations with agricultural extension networks to bridge the digital divide in smallholder farming communities.

Biography

Kelly Ochuko Egode holds an MSc in AI/Data Science (Distinction, University of Hull, UK) and a BEng in Electrical Engineering (FUT Akure, Nigeria). A multidisciplinary technology leader, he is the Founder/ CTO of Omfeonix Agritech Ltd, where he pioneers AI-driven Agriculture 4.0 solutions, including AquaECO AI—a real-time aquaponics monitoring platform. With 18+ years in AI, IoT, and digital transformation across finance and agriculture, he has led projects yielding 25% operational efficiency gains and 70% labor reduction. A NeurIPS/IEEE mentor and published researcher (31+ citations), Kelly bridges cutting-edge tech with sustainability, speaking at global forums (AAAI and the Aquaponics Association).

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Phytochemical profiling, antibacterial activity and antibiofilm activity of wild Tunisian rosemary (*Rosmarinus officinalis L.*) and thyme (*Thymbra capitata L.*) essential oils against pathogenic bacteria

The excessive use of antibiotics in several fields, such as agriculture, food and pharmaceutical industries and medicine leads to the emergence of multi-resistant bacteria and the evolution of antimicrobial resistance genes with serious consequences on environment and human health. The bacteria adopted many drug-resistance strategies such as drug molecules inactivation, mutant proteins synthesis, and biofilm production. Therefore, controlling bacteria biofilm formation's still a challenging issue that requires discovery and development of effective and safe alternative antimicrobials that may be used for the prevention of antibiotic resistance and infection recurrence. In fact, aromatic and medicinal plant essential oils have been used for thousands of years as natural medicines to fight against a multitude of pathogens, such as bacteria, fungi and viruses. *Rosemary (Rosmarinus officinalis L.) and Thym (Thymbra capitata L.)* essential oils have been used in food, pharmaceutical, cosmetics, and industries. Indeed, these oils have several biological properties: antioxidant, antibacterial, antifungal, antiviral and antibiofilm. The present study was conducted to investigate the phytochemical composition, to evaluate the antibacterial activity and anti-biofilm effect of Tunisian wild Rosemary and Thyme Essential Oils (REOs and TEOs). The phytochemical composition was analyzed by GC-MS. The antibacterial activity, evaluated by disc diffusion and micro-dilution method, and the anti-biofilm activity assessed using a crystal violet test, were tested against two Gram-positive bacteria *(Staphylococcus aureus and Staphylococcus epidermidis) and two Gram-negative strains (Escherichia coli and Salmonella typhimurium)*. GC-MS analysis revealed thirty-one compounds in REOs. The main components that define the chemotype were eucalyptol,

α-pinene and camphor (48.98, 13.84 and 6.22, respectively). For TEOs, twenty compounds were identified in which represent 99.8% of the oil. The main component of the TEOs that define the chemotype was carvacrol (85.41%). The inhibition zone diameter values were determined and the results showed that all the tested REOs showed a strong activity against all bacterial strains. The Minimum Inhibitory Concentration (MIC) varied between <0.97 and 1.95 and the Minimum Bactericidal Concentration (MBC) ranged from 0.97 to 15.62 µL/mL. Moreover, the studied REOs showed potential anti-bifilm activities. The percentages of inhibition varied from >50% to more than 90%. Similarly, in the eradication activity, the majority of the tested REOs were able to eradicate the bacterial preinstalled biofilms with rates attending 92%. Furthermore, the studied TEOs exhibited interesting antibacterial activity against all tested bacterial strains. Also, the studied TEOs showed potential anti-biofilm activity. The percentages of inhibition varied from 57.92% to 83.72%. Similarly, in the eradication activity, the tested TEOs were able to eradicate the bacterial preinstalled biofilms with rates attending the 88.41%. Overall, the results demonstrate that REOs and TEOs present strong antibacterial and antibiofilm activities and could be, explored for food pharmaceutical and cosmetics industries with appreciable human health-promoting properties.

Keywords: Rosemary (*Rosmarinus officinalis L.*), Thyme (*Thymbra capitata L.*), Essential Oils, Phytochemical Profile, Pathogenic Bacteria, Antibacterial Activity, Antibiofilm Effect.

Biography

Dr. Kheiria Hcini is a researcher at the Laboratory of Biodiversity, Biotechnology and Climate Change (LR11ES09), University of Tunis El Manar, Tunisia and Associate Professor at the University of Gafsa. She holds a doctorate in Biological Sciences from the University of Tunis El Manar, Tunisia. She has expertise in phytochemical characterization and evaluation of biological properties of essential oils and polyphenolic compounds of aromatic and medicinal plants. Furthermore, her area of expertise is the valorization of hydrodistillation residues. Dr. Hcini is also interested in the nanoencapsulation of plant extracts in Silk Fibroin Nanoparticles (SFNs) for the controlled release of these compounds in applications in the field of biomedicine, cosmetics, and food.

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Insect natural enemies of the fall armyworm *Spodoptera frugiperda* in Côte d'Ivoire

Maize production has been compromised in Côte d'Ivoire since the discovery of the fall armyworm, *Spodoptera frugiperda,* in 2017. As chemical control has shown its limitations, the search for alternative solutions, including insect biological control agents, is being encouraged. An exhaustive inventory of this pest's natural enemies was therefore carried out in three main maize-growing areas in Côte d'Ivoire (forest, transition, savannah). In addition, the predatory capacity of adults and stage 3, 4 and 5 larvae of *Rhynocoris albopilosus*, a generalist predator present in maize plots, was assessed on stage 2 *S. frugiperda* caterpillars in the laboratory. In a semi-controlled environment, only adults and stage 5 larvae of the predator were tested. A total of 10,409 natural enemy insects in six orders were collected. Hymenoptera and Coleoptera were the most abundant, with an average of 156.14±18.21 and 124.03±34.70 individuals respectively. Natural enemies were caught to a greater extent in forested areas and in untreated maize plots. Predators were in the majority, with 67.84% of natural enemies captured. The predatory capacity of *R. albopilosus* increases with the stage of development. In the laboratory, *R. albopilosus* stages 3, 4, 5 and adult insects consumed 7.37, 8.92, 12.25 and 11.78 prey per day respectively. In a semi-controlled environment, stage 5 of the predator was the most voracious, with an average of 8.83 *S. frugiperda* larvae consumed in 48h. Among the natural enemies of *S. frugiperda, R. albopilosus* was remarkably active on the pest and can be considered a good candidate as a biological control agent.

Keywords: *Spodoptera Frugiperda*, Natural Enemies, Maize, Biological Control, Côte d'Ivoire.

Luis L. Vázquez
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The nutritional and immunological functions of the diversity of plants grown in family and community gardens need to be valued

Agri-food research needs a systemic approach to facilitate the stability of the functional interactions of biodiversity with cultivated plants and to ensure that fresh agricultural products, when ingested by people, maintain a stable nutritional composition and microbiome, thus contributing to recovering the role of biodiversity in preserving health. Fresh foods should not only be valued for being free of agrochemical residues and biosafe, but they also need to contribute to people's nutrition and immunity. This contribution is the result of research that is carried out through exchange and reflection meetings with families in rural, peri-urban and urban areas of Cuba and has the objective of synthesizing food experiences and perceptions about the food-health relationship. The following criteria were assumed: Healthy Food Origin (HFO); Nutritional Diversity of Foods (NDF); Nutritional Seasonality of Food (NSF) and Family Perception of Health-Food (FPHF). Families have access to food from Family Food Self-Management (FFSM), direct access to Community Food Gardens (CFG), access to Direct Sales Points of Producer Cooperatives (DSPPC) and acquisition in Food Offers in Markets (FOM). The Healthy Food Origin (HFO) was in the following order: FOM>DSPPC>CFG>FFSM. Regarding Nutritional Diversity of Foods (NDF), families most frequently eat 3-4 types of fresh foods (roots and tubers, bananas, vegetables, fruits) and up to 3 species of each type, with predominance for those living in urban areas that have access to FOM, DSPPC and CFG, a characteristic that shows the dependence on a market for basic products grown in rural areas and the contribution of leafy vegetables obtained in community agriculture in urban areas. In contrast, the FFSM eat more than 4 types of foods and more than three species of each type; although, the diversity of leafy vegetables is lower than that of families that have access to CFG. The seasonality of food is better distributed in FFSM systems, compared to those that depend on FOM, DSPPC and CFG, a situation that reinforces the contribution of conucos or gardens on farms and family garden to the feeding of families. The predominant relative perceptions regarding the food-health relationship are the following: we are healthier if we combine agricultural foods and meats>in general we feel better during the months when there are more vegetables and fruits>we have had family experiences about the contribution of food to the recovery of health>we have the tradition of reinforcing food diversity in pregnant women, children and the elderly>when the Covid-19 pandemic we were not affected because, in addition to social isolation, we eat a diversity of nutritious foods. These results suggest that primary production systems in rural areas, which obtain products to be transported to distant markets in urban areas (FOM, DSPPC), concentrate on a few basic products that better resist handling during transport, a characteristic that reduces the nutritional and immunological diversity and seasonality of fresh foods that urban families have access to; justifying the need to promote Community Food Gardens (CFG) and the Family Food Self-Management (FFSM).

Biography

Professor Luis L. Vázquez is an agricultural engineer and doctor of science. He is a retired senior researcher of entomology and pest management at the Institute of Plant Health Research in Havana, where he worked from 1977 to 2014. Subsequently, he has advised and facilitated agroecology projects in family farming. He is the author of six books and chapters in eight books; He has published more than 120 articles in scientific journals. He has been a visiting professor of postgraduate courses at universities in Cuba and other countries in the region.

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Evaluation of organic products for the control of foliar diseases in resistant grapevine varieties

Erysiphe necator and *Plasmopara viticola* are the causal agents of two of the main fungal diseases responsible for important economic losses in grapevine. To control these diseases, numerous chemical treatments are applied, favouring environmental deterioration and endangering the sustainability of the vineyard. To achieve the objectives of the European Green Deal, one environmentally friendly strategy is the introduction of varieties with resistance genes to fungal diseases. Therefore, various initiatives have led to the development of more than 150 new cultivars as a result of the introgression of resistance genes from American and Asian Vitis species with different genetic backgrounds of *V. vinifera*. The most recent ones contain a wide range of *V.vinifera* genome (75% to 94%) trying to preserve the quality characteristics of their European parents. These genes do not provide total resistance to pathogens and some treatments are needed. In this context, the objective of this work is to implement a sustainable agroecological strategy with the combination of resistant varieties with 6 basic substances, low risk products with less environmental impact. This objective is framed within the Shield 4 Grape project (HORIZON-CL6-2023-BIODIV-01-14). Firstly, the we evaluated the growing capacity of the 2 pathogens, *E. necator* and *P. viticola*, in 9 PIWI (Rpv3 and/or Rpv12 genes for downy mildew and Ren 1 for powdery mildew) varieties in in vitro assays. The in vitro tests were performed on detached leaves previously sterilized, the inoculation of powdery mildew was done with a vacuum tower by massive inoculation recording the growth of the fungus at 7 and 14 days, and for downy mildew by dilution at a concentration of 105 ufc/ml, collecting the results at 5 and 7 days. For powdery mildew, at 7 days, mycelium growth, without development of conidiophores, was observed in all varieties, and at 14 days, the lowest incidence was recorded in S.Rytos, Fleurtai and Soreli. For downy mildew, C.Eidos, S.Kretos, S.Nepis and Soreli were the most resistant, Secondly, Soreli and S.Rytos were selected to implement an integrated pest management assay in the greenhouse, with Viura and Chardonay as controls. Potassium hydrocarbonate, lecithin, chitosan and extracts of orange oil, salix and equisetum were used at the doses recommended by the manufacturer. The evaluation of disease incidence was made from 10 days after inoculation for *E. necator* and 5 days for *P. viticola* until the date of action of the product. Results from the IPM experiment in the greenhouse will be discussed.

Biography

Dr. María del Mar Hernández studied Biology (in the specialty of biochemistry) at the University of Valencia, and graduated in 1987. She later joined the research group of Professor Eduardo Primo Yúfera at the Polytechnic University of Valencia where received her PhD in 1995 at the same institution. She is currently working in the Department of Agriculture and Food at the University of La Rioja. She has published more than 15 research articles in SCI (E) journals.

Marjana Zajc*, Lovro Rupar
Department of Regional Geology, Geological Survey of Slovenia, Ljubljana, Slovenia

3D GPR models of agricultural fields for analyzing changing soil conditions

Soil characteristics of agricultural fields are traditionally determined by pedological analyses, where soil samples are collected from each horizon within pedological profiles. These provide information on soil characteristic from specific points in the agricultural field. However, due to the heterogeneity of agricultural fields, where soil conditions can change both laterally and vertically, data gathered from these points cannot simply be interpolated across entire fields. Increasing the number of pedological profiles within the area of the field would not only be costly and time-consuming but also extremely invasive.

Non-invasive techniques can help with investigating the changing conditions of agricultural fields and determining areas where additional pedological profiling is needed. One such method is the Ground Penetrating Radar (GPR), a non-invasive geophysical method for investigating the near subsurface. By recording parallel GPR profiles across the agricultural fields, it is possible to merge 2D profiles into 3D models that can be further analysed by horizontal slices at different depths. This enables us to observe the changes of soil characteristics across entire fields and locate possible areas of anomalies, such as areas of higher water and nutrient retention and/or faster runoff, as well as paleochannels of nearby streams and rivers. These land features have a different soil composition and thus crucially impact crop growth as they require irrigation and fertilisation regimes different from their surroundings. Identifying such areas can help landowners adapt their precision agriculture practices for the changing field conditions and advance their sustainable farming practices.

The results of a 3D model of an agricultural field created from parallel 2D GPR profiles will be shown. The analysis of horizontal slices of the 3D model uncovered a clearly visible paleochannel at the depth of approx. 0.5 m. This paleochannel of a nearby stream runs across the field at the exact area where crop growth is heavily reduced in comparison to the surrounding area.

This research is co-funded by the Slovenian National Committee of the UNESCO, International Geoscience and Geoparks Programme, grant No. C3360-25-456005, and its project IGCP 730: Hydrogeological Significance of Mediterranean Geoparks. It is also co-funded by the Slovenian Research and Innovation Agency (ARIS) project No. J1-4412 and programmes P1-0020 and P1-0011.

Biography

Marjana Zajc obtained her Ph.D. in 2015. Throughout her doctoral research, the emphasis of her work was on the use of GPR in geology. During her postdoctoral research at the Life and Earth Institute at UCL, Belgium, she expanded her knowledge in the field of GPR to agronomic applications. In 2017, she started working at the Geological Survey of Slovenia, where she is using GPR to study the impact of agricultural activity on groundwater in an ongoing research project 'Use of the non-invasive GPR method and remote sensing for determining groundwater vulnerability due to anthropogenic impacts'.

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Effect of exogenous treatment with Nitric Oxide (NO) on redox homeostasis in barley seedlings (*Hordeum vulgare L.*) Under copper stress

The present research investigates the protective mechanism of Nitric Oxide (NO) in regulating tolerance to Cu-induced toxicity in shoots of barley (Hordeum vulgare L.). After 10 days, treatment with 200 µM CuCl2 caused a significant reduction in growth and photosynthetic efficiency concomitant with a strong increase in the contents of Reactive Oxygen Species (ROS), antioxidant enzymes activities such as Catalase (CAT), Superoxide Dismutase (SOD), Guaiacol Peroxidase (GPOX) and Glutathione Peroxidase (GPX). An increase in the lipid peroxidation markers Malondialdehyde (MDA) and Lipoxygenase Activity (LOX) indicated oxidative stress. Furthermore, inhibition of growth in 200 µM Cu-treated plants was associated with a reduction in carotenoids, chlorophyll and maximum photosystem II efficiency. However, copper treatment provoked a strong increase in activity of the glutathione-ascorbate cycle enzymes Ascorbate Peroxidase (APX), Dehydroascorbate Reductase (DHAR), Monodehydroascorbate Reductase (MDAR) and Glutathione Reductase (GR), but a decrease in levels of the non-enzymatic antioxidant compounds Glutathione (GSH), Ascorbate (AsA). The addition of 500 µM of the Nitric Oxide (NO) donor, Sodium Nitroprusside (SNP), to the growth medium alleviated Cu toxicity by reducing Cu uptake and enhancing antioxidant capacity, as indicated by increased contents of GSH and AsA. The current results show that NO addition can alleviate Cu toxicity by affecting the antioxidant defense system, photosynthetic system and maintaining the glutathione-ascorbate cycle status, suggesting that NO treatment protects proteins against oxidation by regulating the cellular redox homeostasis.

Biography

Dr. Marouane Ben Massoud studied Biology at the University of Carthage, Tunisia and the University College Cork, Ireland. He currently works at the School of Biological, Earth and Environmental Sciences, University College Cork. Marouane does research in Cell Biology, Plant Physiology, Molecular Biology and Proteomics. Their current project is 'Alleviation of Heavy Metals Toxicity in Germinating Seeds by Exogenous Chemical Effectors'.

Martin Banov*, Viktor Kolchakov

Scientific Department Genesis, Geography and Classification of Soils, N. Poushkarov Institute of Soil Science Agrotechnologies and Plant Protection/Professor, Sofia, Bulgaria

Developing a system for land assessment and improving soil health on farm land

The system developed by us adheres to the limitation methods recommended by the FAO, and more precisely to those that take into account the number and degree of existing limitations for a certain set of land characteristics and is tailored to the specifics of agricultural production at the farm level. The research enables dynamic monitoring of the changes in the qualities of the soils in accordance with the measures taken to improve their health.

In its initial version, a limited set of soil characteristics was provided to characterize the individual farm. The aim was to make it easier for the farmer to provide the necessary information.

The land features selected for work are grouped into 4 large groups. When selecting the working characteristics of the lands, we complied with the rule to work with the smallest possible number of characteristics that describe as fully as possible the agro-ecological conditions in relation to the requirements of the plants, while at the same time not allowing double and triple evaluation of the same characteristic.

The degrees of restrictions (from L0 to L4) are determined for each land feature separately through the developed scales, and on this basis the suitability for agricultural use of the farm is obtained. A comprehensive assessment and classification of farms by suitability for agriculture is carried out.

Biography

DSc Martin Banov graduated as a land engineer in 1983. He defended his doctorate in the field of soil science in 1989. In 2021 he defended his dissertation on the topic Methodology for the assessment and categorization of agricultural lands with reclaimed soils in Bulgaria, for the degree of Doctor of Sciences. In the period from 2019 to 2023 he was the President of the Agricultural Academy, Sofia, Bulgaria. He is currently a professor at the N. Poushkarov Institute of Soil Science Agrotechnologies and Plant Protection, Sofia, Bulgaria. He has published more than 170 research articles in SCI (E) journals.

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Microelement profile of soybean forage managed by intercropping and bio-fertilizer use

One of the foremost advantages of soybean forage production is flexibility of harvest date due to retention of high nutritional quality of plant over longer period. This characteristic is particularly desirable in intercropping systems, where harvesting time must take in account the yield and quality of multiple crops. As deficiencies in essential mineral elements can affect normal physiological functions in animals, and so impair forage utilization, objective of this study was to investigate the microelements accumulation in different parts (vegetative and reproductive) of the soybean plant, intercropped with common millet, simultaneously identifying the most appropriate sustainable agricultural practice that enhance accumulation of beneficial elements in biomass. The experiment encompassed three intercrop combinations: AR-alternating rows, AS1-alternating strips consisted of two rows of soybean and two rows of millet, AS2-alternating strips consisted of two rows of soybean and four rows of millet, as well as soybean mono-crop, as control. The effect of Bio-Fertilizer Coveron (BF) was also examined. In general, soybean biomass is deficient in micro-elements, particularly Zn and Cu, necessary to meet feed requirements. AS1 combination proved to be perspective for increasing accumulation of B and Zn in vegetative part of biomass, especially in combination with BF. Additionally, AS1 combination, in general, resulted in the greatest accumulation of Cr and Mn in reproductive part, i.e. pods, thus complementing nutritional value of soybean. On the other side, AR combination without BF could be recommended when higher concentration of Cr, Cu and Zn in vegetative part of soybean biomass is needed, whereas the increased Cr, Mn, Co and Ni concentration in reproductive part was present, too. Although integration of intercropping and BF influenced significant changes in accumulation of Cr in both parts of soybean, as well as Cu and Zn in vegetative and Mn and Co in reproductive part, independent effect of BF was not observed. According to the results, the inclusion of common millet in intercropping with soybean appears to enhance microelements concentration in soybean forage, particularly when implemented in a 1:1 ratio. In contrast, the effect of bio-fertilizer was relatively limited.

Biography

Milena Šenk completed her Master's degree in Chemistry at the University of Belgrade, Serbia, in 2015. In 2018, she joined the research group of dr Simić at the Maize Research Institute Zemun Polje, Belgrade. She is currently employed as a Research Assistant within the Agro-ecology and Cropping Practiced Group. Her research is primarily focused on investigating the effects of sustainable agricultural practices on soil properties and plant nutrient responses.

Muhammed D Baldeh*, Musa Baldeh
Surex Farms Banjul, The Gambia

Global advances in agricultural and horticultural sciences

It is a pleasure to address you today on the topic Global Advances in Agricultural and Horticultural Sciences, with a particular focus on their relevance and application in The Gambia.

As we gather to explore innovations in agriculture and horticulture, we are reminded of the pressing need to localize global solutions—especially in regions like The Gambia, where farming remains the backbone of the economy and a vital lifeline for rural communities.

The Gambia's climate, characterized by a distinct dry and rainy season, presents both opportunities and challenges. While the rainy season supports crop cultivation, erratic rainfall patterns, rising temperatures, and frequent dry spells—driven by climate change—have increasingly put food production at risk.

However, science and innovation offer hope. Globally, we are seeing transformative advances: climate-smart agriculture, drought-resistant crop varieties, improved soil management techniques, and digital technologies like satellite mapping and mobile-based extension services. These innovations are not just theoretical—they are adaptable and relevant to Gambian realities.

In the face of accelerating climate change, population growth, and evolving consumer demands, the global landscape of agricultural and horticultural sciences is undergoing a transformative shift. This presentation explores the latest innovations and interdisciplinary approaches driving sustainable productivity, resource efficiency, and crop resilience. Key topics include precision agriculture, genome editing (CRISPR-Cas9), controlled environment agriculture, integrated pest management, and soil health regeneration. Emphasis is also placed on the role of digital technologies—such as AI, remote sensing, and big data analytics—in optimizing decision-making and fostering climate-smart practices. Case studies from both developed and emerging economies illustrate how science-led solutions are enhancing food security, economic viability, and environmental stewardship. The session aims to provide a global perspective on the synergy between traditional knowledge and modern science, highlighting collaborative strategies that are shaping the future of agriculture and horticulture.
In The Gambia, there is growing momentum to integrate conservation agriculture, promote

horticultural diversification, and adopt small-scale irrigation systems that reduce dependency on rainfall. At the same time, partnerships are being formed to bring biofortified crops, organic practices, and youth-led agri-tech solutions into the mainstream of Gambian farming.

Thank you, and I look forward to engaging with you on how we can translate these advances into real impact for The Gambia and beyond.

Biography

Mr. Baldeh studied Management at the University of The Gambia and graduated in 2021. He then joined an Agric business group of Musa Baldeh at Surex Farms, Gambia. He received his certification in food processing in 2023 at the same organization. Baldeh has partnered with many agricultural agencies earning him a great deal of experience and exposure.

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Soil physical property assessment of large-scale paddy fields using autonomous robots

In recent years, due to the effects of climate change, intense rainfall exceeding 50 mm per hour has become more increasing. Large-scale flooding caused by linear rainbands and massive typhoons occurs almost every year somewhere in Japan. Agricultural fields are also suffering significant damage due to waterlogging. In agricultural production, improving soil physical properties, particularly field drainage, has become a more urgent issue than soil chemical properties.

Therefore, from the perspective of soil health, we have been developing technology to efficiently evaluate soil physical properties in fields within a short time. A cone penetrometer can obtain soil hardness data at 1 cm increments up to a depth of 60 cm in 60 to 90 seconds. Using this device, we collected data in an about 10-meter grid within fields and developed a technique to assess field drainage based on spatial distribution of soil hardness. To reduce labor and improve efficiency in data collection, we have also been working on the development of a robot that automatically measures soil hardness.

On March 11, 2011, the Great East Japan Earthquake triggered a tsunami that damaged the coastal areas of Tohoku and Kanto, including Fukushima Prefecture. A project was initiated to restore the tsunami-affected paddy fields. In a large-scale 1-hectare paddy fields in Minamisoma City, Fukushima Prefecture, we used an autonomous penetration-type soil hardness measurement robot to evaluate soil physical variability and estimate field drainage, comparing the results with those obtained using a conventional cone penetrometer. The autonomous penetration-type soil hardness measurement robot, which was in the prototype stage, began full-scale operation in this project. This will be the world's first presentation of operational results from an autonomous soil hardness measurement robot.

Biography

Dr. Ebato studied soil science at Kyoto University, Japan, and obtained a master's degree. He then conducted research on the soil adsorption of herbicides at Kyoto Prefectural University, Japan, and earned his Ph.D. in 2003. In the same year, he joined the National Agriculture and Food Research Organization (NARO), where he conducted research on cattle grazing and environmental impact assessment. Witnessing soil degradation caused by cattle trampling during grazing, he began research on simplified soil physical diagnostics and field drainage from 2015. He has developed simplified soil physical diagnostic techniques and related technologies, resulting in 14 patent applications and acquisitions.

Neeraj Shukla

Department of Botany, P.S.P.T. Degree College, Ramaipur, Kanpur (U.P.), India

Abundance of aero-algal allergens and public health hazards in Pandu River ecosystem

Algae are ubiquitous and omnipresent organisms growing profusely in varied environments. Airborne algae remain viable in the atmosphere. Allergenic algae are dispersed effectively by air in dried condition. Dispersed algal allergens cause either contact skin or respiratory allergies among human beings and cattle. The airborne algal flora and its potential allergenicity is a primacy for intensive investigation. There are few investigations scattered in the literature vis-a-vis aero-algae. Quantitative data milieu of algal growth and infestation in Pandu river between Bingawan, Kanpur and Sheorapur, Fatehpur is lacking. Present study enriches the available literature and fills this vacuum in order to obtain and evaluate pertinent information relating allergenic forms of algae and their prevalence in the air. Present observations record aero-algal species of Pandu River ecosystem and portrays its importance in spread of allergenic diseases. The marked resemblance between allergenic algae in air around Pandu river and its water records cyclic transmission of aquatic and aero-algal allergens in air and riverine water. Present investigation emphasizes implications of aero-algae causing prospective public health hazards and it's control.

Biography

Dr. Neeraj Shukla studied at D.A.V. College, Kanpur, India and took Master of Science degree in the year 1993. He then joined research under the supervision of Prof. A. C. Shukla at the Biopollution Study Centre, Christ Church College, Kanpur. He received his PhD degree in 2002 from C.S.J.M. University, Kanpur. He is currently Assistant Professor and Head of Botany Department, P.S.P.T. Degree College, C.S.J.M. University, Kanpur. He is teaching, Botany to B.Sc. and M.Sc.students since last two decades. He is liked by his students for his clarity of subject and teaching methodology. He has contributed 24 research papers at various national and international seminars and conferences.

Priyanka S. Patil, Nileema S. Gore*

Institute of Biosciences and Technology, Mahatma Gandhi Mission University, Chhatrapati Sambhajinagar, MS, India

Bacterial non-ribosomal peptides: A sustainable approach for combatting phytopathogenic fungi in agriculture

Plant diseases are the major threats to sustainable agriculture, leading to yearly yield losses. Several phytopathogens such as fungi, bacteria and viruses are known to cause plant diseases that affect agricultural production. To overcome this, the use of toxic chemicals has increased, raising public concern due to their negative impacts on human health and the environment. An alternative to chemicals is the application of biological agents, which may include various bioactive compounds from microbes. Bacterial species' Non-Ribosomal Peptides (NRPs) are becoming promising alternatives to synthetic fungicides due to their antifungal activities. NRPs are small peptides usually containing special amino acids and other organic acids and are biosynthesised by Non-Ribosomal Peptide Synthetases (NRPSs). NRPs are used to control phytopathogens in fields. In this review, we highlighted the NRPs' mechanisms of action against key fungal pathogens like Fusarium, Alternaria, and Botrytis. These mechanisms include disrupting cell membrane integrity, interfering with cell wall synthesis, and inhibiting essential cellular processes. We have also addressed various methods for utilising NRPs in agriculture for enhanced production, and formulation into biocontrol agents. Overall, NRPs offer significant potential to enhance crop resilience and reduce losses from fungal diseases, aligning with sustainable agriculture practices. However, further research and collaboration are needed to fully realise their potential in agricultural systems.

Biography

Dr. Nileema Gore is working as associate professor at Institute of Biosciences and Technology, MGM University, Chhatrapati Sambhajinagar, MS, India. She has received INSPIRE Fellowship from Department of Science & Technology (DST), Government of India during Ph.D. Program. She has over nine years of research and academic experience. She is recognized Ph.D. Guide in the subject of Microbiology in the Faculty of basic and Applied Sciences of MGM University. She has published more than 14 research papers in national and international journals. She has authored 2 books and 2 book chapter. Her research interest is plant protection and agricultural microbiology.

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Morphologic and transcriptomic response of two libyan wheat germplasms in the form of P5CS, and PEPCs genes under salt stress and some nutrient additions

The study has been conducted to find the effects of salt stress and nutrient additions (Iron and potassium) on growth, yield, Proline-5-Carboxylate Synthase (P5CS), and Phosphoenolpyruvate Carboxylase (PEPCs) Genes, and gene expression of two Libyan bread wheat varieties. A factorial design of a greenhouse experiment with three replications was applied to accomplish the study. The treatments were control (distilled water), 5000 ppm NaCl, 5000 ppm NaCl+1500 mg/L potassium nitrate spray, and 5000 ppm NaCl+1500 mg/L potassium nitrate+50 µmol/L Fe-EDTA. These treatments are applied to evaluate and assess whether iron and potassium can alleviate the negative effects of salt stress on bread wheat varieties through some morphological and molecular traits. Results revealed that salt stress significantly reduced plant growth and productivity of both varieties by 29.0% to 52.8%. The addition of potassium improved the performance of the morpho-metric parameters of both genotypes under salt stress. The performance was more effective for the Iron+Potassium treatment, 26.6% to 88.3%, than for potassium, only 12.7% to 46.9%. At the molecular level, salinity induced the expression of PEPC and P5CS in Khrissi more than in Bohoot 210. The increase of PEPC and P5CS gene expression was significantly higher by adding nutrients. It exceeded twofold in Bohoot 210 and threefold in Khrissi compared to the control, and the Iron+Potassium treatment allowed the highest gene expressions.

Biography

Dr. Omar Sulaiman Belhaj studied Water and Soil Science and got a master's in environmental science and engineering from the Libyan Academy in 2009. He joined the research group of Prof. Elhadi Hadia at the University of Elmergib, Libya to study stress conditions on growth and yield on different crops such as beans and wheat. In 2015 he joined the research group of Prof. William Hargrove at the University of Texas at El Paso, U.S., to find solutions to water scarcity in the Middle Rio Grande Region, Southwest U.S. He received his PhD degree in 2022 at the same institution. After a year postdoctoral fellowship, he joined the Department of Earth, Environmental, and Resource Sciences at the University of Texas at El Paso, U.S., in 2023 as a faculty member instructing and coordinating the introductory laboratories. He has published many research articles in various science journals.

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Species proportion modulates biomass allocation, nitrogen dynamics and soil biogeochemistry in rye–vetch intercropping systems

Intercropping cereal–legume species is a well-established strategy to enhance agroecosystem sustainability, yet the influence of species proportion on plant performance and below-ground processes remains incompletely understood. In this study, we investigated how varying the relative abundance of rye (*Secale cereale L.*) and vetch (*Vicia sativa L.*) affects plant Nitrogen (N) acquisition, biomass partitioning, and soil biochemical activity under controlled conditions. The experimental design included four treatments: Monocropping (100% rye or 100% vetch) and intercropping with two contrasting species ratios (66:33 and 33:66 rye:vetch). Root and shoot dry biomass and total N content were quantified, alongside soil analyses encompassing nitrogen-related enzyme activities, untargeted metabolomic profiling, and ^15N stable isotope analysis. Preliminary findings indicate that species proportion strongly influenced both biomass allocation and N distribution within plant organs. Intercropping enhanced complementary interactions in N use and altered the balance between soil-and symbiotically-derived N sources. Soil enzymatic activities linked to the N cycle, as well as metabolomic fingerprints, varied across treatments, reflecting shifts in microbial function and plant–microbe interactions. Overall, our results highlight that species proportion is a key driver of both plant-level responses and rhizosphere biochemical processes in mixed cropping systems. Understanding these interactions is essential for designing functionally optimized intercropping strategies that support nutrient efficiency and soil health.

Biography

Dr. Paola Ganugi studied Agricultural Sciences at the Catholic University of the Sacred Heart (Italy), where she obtained both her MSc (2017) and PhD in Agricultural Genetics (2020). She completed visiting fellowships at the University of Pisa and ZALF (Germany), focusing on plant–microbiome interactions. Currently, she is a Researcher (RTDa) at the University of Turin, working in Agricultural Chemistry. Her research explores plant–soil interactions, nutrient dynamics, and metabolomic responses to abiotic stress.

Rahul Chillawar

Department of Environmental Science Yeshwant Mahavidyalaya Nanded (M.S.) India- 431602

Assessment of eutrophication and proliferation of water hyacinth in the Godavari River at Nanded district

The Godavari River, known as the Dakshin Ganga, is India's second-largest river and a vital freshwater source for millions of people across multiple states. In the Nanded district of Maharashtra, the river supports a range of essential functions including agriculture, fisheries, domestic water supply, and religious activities. However, increasing urbanization, industrialization, and population growth have significantly compromised the river's ecological balance. One of the most pressing environmental issues threatening the river's health is eutrophication, which has led to the excessive proliferation of *Eichhornia crassipes* (commonly known as water hyacinth), an invasive aquatic plant. This study was undertaken to investigate the relationship between nutrient pollution and the uncontrolled growth of water hyacinth in the Godavari River at Nanded, and to assess the broader ecological implications of this phenomenon. Water samples were collected from hyacinth-affected sections of the river in month of July using a composite grab sampling method to ensure representative data.

The samples were analysed for various physical, chemical, biological, and nutrient parameters. The results indicate that the river is undergoing significant nutrient enrichment, particularly from nitrogen (including nitrate and ammonia) and phosphate. These nutrients, while essential in limited amounts, were found at elevated levels. Findings strongly suggest that the primary drivers of eutrophication in the river are untreated domestic sewage and industrial efluents rich in organic matter and nutrients. The study also recorded other vital parameters such as Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Organic Carbon (TOC), and Dissolved Oxygen (DO). The unchecked growth of water hyacinth, fuelled by the nutrient-rich environment, has formed thick floating mats that block sunlight penetration, reduce photosynthesis in submerged plants, deplete oxygen levels, and create breeding grounds for disease-carrying insects. The implications of this ecological imbalance are profound. The invasive nature of water hyacinth disrupts navigation and damages fishing gear, leading to economic losses if left unmanaged, the continued spread of *Eichhornia crassipes* could result in long-term degradation of the riverine ecosystem. This work underscores the need for integrated and sustainable water management strategies. Effective sewage treatment, regulation of discharge, periodic monitoring of water quality, and the adoption of mechanical, biological, or eco-engineering methods for controlling water hyacinth are essential. Equally important is the involvement of local communities and stakeholders in river conservation efforts to ensure

lasting impact. Policymakers must priorities ecological restoration alongside development to maintain the health of the Godavari River. In conclusion, this study reveals a strong correlation between nutrientpollution and the rise of eutrophication in the Godavari River at Nanded. It calls for action to curb pollution sources and implement holistic conservation strategies. Protecting this sacred and life-sustaining river is crucial not only for the environment but also for the well-being of those who depend on it.

Biography

Mr. Rahul has completed his Master of Science (M.Sc.) in Environmental Science, building on a strong academic foundation in Life Sciences, including Botany and Zoology. He has presented his research at various national and international conferences, including the Global Conference on Plant Science and Molecular Biology (2024, Rome), where he shared his findings on the phytochemical and ethnobotanical properties of Vitex negundo L. His recent work explores nutrient enrichment and the proliferation of invasive species, specifically water hyacinth, in the Godavari River at Nanded District. Rahul aims to contribute meaningfully to sustainable development and ecological restoration.

Pr. Saida Chaouch

Kasdi Merbah University Phoenix Planting Research Laboratory, Ouargla, Algeria

Sustainability of farms in drylands; universal assessment methods and regional specificities

Since the publication of the first report on the state of the environment by the IUCN (1952) and the proposal of the term sustainable development (1980) followed by the definition of this concept in 1987 by the Brundtland Commission, the international scientific community has continued to make considerable efforts with the aim of concretizing this concept in the different sectors of activity. In agriculture, the concepts of sustainable agriculture, agroecology and sustainable exploitation are also gaining importance and methods for assessing the sustainability of agricultural holdings are adopted by the majority of countries where they constitute the basic tool for the development of the agricultural sector.

These methods are designed and applied in several countries around the world but remain very little used in arid zones which cover in some countries a very large proportion of the territory and where agricultural policies aim at increasing agricultural areas and production, nevertheless these objectives cannot be achieved without a prior assessment of the sustainability of agrosystems. However, some studies have used these assessment methods such as RAD (Sustainable Agriculture Network), IDEA (Indicators of Sustainability of Farms) and DIALECTE (Agro-environmental Diagnosis Linking Environment and Territorial Farm Contract) and have for their entirety confirmed the need to adjust several indicators for a possible adaptation to arid zones. In this context we point out the need to design methods based on indicators specific to the local context by taking into consideration the physical and human characteristics of these environments in order to be able to make decisions relating to agricultural development in arid zones.

Biography

Pr. Chaouch Saida Engineer in Saharan Agronomy (1988) from the Technical Institute of Saharan Agronomy in Ouargla (Algeria). She began a doctoral training in Geography at the University of François Rabelais in Tours (France) then at the University of Aix-en-Provence (France) with Professor Emeritus Marc Côte. Promoted to the rank of Professor since 2021, she is currently a Research Professor at Kasdi Merbah University and a member of the Phoenix Laboratory in Algeria.

Salvina Panebianco[1*], Maria Cristina Caggiani[2], Germana Barone[2], Gabriella Cirvilleri[1], Claudio Finocchiaro[2], Gabriele Lanzafame[2], Paolo Mazzoleni[2], Agatino Musumarra[3,4], Maria Grazia Pellegriti[4]

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Application of Fourier-Transform Infrared (FT-IR) spectroscopy to identify chemical markers for the authentication of the PDO "Pistacchio Verde di Bronte"

The “Pistacchio Verde di Bronte” is a renowned agri-food product known worldwide, playing a key economic role in Italy. Grown exclusively on the slopes of Mount Etna, between Bronte, Adrano and Biancavilla (Catania province, Sicily, southern Italy), it holds the Protected Designation of Origin (PDO) label granted by the European Union, which ensures its authenticity and strong connection to the territory. However, its high commercial value often makes it a target for counterfeiting, negatively impacting the entire supply chain. To counter this phenomenon, it is essential to use fast and accurate analytical methods able to verify its geographical authenticity. In this context, the present study aims to evaluate the effectiveness of Fourier-Transform Infrared (FT-IR) spectroscopy as a tool for authenticating the “Pistacchio Verde di Bronte” and, more generally, for distinguishing pistachios from different growing areas. In recent years, this technique has attracted extensive attention from scientists due to the fact that it is a simple (requiring minimal sample preparation), fast, relatively inexpensive and non-destructive analytical tool. In this study, the FT-IR spectra of samples collected in the Bronte district were analyzed and compared with those of pistachios originating from other parts of Sicily and from various foreign countries, in order to identify chemical and elemental differences linked to their geographical origin. Experimental data were analyzed by Principal Component Analysis (PCA) and validated through Linear Discriminant Analysis (LDA). Our results suggest that FT-IR spectroscopy can reliably identify pistachio samples from different geographical Sicilian areas, confirming the correlation between terroir and food chemical composition. Based on these findings, FT-IR emerges as a promising, non-destructive and efficient technique for verifying the quality and authenticity of food, including the PDO “Pistacchio Verde di Bronte”, offering valuable support to conventional analytical methods. This research was funded by the European Union - Next Generation EU, Mission 4 Component 1 CUP E53D23015570001 (project PRIN 2022 PNRR “P20223P48S” entitled “Implementing advanced elemental and chemical analysis for quality, safety and traceability assessment of PGI and PDO agri-food products”).

Biography

Dr. Panebianco studied Agricultural Sciences at the University of Catania, Italy, and graduated in 2006. She then joined the research group of Prof. Cirvilleri at the Department of Agriculture, Food and Environment (Di3A) and since 2019 she has been collaborating with Prof. Musumarra from the Department of Physics and Astronomy (DFA), as well as with Prof. Mazzoleni and Barone from the Department of Biological, Geological and Environmental Sciences. She received her PhD degree in 2010 at Di3A and a second PhD in 2022 at DFA. She is currently a postdoctoral researcher at Di3A. She has published 20 research articles in SCI-E journals.

Dr. Sassan Mohasseb[1*], Atiyeh Meidanchi[2*], Sonia Daneshgari[1]

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Application of bioengineering in construction

Bio-cement and bio-concrete are innovative solutions for sustainable construction, aiming to reduce environmental impact while maintaining the durability and versatility of building materials.

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

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

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

Biography

Dr. Sassan Mohasseb received his bachelor's degree in structural engineering from the University of California, his master's from Cornell University, an Engineering degree from Stanford University, and his doctorate from Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland. He has made significant design contributions to a wide range of projects around the world, many of which also saw him involved during the construction phase. He has given invited lectures at MIT, Stanford, and ETH Zurich. Furthermore, he is a reviewer for eight technical journals and has published thirteen books.

M. K. S. L. D. Amarathunga*, H. M. R. L. B. Herath, V. R. Thanthrige, A. S. M. Roshan

Department of Export Agriculture, Uva Wellassa University of Sri Lanka Division of Agribusiness Development, Department of Agriculture of Sri Lanka

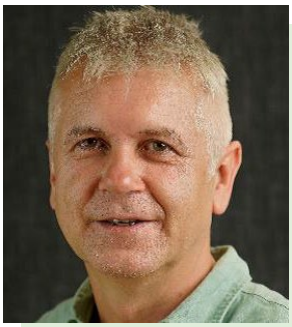
Assessing adoption of good agricultural practices in protected house vegetable growing farmers in Badulla District, Sri Lanka: Perceptions, challenges, and pathways for sustainable farming

The agricultural sector in Sri Lanka, particularly in the Badulla District, plays a pivotal role in the national economy, contributing significantly to food security, employment, and export revenues. Despite the growing emphasis on sustainable agricultural practices, the adoption of Good Agricultural Practices (GAP) among protected house vegetable farmers in Badulla has been notably limited, primarily due to a lack of awareness and the perceived complexity of these practices. This study aims to investigate the perceptions of these farmers toward Good Agricultural Practices, focusing on identifying the perceived benefits, challenges, and influencing factors that ultimately affect their decision to adopt GAP standards. A structured survey was employed to gather data from a purposively selected sample of 105 protected house vegetable farmers in the Badulla District who have been exposed to GAP. The analysis of the data utilized descriptive statistics and binary logit models to ascertain the determinants influencing farmers' perceptions and their subsequent decisions regarding the adoption of Good Agricultural Practices. The findings indicate that farmers exhibit favourable perceptions toward the adoption of GAPs. Specifically, factors such as age, farm income, and engagement with extension services positively correlate with the perception of GAPs. Additionally, perceived benefits—including increased income, enhanced productivity, reduced production costs, improved worker well-being, and positive environmental implications—serve as significant motivators for farmers. Conversely, challenges such as limited market access, financial constraints, insufficient technical knowledge and support, and the inherent complexity of GAP implementation negatively impact their perceptions. This study elucidates the critical barriers hindering the adoption of GAPs and emphasizes the necessity for enhanced technical support, improved market access, and the simplification of GAP processes to facilitate greater acceptance of sustainable agricultural practices. The findings offer valuable insights for policymakers and agricultural extension services, enabling them to devise targeted interventions that effectively promote the adoption of sustainable farming practices among vegetable farmers in Sri Lanka.

Keywords: Good Agricultural Practices, Sustainable Farming Practices, Perceptions, Vegetable Farmers.

Biography

Dr. Lalith Amathunga Head/Department of Export Agriculture, Uva Wellassaa University of Sri Lanka, is a dedicated Agricultural Extensionist and environmentalist graduated as B.Sc. Agriculture from University Ruhuna in 1987 and he obtained his Master's degree of M.Sc. Environmental Science from the University of Colombo in 2000 specializing in the impact of climate change on tea productivity. He doctored in the field of Agricultural Extension specializing in Public-Private Partnership Extension in the tea sector from the University of Peradeniya in 2015. He worked as a Senior advisory officer at Tea Research Institute in 1991-2010 and as Senior Manager of Tea Extension at John Keells Group in 2011-2020, and currently working as a Senior Lecturer in Uva Wellassaa University of Sri Lanka.



Simon Vrečar*, Dr. Matej Mertik*, Blaž Barbori
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Empowering SMES through data interoperability in digital agriculture: The DIS4SME approach

The DIS4SME project tackles the urgent need for upskilling and reskilling in European SMEs by positioning data interoperability as a cornerstone of digital transformation. Its Digital Agriculture course provides SME managers and technicians with hands-on training in using location data, GIS tools, and emerging technologies to implement sustainable farming practices. Aligned with EU data strategies and precision agriculture trends, the course strengthens SMEs' capacity to adopt digital solutions, improve resource efficiency, and meet regulatory demands. DIS4SME illustrates how interoperable data systems can drive innovation and sustainability in agricultural production across Europe.

Biography

Simon Vrečar is an applied mathematics graduate with over 25 years' experience across public, private, and NGO sectors as a GI expert, consultant, and project manager. He has led initiatives in IT, geographic information, education, and EU funding, including Slovenia's spatial data infrastructure. Former Secretary General of EUROGI, he advises the European Commission's Joint Research Centre on digital public service interoperability. Active in International Standardization (ISO), he chaired Slovenia's GI technical committee and promoted Open Government via the Danube Civil Society Forum. He also supports start-ups and innovation platforms, connecting business, government, and research communities across Europe and beyond.

Thato Moagi*, Sinah Modirwa*

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Effects of climate change on the yield of smallholder maize farmers in the Ngaka Modiri Molema district, North-West province

Climate change is a long-term shift in average weather patterns, like temperature and rainfall, occurring over extended periods. These changes are primarily driven by human activities, particularly the release of greenhouse gases into the atmosphere through burning fossil fuels. The increase in greenhouse gas concentration leads to a warming effect, trapping more heat and causing global temperatures to rise. Climate change significantly affects agricultural production, threatening food security and human well-being by altering growing seasons, water availability and crop yields. The impact of climate change can therefore be detrimental to crops such as maize, which is the most important grain crop in South Africa since it is a staple food for majority of the population in the country and a major feed grain. As such, the study assessed the effects of climate change on crop yield among smallholder maize farmers in the Ngaka Modiri Molema District Municipality, North-West Province, South Africa. The objectives of the study were to examine smallholder maize farmers' socio-economic characteristics and their knowledge on climate change. The data was collected in 2024 from a sample size of 213 smallholder maize farmers using Raosoft sample calculator and it was analysed using STATA. The method of analysis used for the study comprised descriptive statistics and multinomial logistic regression model. The study found out that farmers are aware that there has been a significant change in climate over the years and that it reduces the crops yields. The study recommends that farmers should consider practicing climate smart agriculture to mitigate the effects of climate change.

Biography

Ms. Thato Moagi holds a master's degree in Agricultural Extension obtained at North-West University in 2014. She is currently employed as a lecturer in the Department of Agricultural Economics and Extension at the same University.

Dr. Sinah Modirwa obtained her PhD in Agricultural Extension at North-West University in 2014. She is currently employed as a senior lecturer in the Department of Agricultural Economics and Extension at the same University.

Valery P. Kalinitchenko[1,2*], Valery P. Meshalkin[3], Mikhail G. Baryshev[2], Sergey V. Gudkov[4], Vladimir V. Chernenko[1], Tatiana M. Minkina[5], Saglara S. Mandzhieva[5], Svetlana N. Sushkova[5], Vishnu D. Rajput[5], Dmitry A. Makarenkov[6], Georgiy S. Larin[1]

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Biogeosystem technique methodology for chemical-soil-biological engineering

Current Ecosphere–technology conflict stems from an environmental, agricultural and chemical management outdated technological platform based on an attempt to imitate natural phenomena in technology root case. A standard chemical-technological system hierarchy determines the own technological waste and ecosphere chemical-technological load. Badly controlled soil geophysical system reduces a soil productivity.

A critical reassessing of the land and water use, waste recycling technologies, environment and agronomy practice is needed to eliminate shortcomings and configure a future sustainable environmentally sound chemical-soil-biological engineering.

Using a heuristic approach to understand an origin of an environmentally sound technological development niche, we configured the Chemical-Soil-Biological Engineering (CSBE) methodology and Biogeosystem Technique (BGT*) methodology.

The CSBE and BGT* objects are: a main product chemical-technological system; a device for improving the geophysical and geochemical properties of soil by synthesizing the structure and architecture of its illuvial layer for the biological-soil recycling of bulk or granular by-product; a pulsed intra-soil sequential-discrete device for recycling of liquid by-product and/or soil moistening and plant nutrition; and a production of environmentally friendly biological product.

CSBE and BGT* are capable in providing: a main chemical product fully waste-free technology; a dispersed by-products recycling within the synthesized fine-aggregate architecture of the soil inner layer for a plants favorable development; and a food, fodder and row material economic use of the biological production obtained on the synthesized soil.

BGT* applies nature phenomena creating a nature-friendly technical means and technologies for a long-term soil geophysical, chemical, water and biological properties optimization. The BGT* based one time 20–50 cm layer intra-soil milling provides a stable soil fine multilevel aggregate system improving a soil biome function for up to 40 years. The BGT* based intra-soil pulse continuous-discrete watering reduces a plant water consumption circa 5–20 times compared to the standard irrigation. BGT* based municipal, industrial waste and gasification byproduct intra-soil dispersed recycling in a course of the 20–50 cm soil layer milling provides soil solution equilibria control, heavy metals passivation, environmental safety and plant nutrition. Using BGT* methodology, the yield becomes higher circa 50–80% compared to standard technology. BGT* methodology promotes the soil system continuity, reinforces soil biogeochemical turnover, ensures a reversible carbon intra-soil and aboveground biological sequestration, provides biosphere health and climate system sustainability.

BGT* is a CSBE platform of a circular green chemistry waste free environment friendly and biosphere high quality and productivity development.

Biography

Professor Dr. Sc (Biol) Valery P. Kalinitchenko is the director of the Institute of Fertility of Soils of South Russia, Persianovka, Russia. And the leading researcher in the All-Russian Phytopathology Research Institute, Big Vyazemy, Russia. He earned his Doctoral Degree from Moscow State University, Soil Science Faculty in 1991. Don State Agrarian University, Agriculture and Land Reclamation Department Chair, Persianovka, Russia, in 1976-2012. His areas of interest are the soil and water saving, waste recycling, biosphere sustainability, soil high productivity and health. 700 monographs, journal and conference papers and 50 patents.

Vladimir Todiraș

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Development of online spatio-temporal risk prediction model for downy mildew (*Plasmopara viticola*) in grapevine

Development of a spatio-temporal model to predict downy mildew risk would facilitate development and implementation of a disease warning system for efficient fungicide application in grapevine. The objective of this study was to estimate the incidence of the downy mildew in grapevine and validate a spatio-temporal risk prediction model for downy mildew. Development of spatio-temporal risk prediction model for downy mildew was based on fuzzy classifiers in BioClass DSS. BioClass is a GIS tool designed to solve multiple-criteria classification and optimization problems. We present a new classification system which is based on combining fuzzy logic and level set methods. Preference-ordered fuzzy sets approach provide the degree to which two classes are related to each other. An essential part of forming membership functions is the input space partitioning. The Response function as degree of satisfaction and Membership function as the expression of fuzziness for decision making and optimization problems is introduced. Our study demonstrated that in BioClass we can combine fuzzy logic and geographic information systems with knowledge of downy mildew biology and environmental data to derive new information for decision making. It was concluded that spatio-temporal models provide new possibilities for real time action in downy mildew risk analysis using decision support digital maps. The adopted methodology permitted quantifying the severity of the grape downy mildew not only in spatial terms, identifying the variability among the different regions of Moldova, but also in temporal terms, making an adequate distinction of the studied areas. The online version of spatio-temporal model was implemented into information system for integrated plant protection.

Biography

Dr. Vladimir Todiraș studied agriculture at Timireazev agricultural Academy, Russian Federation and graduated as MS in 1980. He then joined the research group at the Institute of Plant Physiology and Biochemistry, Moldavian Academy of Sciences. He received PhD degree in 1996 at the same institution. After one year he obtained the position of head of laboratory. Now he is working as head of laboratory in the Institute of Genetics, Physiology, and Plant protection, State University of Moldova, Chisinau, Moldova. He has published more than 80 research articles in SCI journals.

Wensheng Fang*, Qiuxia Wang

Institute of Plant Protection, Chinese Academy of Agricultural Sciences, China

Soil fumigation prevents soil-borne diseases and its effects on soil microorganisms

Soil fumigants, recognized for their strong diffusion in soil and broad-spectrum inhibition of pathogens, have become an effective method for controlling soil-borne diseases before planting. However, the processes governing the succession and regulation of microbial communities after fumigation remain largely unclear. Our research indicates that the effects of fumigation on microbial diversity vary depending on the type of fumigant used, are influenced by the dosage applied, and tend to diminish over time. Notably, both positive and negative changes in the structure of microbial communities have been observed. Fumigation also alters soil ecological functions, accelerating the conversion and metabolism of key nutrients such as nitrogen and potassium. Among pathogens, Fusarium showed greater resilience to fumigation compared to Ralstonia solanacearum. Interestingly, bacterial community assembly is largely driven by deterministic processes, whereas the assembly of fungal communities appears to follow a more random, stochastic pattern. Soil nutrients, particularly those added through fertilization, are crucial for the rapid recovery of bacterial and fungal populations after fumigation. In fact, there is a significant positive correlation between the rate of microbial recovery and the amount of fertilizer applied. Based on these findings, we developed a comprehensive soil-borne disease control strategy that integrates soil disinfection with microbial community activation. This strategy has already been successfully implemented in crops such as ginger and Panax notoginseng, proving its effectiveness in enhancing crop health and productivity.

Biography

Dr. Fang Wensheng, born in July 1989, is an Associate Researcher at the Chinese Academy of Agricultural Sciences and a key member of the Soil Pest Control Innovation Team. His research focuses on soil fumigation technologies and mechanisms for controlling soil-borne diseases, and their effects on nutrient cycling and microbial communities. He has led and contributed to numerous national projects and published 54 scientific papers, including 16 in top-tier journals like Journal of Hazardous Materials. His work has been applied to over 300,000 acres of crops annually, earning him multiple awards.

Xie Qing[1], Xiaochang Yin[2], Yu Wang[1], Yang Zhou[2], Xingyu Jiang[1,2*]

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[2]Key Laboratory for Quality Regulation of Tropical Horticultural Crops of Hainan Province/School of Tropical Agriculture and Forestry, Hainan University, Haikou, Hainan Province, China

Structure, function, and regulation of the plasma membrane Na^+/H^+ antiporter Salt Overly Sensitive 1 (SOS1) in plants

Physiological studies have confirmed that export of Na^+ to improve salt tolerance in plants is regulated by the combined activities of a complex transport system. In the Na^+ transport system, a plasma membrane Na^+/H^+ antiporter Salt Overly Sensitive 1 (SOS1) is the main protein that functions to excrete Na^+ out of plant cells. While in roots exposed to increased salinity, the activated protein kinase complex composed of CBL4 (also known as SOS3) and CIPK24 (also known as SOS2) activates SOS1, in shoots CBL10 interacts with and phosphorylates CIPK24, and the complex then promotes Na^+ extrusion mediated by SOS1. Furthermore, CIPK8, the closest homolog to CIPK24 in the CIPK family, interacts with CBL10, and the CBL10-CIPK8 complex can also activate SOS1 activity in the shoots. Another homolog of CBL4, CBL5 is mainly expressed in the cotyledons and hypocotyls, and functions in seed germination and protects seeds and germinating seedlings from salt stress through the CBL5-CIPK8/CIPK24-SOS1 pathways. Therefore, these SOS signalling pathways, CBL4/5/10-CIPK8/24-SOS1, are the paramount regulatory mechanisms for facilitating Na^+ extrusion and are critical to the ability of plants to adapt to and tolerate conditions of increased soil salinity.

SOS1 proteins from many plant spp. have been identified, and their structures are highly conserved and consisted of a transmembrane N-terminus and an extended C-terminal region involved in enzyme regulation. Without salt stress, the Na+/H+ exchange activity of AtSOS1 is inhibited because of the intramolecular interaction between the auto-inhibitory domain and activation domain in its C-terminal region. Upon exposure to salinity, the Ca^{2+} concentration increases in the cytosol. CBL4 responds to the changes in the calcium signal triggered by salt stress, and binds to Ca^{2+} and then interacts with CIPK24. The protein kinase complex phosphorylates a serine residue at the end of the auto-inhibitory domain and activates Na+/H+/H^+ exchange activity of SOS1. Furthermore, the other serine residue, which is at the beginning of the auto-inhibitory domain, is a regulation site of CBL4-CIPK24 complex too. Token together, the two regulatory sites are at two ends of the inhibitory domain, respectively, and the regulatory domain overlaps with the inhibitory domain in the C-terminal, such that these two regulatory ways may function coordinately to more efficiently regulate SOS1 activity when plants encounter salt stress. These findings suggest that the auto-inhibitory domain completely

hamper SOS1 activity, so its deletion can fully activate Na^+ extrusion mediated by SOS1, and the overexpression of the modified gene confers the stronger salt tolerance in transgenic plants. Therefore, the hyperactive mutant of SOS1 may be a valuable tool for developing salt-tolerant transgenic crops.

Biography

Dr. Xingyu Jiang received his PhD degree in 2001 at the Shandong Agricultural University, China. After two and half years of postdoctoral fellowship at the Ben-Gurion University of the Negev, Israel and Estación Experimental del Zaidín, Consejo Superior de Investigaciones Científicas, Spain, he joined the Instituto de Recursos Naturales y Agrobiologia, Consejo Superior de Investigaciones Científicas, Spain, and had worked for more than seven years. He went back to China in 2011, and started to study Biochemistry and Molecular Biology at the Hainan University and Guangdong Ocean University, respectively. He has published more than 80 research articles in SCI (E) journals.

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Host selection and exploitation of *Microplitis manilae*: Implications for biological pest control

Biological control serves as a sustainable method in integrated pest management strategies. *Microplitis manilae,* a common internal parasitoid wasp belonging to the Hymenoptera order under Lepidoptera, plays a crucial role in pest control. We delved into the host selection and exploitation dynamics of M. manilae. Our evaluation of the parasitic efficacy of *M. manilae* encompassed four pest species from the Spodoptera and Mythimna genera of the Noctuidae family. Results revealed a higher parasitism rate of *M. manilae* on three species within the Spodoptera genus compared to *Mythimna separata* in the *Mythimna genus.* Notably, *M. manilae* exhibited elevated parasitism rates and shorter development durations on Spodoptera litura relative to other species. The parasitism rate for 1st instar hosts stood at 86.67±0.04%, with a development duration of 14.1±0.03 days. Furthermore, when parasitizing the 3rd instar of Spodoptera frugiperda, parasitoids displayed a higher sex ratio of 0.71±0.05. Additionally, *M. manilae* demonstrated a parasitic effect on *M. separata*, presenting a novel host choice for parasitism. These findings highlight the optimal host selection criteria that could amplify the reproduction and survival rates of *M. manilae,* thereby facilitating their large-scale propagation. Understanding the parasitic impact of *M. manilae* on pests not only advances its field application but also plays a pivotal role in fostering the development of biological control technologies and sustainable agricultural practices.

Biography

Dr. Xueyuan Di is conducting entomological research at Guizhou University. She obtained her master's degree in 2016 and Ph.D. in 2021, specializing in research on biological pest control in insects and insect behavioral studies. Dr. Xueyuan Di has published over ten SCI papers to date.

Yu Cheng

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

Gossypium purpurascens genome provides insight into the origin and domestication of upland cotton

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

Biography

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

Yu Han

Horticultural Crop Production Equipment Engineering Technology Research Center, Nanjing Institute of Agricultural Mechanization, Ministry of Agriculture and Rural Affairs, Nanjing, Jiangsu, China

Intelligent tea-picking technology and equipment

As we know, tea is a famous traditional Chinese beverage and enjoys a high reputation in the world. Recent years, the shortage of agricultural laborer is getting worse, which impedes the development of tea industry. To break the bottleneck, our team started to focus on the investigation of tea picking machine several years ago. We have designed a series of tea picking machines successfully, including Tea picking robot, Ride-type tea picker and Remote-controlled intelligent tea picker. The first one is tea picking robot. It's used for picking high quality tea, which usually refers to a single bud or a bud with a leaf. The robot picks tea in a way as human does. It is rather intelligent and all the processes require no human involvement. Next, it is a Ride-type tea picker that is used for picking bulk tea. This machine has a better adaptability to the tea garden with uneven road. Another advantage is its high efficiency. It can increase production efficiency by more than 20 times compared with human laborer. The Last one is the Remote-controlled intelligent tea picker, we name it intelligent tea picker for short. There are two major innovations of this machine. On the one hand, it adopts several sensors to locate tea buds with high accuracy and the cutter tracks the tea canopy adaptively. On the other hand, the machine could be controlled remotely. These advanced technologies enable the tea picked with this machine is of great quality. Although these machines have already been applied for tea harvesting in many provinces, there are still a lot of scientific and technological problems to be addressed, especially for high quality tea picking. Consequently, we will continue working on it, and believe that, in the near future, more practical tea picking machinery will be provided for farmers, offering the support for the modernization of tea industry.

Biography

Han Yu holds a postgraduate degree and is currently a doctoral candidate. He is an assistant researcher at the Nanjing Institute of Agricultural Mechanization, Ministry of Agriculture and Rural Affairs. His main research areas include intelligent technologies and their applications in agricultural fields such as tea picking. He has led 7 national and provincial-level projects or sub-projects, and has published 26 papers as the first or corresponding author, among which 7 are indexed by SCI/EI/CPCI. He has obtained 37 invention patents, formulated 1 industry standard and 2 group standards, and won 12 provincial and ministerial-level science and technology awards.

Zhiyong Li

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Sugar-inducible rice NAC transcription factors regulates carbon partitioning and grain yield

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

Biography

Dr. Zhiyong Li is an Associate Professor at the State Key Laboratory of Rice Biology, China National Rice Research Institute. With a strong academic background, they completed their Ph.D. in Biochemistry and Molecular Biology at Huazhong Agricultural University in 2021. Associate Editor of Plant Signaling & Behavior (Q2) and Frontiers in Plant Science (Q1). Youth Committee Member of the National Society of Agricultural Biochemistry and Molecular Biology. He has published more than 730 research articles in SCI journals.

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Ineffective Agricultural Advisors (AAs) support on climate information and adaptation strategies dissemination in Ugu District, Kwazulu-Natal

There is growing concern that climate change will worsen poverty and food insecurity, particularly in developing countries, hindering the achievement of Sustainable Development Goals (SDG) 1 (No Poverty) and 2 (Zero Hunger). Rural populations are expected to be severely impacted, as 75% of the poorest people in these areas, especially in Africa, depend primarily on agriculture. Although adopting precision agriculture and smart farming has been recommended to counter the adverse effects of climate change on food production, farmers continue to face increasing challenges from climate change despite support from Agricultural Advisors (AAs). The study intended to assess the support provided by AAs in the study areas, focusing mainly on the dissemination of climate information to farmers. This study employed a qualitative research design, collecting data from six focus group discussions in Ezinqoleni and uMzumbe local municipalities in the Ugu district of KwaZulu-Natal. The data were analysed using reflexive thematic analysis with NVivo14 software. Results indicate that while smallholder farmers in the study area are aware of climate change, they lack access to relevant information to help them cope and adapt. The study also reveals that AAs in these areas are not providing useful information or advice to assist farmers in adapting to climate change, leaving them vulnerable to its adverse effects. The study strongly recommends that as South Africa is currently developing climate change policy the capacity building of AAs should be the priority. By providing high-quality climate information inclusive of sustainable adaptation strategies, farmers will better understand the importance of prioritizing climate change adaptation.

Biography

Dr. Zoleka Ncoyini-Manciya is an emerging researcher at the University of KwaZulu-Natal with a keen focus on climate change, the derivation and dissemination of climate information, and climate change adaptation. Her work also explores rural development and the engagement of youth in the agribusiness value chain. Dr. Ncoyini-Manciya is currently leading a study on the capacitation needs of agricultural advisors, or extension officers, in understanding climate change and extreme events. Her research examines whether these advisors have access to the necessary climate information to effectively guide farmers in adapting to climate challenges.

BOOK OF ABSTRACTS

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POSTER PRESENTATIONS

Abbas Pazoki

Department of Biology of Azad University, Varamin Branch, Varamin Iran, Iran

The effect IAA and GA3 on coumarin and scopoletin in *Artmisia dracunculus L*.

The genus Artemisia (Asteraceae) is one of the plants that is widely used as a flavoring and traditional medicine in Asian, European and American countries. Numerous compounds, including essential oils and secondary metabolites such as flavonoids, phenylpropanoids, coumarins, are responsible for numerous biological properties, including antioxidants, antitumor, antimicrobial, antifungal, and immunomodulatory properties. These characteristics have led to increased attention to this plant in terms of identifying and extracting effective compounds and biotechnological issues such as micropropagation through issues culture. In recent years, due to its numerous properties and practical aspects, many pharmacological and biochemical studies have been conducted on different species of Artemisia. In this study, from a physiological perspective, an attempt has been made to investigate the effect of various factors, including growth regulators, on the active compounds. Tarragon plants in this experiment were grown under potted conditions in the Varamin region of Iran The samples were arranged in a randomized complete block design with three replications. The aerial parts of the plants were treated with foliar application of IAA (100, 200, 250 µM) and GA3 (50, 100, 150 µM) in various treatments alone or in pairs three times a week. In this work the effect of two growth regulators was investigated by three treatments: A(100IAA+50GA3µM). B(200IAA+100GA3µM) and C(250IAA+150GA3µM). After one week, the aerial parts were harvested and dried, and the phenolic extract was prepared by the Folin-Ciocca-Lescho method for analysis by HPLC The phytochemical compounds of treatments and control were analyzed by HPLC (Knauer UV. detector smartly 2500_s_7700 PUMP).In this study, the amount of coumarin and scopoletin increased in all treatments the use of GA3 alone significantly increased coumarin from 24.62 µg/ml in the control treatment to 31.78 µg/ml in the GA3 treatment (150 µM).The application of IAA alone significantly increased the amount of scopoletin from 10.35 mg/ml in the control sample to 32.27 in the IAA treatment (250 µM) In treatment of C(250IAA+150GA3µM), the amount of coumarin was 27.10 mg/ml and the amount of scopoletin was 32.54 µg/ml, which showed an increase compared to the control. The results of this research show the positive effect of growth regulators on increasing the amount of effective compounds, including phytoalexins, in plants which is probably achieved by stimulating the biosynthetic pathway of phenolic compounds. The use of these growth regulators increases compounds in plants that are important for medicinal, health, cosmetic, and nutritional uses. This method can be used in all plants and helps improve numerous properties, including antioxidant, antimicrobial, and antifungal properties.

Biography

Dr. Abbas Pazoki received his bachelor's degree in plant sciences from the University of Tabriz and continued his master's degree in this field at Tarbiat Moallem University of Tehran. He received his doctorate in plant sciences from the Islamic Azad University, Science and Research Branch of Tehran, and has presented 25 scientific and research articles on secondary compounds in plants, including essential oils, in reputable journals and international symposiums.

Angelica Ohindovschi[1*], Mihaela Nartea[1], Andreea Lupitu[2], Cristian Moisa[2], Flavia Bortes[2], Dana Maria Copolovici[2], Lucian Copolovici[2], Maria Cojocaru Toma[1]

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[2]Institute for Interdisciplinary Research, Aurel Vlaicu University of Arad, Romania

Comparative study of polyphenolic compounds in extracts from galium species

The Rubiaceae family is rich in medicinal plants that have been used since ancient times in the traditional medicine of many countries, including the Republic of Moldova. Species of the genus *Galium* (*G. verum and G. aparine*) have been traditionally used for their anti-inflammatory, antioxidant, spasmolytic, diuretic, sedative, and healing properties. The aim of the study was to determine the total content of polyphenols and flavonoids in aerial parts of *G. verum* and *G. aparine* depending on the method of dry extract obtaining. Liquid extracts of the aerial parts of *G. verum* and *G. aparine*, harvested from the spontaneous flora of the Republic of Moldova, were obtained by heat-assisted extraction, using a digital water bath model 601, at 80°C, respecting the ratio of 1:10 (5 g of vegetal product in 50 ml of 60% ethyl alcohol) for 30 minutes extraction. The ethanol extracts were dried through evaporation of solvent at a rotary evaporator (Laborota 4011) and lyophilizer (Alpha 1-2 LDplus). The total polyphenol content was determined spectrophotometrically (Metertech UV/VIS SP 8001) according to Folin-Ciocalteu method at a wavelength of 765 nm, the result being expressed in gallic acid (mg GA/g) and total flavonoids–with the reagent AlCl3, in rutozide (mg RU/g). Following the conducted study, the extracts concentrated using a rotary evaporator showed a higher polyphenol content compared to those obtained through lyophilization in the extract of *G. verum* (10.49 and 9.35). The extracts from *G. aparine* had a lower polyphenol content (6.10 and 5.23, respectively). A similar trend was observed for flavonoids, with the total flavonoid content being higher in extracts obtained using a rotary evaporator from the *G. verum* (11.0 and 8.5), followed by *G. aparine* (3.90 and 2.3, respectively). The comparative phytochemical study of polyphenols and flavonoids in the extracts of *G. verum and G. aparine* varied according to the drying method, the total polyphenol content being insignificantly higher in *G. verum extracts followed by G. aparine*, the same being observed for flavonoid content. The decrease in polyphenol content in lyophilized extract can be attributed to changes in the structure of phenolic compounds in the process of subjecting the liquid extract to low temperatures compared to liquid extracts from plant products, demonstrated by Dina Cheaib et al. (2018). The research was carried out within the project: Impact of different habitats and abiotic stress factors on plant metabolites of genus Galium and Helichrysum, project no. PN-IV-P8-8.3-ROMD-2023-0022.

Biography

Ohindovschi Angelica graduated from the Faculty of Pharmacy at the Nicolae Testemitanu State University of Medicine and Pharmacy in Chisinau, Republic of Moldova and completed her residency in Analytical Pharmacy (2021). She is currently a PhD student in pharmaceutical sciences: Pharmaceutical study of Galium species in the obtaining antioxidant phyto products at the Department of pharmacognosy and pharmaceutical botany and works as an academic assistant and scientific researcher in international and national projects.

Brenda Salasini
University of Zambia, Zambia

First report of colletotrichum and pestalotioid fungi on mango in Zambia: Implications for disease management and regional food security

Mango (*Mangifera indica*), a cornerstone of agro-industrial development and a vital source of nutrition in Zambia, faces escalating threats from fungal pathogens that jeopardize food security and rural livelihoods. Despite its economic and nutritional importance, the epidemiology and pathogenic diversity of fungal diseases affecting mango remain largely uncharacterized in Zambia. In this study, symptomatic mango trees in Lusaka Province, exhibiting foliar and fruit lesions indicative of fungal infections, were systematically surveyed during the 2023 and 2024 farming seasons. Microscopic and molecular analyses identified two Colletotrichum species and one pestalotioid fungus from infected samples, representing the first report of these pathogens on mango in Zambia. Pathogenicity assays, including detached leaf and in-field tests, confirmed their virulence across six local mango cultivars, underscoring their significant threat to mango production. Given the increasing vulnerability of smallholder farmers to plant disease outbreaks, these findings highlight an urgent need for integrated disease management strategies to mitigate yield losses and safeguard food security. Moreover, the emergence of these fungal pathogens in Zambia raises concerns of potential transboundary spread, warranting heightened international surveillance and intervention. Addressing these challenges through rigorous pathogen monitoring and sustainable control strategies is imperative to support the resilience of mango-based agricultural systems in developing countries. This study provides crucial baseline data to inform policy frameworks, inspire environmentally sustainable management practices, and foster international collaborations aimed at curbing emerging phytosanitary threats to global food security.

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Metabolites changing in maize inbred lines grain under water deficit condition

In temperate regions worldwide, ongoing climate change has led to frequent and severe summer droughts, resulting in a significant reduction in maize grain yields. The activation of specific physiological processes enables plants to acclimate and adapt to challenging environmental conditions, resulting in metabolic changes that minimise stress-related damage. This study aimed to evaluate the status of secondary metabolites in the grain of maize inbred lines under irrigation treatment (i.e., 75% of full irrigation) and non-irrigation treatment (considered a water deficit condition). The tested inbred lines are components of maize hybrids developed at the Maize Research Institute Zemun Polje, belonging to different heterotic groups. Water stress can trigger the plant's defence mechanisms, including the synthesis of carotenoids and tocopherols, which possess antioxidant properties and protect the plant from the harmful effects of Reactive Oxygen Species (ROS) produced during stress. High-Performance Liquid Chromatography (HPLC) was employed to determine the carotenoid and tocopherol content in maize kernels. A contrasting trend in carotenoid levels was observed under water deficit conditions; two inbreds exhibited an increase in the levels of lutein+zeaxanthin and β-carotene, while the other two displayed a decrease. With regard to tocopherol content, water deficit conditions indicated increased levels of all three tocopherols (δ, α, and γ-tocopherol), with the exception of one inbred line. However, the pronounced increase in secondary metabolite content under water deficit conditions indicates their crucial role in mitigating the harmful effects of water deficit stress, which may be useful in maize breeding for drought tolerance selection.

Biography

Danijela Ristic is a principal research fellow in the Laboratory for Molecular Genetics and Physiology of Maize Research Institute Zemun Polje. She graduated at the University of Belgrade in the Faculty of Biology and obtained a PhD in Genetics in the same Faculty. The primary research area focused on the application of molecular markers in plant breeding, as well as the evaluation of nutritional quality, bioactive compounds, and antioxidant activity in maize.

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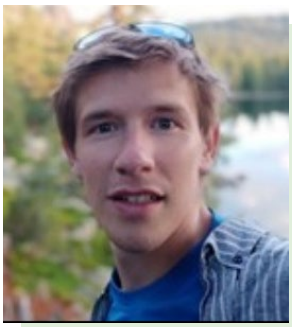
Integrated transcriptome and metabolome analysis of salinity tolerance in response to foliar application of choline chloride in rice (*Oryza sativa L.*)

Salt stress is a major abiotic stress that affects crop growth and productivity. Choline Chloride (CC) has been shown to enhance salt tolerance in various crops, but the underlying molecular mechanisms in rice remain unclear. To investigate the regulatory mechanism of CC-mediated salt tolerance in rice, we conducted morpho-physiological, metabolomic, and transcriptomic analyses on two rice varieties (WSY, salt-tolerant, and HHZ, salt-sensitive) treated with 500 mg·L-1 CC under 0.3% NaCl stress. Our results showed that foliar application of CC improved morpho-physiological parameters such as root traits, seedling height, seedling strength index, seedling fullness, leaf area, photosynthetic parameters, photosynthetic pigments, starch, and fructose content under salt stress, while decreasing soluble sugar, sucrose, and sucrose phosphate synthase levels. Transcriptomic analysis revealed that CC regulation combined with salt treatment induced changes in the expression of genes related to starch and sucrose metabolism, the citric acid cycle, carbon sequestration in photosynthetic organs, carbon metabolism, and photosynthetic antenna proteins in both rice varieties. Metabolomic analysis further supported these findings, indicating that photosynthesis, carbon metabolism, and carbon fixation pathways were crucial in CC-mediated salt tolerance. The combined transcriptomic and metabolomic data suggest that CC treatment enhances rice salt tolerance by activating distinct transcriptional cascades and phytohormone signaling, along with multiple antioxidants and unique metabolic pathways. These findings provide a basis for further understanding the mechanisms of metabolite synthesis and gene regulation induced by CC in rice in response to salt stress, and may inform strategies for improving crop resilience to salt stress.

Biography

Professor Zheng Dianfeng's research fields include healthy crop production, crop chemical control and agricultural disaster reduction. He graduated from China Agricultural University in June 1999 and was a visiting scholar at the University of Missouri, USA from 2009 to 2010. He is currently the executive deputy director of the South China Center of the National Salt-Tolerant Rice Technology Innovation Center. He has successively presided over more than 40 national and provincial-level scientific research projects, and published more than 300 academic papers in academic journals such as Nature Communications, Journal of Plant Physiology, and BMC plant Biology.



Dominik Bleša[1,2*], Pavel Matušinský[1,4], Milan Baláž[2], Zdeněk Nesvadba[3], Zuzana Antalová[1,5], Marta Zavřelová[1]

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Drought resilience in spring barley: The role of genotype, potassium application, and endophyte inoculation

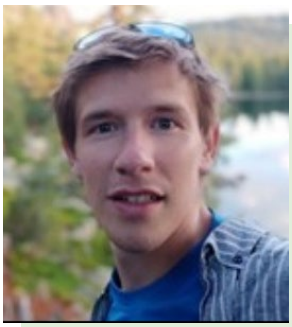
Recurrent droughts pose a significant threat to spring barley (*Hordeum vulgare L.*) production, reducing grain yield and quality. This study evaluated six barley genotypes to assess their drought resilience and examined the potential of potassium fertilization and *Serendipita indica* inoculation in mitigating drought stress. Field experiments were conducted over three years (2020–2022) at the Agriculture Research Institute in Kromeriz, Czech Republic. Six genotypes—Sebastian, Spitfire, Accordine, Nutans Afganistan, CPI 18197, and CI 6388—were tested under three potassium fertilization rates (0, 100, and 200 kg/ha) with and without *S. indica* inoculation. Key physiological and yield-related parameters were analyzed, including soluble sugar content and stable carbon isotope ratios in flag leaves, indicating the plants' physiological response to drought. Results showed that genotype and seasonal variation were the dominant factors influencing yield and physiological traits, rather than potassium fertilization or *S. indica* inoculation. High-yielding Spitfire and Accordine performed well in 2020 and 2021 but suffered significant declines in the drier 2022 season, while drought-adapted genotypes maintained stable yields.

These findings highlight the critical role of genotype selection in breeding drought-resilient barley. While potassium and fungal inoculation showed no significant independent effects, further research is needed to explore their combined influence on crop performance under drought conditions. This study provides valuable insights for improving barley resilience in changing climates.

The research was funded by the Ministry of Agriculture of the Czech Republic (MZE-RO1123, MZE-RO0423, QL24010008), IGA_PrF_2025_001 and MUNI/A/1799/2024.

Biography

Dominik Bleša earned his master's degree in natural sciences in 2018 and is currently pursuing a Ph.D. in plant anatomy and physiology at Masaryk University, Brno. He serves as the head of the laboratory at Agrotest Fyto, Ltd., a research organization specializing in agronomic studies. His research focuses on plant-fungal interactions, the functional ecology of fungi in agroecosystems, and applied biotechnology.



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Endophytic capabilities of rhizoctonia-like fungi in *zea mays*

Rhizoctonia-like fungi have been recognized as key symbionts in Orchid Mycorrhizal (OM) associations for over a century. More than three decades ago, researchers discovered that these fungi also colonize the roots of various non-orchid plants. Today, the ability of Rhizoctonia-like fungi, particularly from the order Sebacinales, to establish all known mycorrhizal types (except arbuscular mycorrhiza) and endophytic associations is well documented. However, endophytic interactions involving other rhizoctonias that typically form OM with green orchids remain poorly studied, partly due to the lack of a reliable method for inducing such associations. This study aimed to assess the influence of mineral nutrient availability and host plant decapitation—triggering a shift from biotrophic to saprotrophic nutrition—on the colonization of maize (Zea mays) roots by rhizoctonias. We found that inoculating maize with fungi cultivated on zeolite saturated with either ½ MS medium or oat-flake medium effectively initiated endophytic associations. While nutrient availability had no statistically significant effect on fungal colonization, a striking increase in root colonization was observed when the fungi transitioned from biotrophy (~20% of root length) to saprotrophy (~98%). These findings highlight the potential ecological role of rhizoctonias in nutrient transfer from decaying plant biomass to actively growing plants, suggesting their broader significance beyond orchid mycorrhiza.

The research was funded by the Ministry of Agriculture of the Czech Republic (MZE-RO1123, MZE-RO1623, QL24010008), IGA_PrF_2025_001 and MUNI/A/1799/2024.

Biography

Dominik Bleša earned his master's degree in natural sciences in 2018 and is currently pursuing a Ph.D. in plant anatomy and physiology at Masaryk University, Brno. He serves as the head of the laboratory at Agrotest Fyto, Ltd., a research organization specializing in agronomic studies. His research focuses on plant-fungal interactions, the functional ecology of fungi in agroecosystems, and applied biotechnology. the functional ecology of fungi in agroecosystems, and applied biotechnology.

El-Shazly Mohamed Hegazy

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Ph.D. Earth Resources (Soil Physics and Management)–African Faculty-Cairo University

Modeling the eco-signal interactions in an agricultural field grown with wheat plants under abiotic stressed conditions and silica fertilization using SF_RE

SF_RE was derived from its basic Darcian-Richard's. It was Darcian-Richard's, modified Richard's, stress from of Richad's, then silicon-like-soil water hydraulic capacitance of Richard's. HASPs were derived, nominated, and discussed. Each boundary condition was set according to DSWEM. The auther considered that total soil water energy modes are diagnostic because each of which needs a special managerial practice to touch the target function of better soil tilth. FORTRAN code of DC. SWEM and Thomas algorism of DD. SWEM were achieved. As the studied variables, HASP, are newly born from SF_RE. It is recommended to use the statistical modeling to correlate them each to other and to the water and nutrients' stresses reduction functions. HASP.α W_Up+HASP.α N_Up. ISSI_MOD, the conceptual ecohydrological model, has led finally to a physical model that sunshine supports the continuity of life on planet earth under the concurrent changes of the global climate. Silicon, made up the skeleton of PANGEA,. acts as antenna. It receives the incoming electromagnetic radiation from the star sun, executes the code of optimality to let the life on planet earth continue, and does the good for the best for all the other agro-ecosystem components. The plants' bio signals, the soil geo-signal, and the canopy atmospheric signal all are under the control of the maternal relationship between star sun's solar radiation and the shielder of PANGAEA's skeleton, silicon.

Keywords: Soil Stress Index, Soil Water Hydraulic Capacitance, Silicon-Like-Soil Water Hydraulic Capacitance, Root Distribution, Gaining Value, HASP.

Elżbieta Wojtowicz*, Joanna Le Thanh-Blicharz, Roman Zielonka, Jacek Lewandowicz

Institute of Agricultural and Food Biotechnology-State Research Institute, Poznan, Poland

A new direction in the use of wheat in agricultural processing

Wheat is a valuable ingredient in many food products, and wheat harvest surpluses can be used to create new solutions for the agricultural industry. Due to the fact that the amino acid profile of cereals is not fully valuable for animal feeding, the most common way to improve the biological value of feed derived from cereals is to add soybean meal. However, in Poland soybean cultivation is not popular due to the climate conditions. An alternative type of legume successfully grown in Poland due to climatic and soil requirements is pea, of which there are over 20 varieties registered in Poland. Thanks to alternating crops, in close proximity, there are harvests of both wheat grain and pea seeds. Peas are a rich source of protein with a different amino acid profile than gluten–the main wheat protein. A small addition of peas is enough to improve the biological value of wheat-based feed products.

The aim of the work was to use wheat in agricultural processing to feed animals. As a result of simultaneous processing, a valuable nutritional base for feeding animals can be obtained. The developed biotechnological process allows for the production of two valuable feed products from wheat grain with the addition of peas i.e. liquid feed and solid feed.

Wheat refinement consists of moisturizing, crushing, and mixing raw materials in optimal proportions. This mixture is then subjected to enzymatic action in a water environment. The soluble components are extracted from the insoluble ones, and finally the liquid components are separated from the solid ones. The liquid fraction, possibly supplemented with rapeseed oil, creates a formula for a milk substitute preparation. The preparation can be pasteurized and packed in 25-50 l canisters or 1000 l pallet containers. The remaining wet mass is intended for feeding directly or after preservation through ensiling or drying. The ideal, rational technological system would select a processing capacity that allows for the immediate feeding of all produced feed products, minimizing the need for energy-intensive preservation methods. Therefore, locating production at a cow farm or similar location is advantageous.

Biography

Elżbieta Wojtowicz is a Food technologist, biochemist. Graduated as MSc., PhD, D.Sc. at Poznan University of Life Sciences, Faculty of Food Science and Nutrition. Researcher on IBPRS. Main scientific interests: food technology, food chemistry, agricultural technology, food aroma, bioactive ingredients, sensory analysis.

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Mechanisms of calcium distribution and surface uptake in developing strawberry fruit

Calcium (Ca) plays a crucial role in strawberry (*Fragaria x ananassa Duch.*) fruit quality, enhancing both pre-and postharvest performance when fruit Ca levels are increased. Recently, it has been found that the xylem in the strawberry pseudocarp loses functionality during ripening, which may restrict calcium import to the early stages of development, as calcium is translocated only through the xylem. Consequently, in the later stages, uptake is only possible through the fruit skin. This hypothesis was tested by quantifying fruit Ca content during development and Ca uptake through the fruit skin by incubating the fruit in 10 mM $CaCl_2$ solutions. Ca content of fruit and calyx increased during development. However, the Ca/dry mass ratio of the fruit decreased, in contrast to the calyx increased. The fruit Ca content and Ca/dry mass ratio were positively correlated with fruit mass. Ca/dry mass ratio increased only in the calyx but decreased in the skin, flesh, pith, and achenes of ripe fruit compared to unripe fruit. Ca content was lowest for fruit grown at high RH as compared to ambient or low RH. Ca uptake increased linearly with time. Ca uptake increased linearly as the concentration of Ca in the incubation solution increased. Ca uptake was positively related to fruit mass. Ca uptake was largely independent of temperature in the range from 5 to 35°C. Our results indicate that calcium physiology in strawberry fruit is primarily influenced by the loss of xylem function during development, and that changes in transpiration do not directly impact calcium import. Calcium uptake through the fruit skin appears to be a passive physical process, likely occurring via viscous flow through openings such as polar pathways and microcracks in the cuticle. Therefore, agronomic practices should prioritize enhancing Ca levels through foliar applications, taking these penetration pathways into account.

Biography

Dr. Grecia Hurtado studied Agro-industrial Engineering at the Escuela Politécnica Nacional in Ecuador. In 2018, she joined the Fruit Science research group led by Prof. Moritz Knoche at the Institute for Horticultural Production Systems in Hannover, Germany. She earned her Master's degree in International Horticulture and, in 2024, completed her Ph.D. in Horticultural Sciences at the same institution. Currently, she works as a researcher at Universidad UTE in Ecuador. She has published several articles in the field of plant physiology.

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[3]Faculty of Science, University of South Bohemia in České Budějovice, České Budějovice, Czech Republic

Old descriptions, new evidence: Polyploid hybrids of mercurialis perennis and M. Ovata revealed by genome size and stomatal traits

Hybridization and polyploidization play a key role in plant evolution, yet their impact in perennial species of the genus Mercurialis remains underexplored. In North Bohemia, we investigate natural hybridization between Mercurialis perennis and the rare, legally protected M. ovata. Putative hybrids of these species were first noted in early 20th-century Central European floristic surveys, described as Mercurialis×paxii and M. longistipes, but their taxonomic status has remained unclear due to a lack of cytogenetic and molecular data. Using flow cytometry and digital morphometry, we analyzed genome sizes, leaf shape, and stomatal density in several populations. Our results confirm genome sizes for M. ovata (3.39±0.27 pg/2C) and M. perennis (7.24±0.17 pg/2C), while morphologically intermediate individuals showed a mean genome size of 5.62±0.66 pg/2C, consistent with hybrid origin. These plants also differed significantly in stomatal density and epidermal cell morphology, suggesting that stomatal traits may serve as a reliable diagnostic marker. The combined data support the existence of at least two distinct hybrid or polyploid forms in regions where both parental species co-occur. Our findings not only shed light on historical taxonomic ambiguities but also open new avenues for field identification and conservation of M. ovata. Ongoing cytological and molecular analyses aim to refine these preliminary conclusions and contribute to a practical identification key and distribution map.

Biography

Dr. Hana Auer Malinská completed her Ph.D. in General and Molecular Genetics at Masaryk University Brno, Czech Republic in 2012. Since 2015, she has been a faculty member at the Department of Biology, Jan Evangelista Purkyně University in Ústí nad Labem, where she teaches courses in Plant Physiology, Molecular Biology, Didactics of Biology, and Plant Biotechnology. Dr. Auer Malinská has extensive research experience, having worked in the Laboratory of Molecular Epigenetics at the Institute of Biophysics, Czech Academy of Sciences. She is the author of 20 publications in high-impact journals and has an H-index of 11.

Irina Tvauri[1*], Nani Goginashvili[2]

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[2]Scientific-Research Center of Agriculture, Agroforestry Research Division, PhD, Head of division, Tbilisi, Georgia

Bioecological characteristics of natural stands of yew (*Taxus baccata*) in the Batsari Gorge in Georgia

Yew-*Taxus bacata* L. is a widespread species in Europe, although its natural stands are only found in Georgia, covering an area of 300 ha. Here, beech, hornbeam, maple and other species grow alongside yew. There are areas where stand is mainly represented by thousand-year-old yews, and there are also stands of mostly yew, where beech is the dominant tree. This species has a fragmented range in Georgia, and according to the IUCN categories it is assigned the status of Vulnerable (VU). The study was conducted to investigate bioecological characteristics of yew in natural conditions. In particular, the rate of renewal and growth of yew and formation of yew stands were studied.

Studies have shown that the yew grows in the Batsara Gorge from 850 m to 1600 m, mainly on the northern slopes. In these areas, yew is mostly distributed in small groups, although there are also individual trees together with beech. The age of the yew is from young to 2000 years. The growth of the yew tree in the open areas and under trees in the forest is completely different. Growth in the forest is very slow up to 150-200 years, while growth is relatively intensive in trees aged 200-500 years. Adult trees increase in diameter more than in height. In Batsara Gorge the height of a 200-year-old yew is 6-7 m, and the diameter is 10 cm, while the height of 400-500-year-old trees is 20-23 m and the diameter is 45-50 cm.

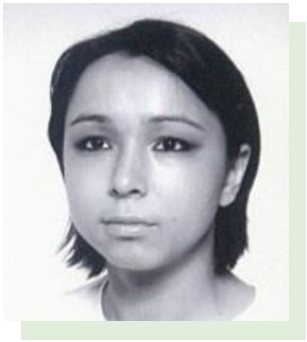
The natural regeneration and adults of the species are usually yew. Their numbers are average in open areas, and very low (or absent) under trees in forests.

Studying the bioecological characteristics of yew will help us properly plan conservation measures for this rare and endangered species.

This work was implemented with the financial support of Shota Rustaveli National Science Foundation of Georgia (Grant # FR-22-2188).

Biography

Irina Tvauri Scientific research began in 1990 in V. Gulisashvili Institute of Mountain Forestry, after awarding diploma in M.Sc. in Forestry Engineering. Her main direction of scientific research is the conservation of forest genetic resources, since 2004 she is a focal person of Forest Genetic Resources and EUFORGEN in Georgia. Since 2002, she has been actively participating in some international conferences and projects. In 2006, she defended her dissertation thesis and awarded PhD in Agriculture. She is working since 2014 Scientific-Research Center of Agriculture on the position fild inspection and database management specialist of Standardization, Certifications, Planning and Economic Analysis Division. She has published more than 40 research articles.



Joanna Le Thanh-Blicharz*, Elżbieta Wojtowicz, Roman Zielonka, Jacek Lewandowicz

Institute of Agricultural and Food Biotechnology - State Research Institute, Poznań, Poland

Characteristics of new solid and liquid feed products based on wheat and pea

Wheat grain constitutes a vital source of plant-based nutrition for humans. Wheat is valuable ingredient in many food products, and wheat harvest surpluses offer opportunities for innovative solutions within the agricultural industry.

Due to the fact that the amino acid profile of cereals is not fully valuable for animal feeding, soybean meal is most often added to improve the biological value of feed derived from cereals. In Poland, most soybeans are imported due to the unfavorable climate for soybean cultivation. An alternative legume successfully cultivated in Poland, both due to climatic and soil requirements is pea, with over 20 varieties registered. Growing peas is beneficial for improving the soil structure and allows for the reduction of the amount of nitrogen fertilizers used in subsequent cereal crops. By intercropping wheat and peas, both crops can be harvested efficiently and later processed in an innovative and rational way and secured in the form of animal feed. Peas are a source of protein with an amino acid profile that complements that of gluten, the primary protein in wheat. To improve the biological value of wheat feed products, a small addition of peas is sufficient.

The aim of the work was to characterize two new preparations for animal nutrition obtained by simultaneous processing of wheat and pea. These preparations serve as valuable semi-finished products, suitable for both solid feed and milk replacer in calf nutrition. The addition of pea seeds enriched the amino acid composition of wheat with some valuable exogenous amino acids, including lysine. Tests were carried out on the nutritional value and microbiological durability of packaged feed products.

Biography

Joanna Le Thanh-Blicharz is a Food technologist Associate professor at Institute of Agricultural and Food Biotechnology. Graduated as D.Sc. at Poznan University of Life Sciences, Faculty of Food Science and Nutrition. Main scientific interests include; food technology, food chemistry, starch technology and food texture. Author of over 50 internationally scientific papers as well authors of several patents in the area of food science and technology.

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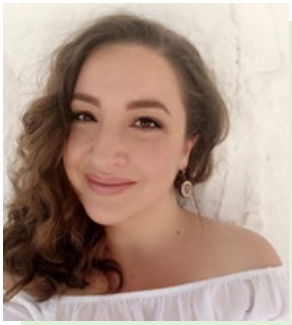

The use of Biofungicides as an environmentally friendly strategy for disease management

Reflected in its mission 'Applied Nature for a Better Agriculture', Aphea.Bio develops sustainable agricultural products based on natural microorganisms to increase crop yields and to protect them against specific diseases. Aphea.Bio distinguishes itself through its unique technology platform and its expertise to isolate, culture and exploit the so far unexplored microbial space. VIRTUOSATM, Aphea.Bio's biofungicide product for foliar application in fruit and vegetables will offer farmers a sustainable and economically viable answer to diseases such as grey mold and powdery mildew. Based on a Streptomyces strain, VIRTUOSATM offers advantageous features, such as broad-spectrum activity, ease of use, a two-year shelf life at ambient temperatures, compatibility with standard chemistry and suitability for integrated pest management. This positions VIRTUOSATM as a reliable option for growers looking to replace or supplement their standard practices. All studies confirm that the microbial strain has a very low risk profile, with no adverse effects observed in toxicity studies and no ecotoxicological risks identified whilst also having a short preharvest interval. Our current data supports a mode of action consisting of (i) nutrient and spatial competition with the plant pathogens, (ii) transient production of several lytic enzymes and secondary metabolites inhibiting growth of the plant pathogens, and (iii) impairment of the iron nutrition of plant pathogens by the production of siderophores.

Biography

Jonathan Smet studied Biotechnology and Biochemistry with a major in plant science at Ghent university and graduated as MS in 2022 and started working at Aphea.Bio in 2022. He is Lab manager and Lab Technical Expert at the department of development in the group of microbiology and mode of action.

Eleni Sioziou studied Biological Applications and Technologies (University of Ioannina, Greece) and has a master's degree in Plant Molecular Biology and Biotechnology (University of Crete, Greece). She has been working at Aphea.bio since 2022. She is a research associate at the Department of Development.

Ljubiša Bezbradica* MSc, Boško Josimović PhD, Božidar Manić PhD

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Planning of wind protection belts in the function of protecting agricultural land from aeolian erosion in lowland areas

The negative effect of wind on agricultural land is reflected in the mechanical impact on the soil, which destroys and carries away soil particles. In addition to the removal of the fertile layer of the soil, there is also the burying of agricultural crops with the material carried away, which leads to the weakening of the plant and consequently to the reduction of the yield. In addition to this effect, the wind most often dries out the soil, which is already scarce in moisture. All of the above points to the importance of building wind protection forests, especially in lowland areas that are largely exposed to aeolian erosion due to the specific topography. Spatial planning, as a basic instrument for the implementation of optimal spatial solutions, enables the symbiosis of various planning and organizational measures that can achieve the best results in space. In this context, optimal planning solutions for the realization of wind protection belts, which are formalized through the process of spatial planning, are particularly important. It is possible for them to have a positive influence on changing the existing negative trends in this area, that is, creating positive effects that are reflected in: changes in temperature and humidity of the air and soil; evaporation; distribution of snow cover; pedological properties of the soil; amount of yield; etc. In addition to the optimal spatial solutions in the realization of wind protection belts and the selection of appropriate forest plantations, the planning process takes into account their impact on the landscape, as well as the economic justification of the realization of wind protection belts, emphasizing the real ecological, social and economic value, which is not closely related to harsh rules economic justifications.

Biography

Ljubiša Bezbradica is a forestry engineer. He holds a BSc in Protection against erosion and arrangement of torrents and MSc in Forestry and he is a PhD candidate at Faculty of Forestry, University of Belgrade. He works as a research assistant at the Institute of Architecture and Urban & Spatial Planning of Serbia. His expertise includes protection of forests, land and water. Main research fields include prevention and preservation of forest degradation, protect of soil from erosion, environmental protection. He published over 30 scientific papers in relevant national and international scientific publications.

Lorenza Tuccio*, Simonetta Paloscia, Giovanni Agati, Leonardo Santurri, Giacomo Fontanelli

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Contribution of fluorescence sensing for the nitrogen status estimation of sunflower (*Helianthus annus L.*)

Sunflower (*Helianthus annus L.*) cultivation is widespread due to its dual use as both food and biofuel. The non-destructive assessment of Nitrogen (N) status of this crop is crucial to maximize its growth and productivity, reducing the waste of fertilizers. Remote sensing techniques have been widely used to develop agricultural strategies for crop management at global and regional scale. Anyway, satellite-based monitoring and estimation algorithms need affordable and reliable ground data for their calibration and validation. Here we aim to test the ability of a hand-held portable sensor for the non-destructive determination of the leaf N status of sunflower.

The study was conducted for two consecutive years in a rural area in Central Tuscany (Italy), monitoring five commercial fields (three in 2023 and two in 2024) across various growth stages described in three measurement campaigns in 2023 and two in 2024.

The middle part of the adaxial side of the youngest leaf that had reached at least 75% of its final size was measured by Dualex (METOS® by Pessl Instruments, Weiz, Austria) from three to five representative plants per field; afterward, the N-concentration of the selected leaves was chemically assessed by the Kjeldahl method for a total of 53 samples.

Dualex (Dx) is a leaf-clip optical sensor that uses three LEDs emission bands at 375, 520 and 650 nm to excite Chlorophyll (Chl) fluorescence. It provides a Chl index by differential transmittance, an epidermal Flavonoids (Flav) index by the chlorophyll fluorescence screening method and a Nitrogen Balance Index (NBI) as the Chl/Flav ratio, based on the opposite N-dependency of chlorophyll and flavonoids on N availability.

In our study, we used Optical Indices (OI) from Dx in combination with the Days After Sowing (DAS) to assess the effect of sunflower phenology on the measured indices (mChl=Chl/DAS, mFLav=Flav×DAS and mNBI=NBI/DAS2). The mFlav index was better related to the leaf N status (Pearson $r=-0.82$; $p<0.001$) than mChl index (Pearson $r=0.80$; $p<0.001$) and mNBI (Pearson $r=0.79$; $p<0.001$). The Pearson coefficient of the relationship between OI and the leaf N concentration is significantly improved by the integration of the OI with DAS. This result suggests the addiction of further variables in the future development of a N estimation model for sunflower that would be reliable under different soil and weather conditions.

Our results at ground level are promising for the integration of proximally and remotely sensed data in a general sunflower growth model since they prove the relationship of Dx OI with leaf N over time. This research is part of the STRIVE project (Sciences for Industrial, Green and Energetic Transition) funded by the Italian National Research Council (CNR) under the FOE 2022 program.

Biography

Dr. Lorenza Tuccio received her PhD degree on Crop Science Productions in 2011 at Pisa University, Italy. She then joined the research group of Dr. Giovanni Agati at the Institute of Applied Physics Nello Carrara of the National Research Council (CNR IFAC). After six years of postdoctoral fellowship, she obtained the position of Researcher. She has published more than 20 peer-reviewed research articles mainly focusing on precision agriculture.

Maria Cojocaru-Toma[1*], Angelica Ohindovschi[1], Mihaela Nartea[1], Andreea Lupitu[2], Cristian Moisa[2], Flavia Bortes[2], Dana Maria Copolovici[2], Lucian Copolovici[2]

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Optimization of polyphenol extraction in aerial parts of *Agrimonia eupatoria* l. *and Cichorium intybus L.*

Phenolic compounds are essential for human health and exhibit a wide range of pharmacological activities, such as antioxidant, anti-inflammatory, antimicrobial, antitumor properties, whereby they can be used in the pharmaceutical, cosmetic and food industry with the development of new products. The aerial parts of *Agrimonia eupatoria* and *Cichorium intybus* were collected in flowering time, on June 2024, from the collection of Scientific Practical Center of Medicinal Plants (SPCMP) of Nicolae Testemitanu State University of Medicine and Pharmacy, Chisinau, Republic of Moldova.

Extraction of phenolic compounds from plant products was performed by different extraction conditions, using the water bath with the condenser reflux, the magnetic stirrer with heating and the ultrasound assisted bath, respecting the ratio of plant product to ethyl alcohol 60% (1:20) and extraction time of 30 minutes for all methods applied. Total Phenolic Content (TPC) was determined using Folin-Ciocalteu reagent with absorbance reading at wavelength λ=760 nm, Total Flavonoid Content (TFC) with 2.5% AlCl3 at wavelength λ=430 nm; Total Phenolic Acids (TPA) were determined using Arnow reagent (5% NaNO2 and Na2MoO4) and 2 M NaOH at wavelength λ=500 nm, with the Metertech UV/VIS SP 8001 spectrophotometer in the Department of Pharmacognosy and Pharmaceutical Botany. Phenolic compounds were higher in ethyl extracts obtained with the magnetic stirrer: The TPC reported as Gallic Acid equivalent (mg GA/g) for *A. eupatoria*–78.42±0.025, *C. intybus*–30.65±0.013; TFC equivalent in Rutine (mg RU/g) for *A. eupatoria*–39.25±0.120, C. intybus–18.35±0.041; and TPA reported as Caffeic Acid (mg CA/g) for *A. eupatoria*–3.78 ±0.049, *C. intybus*–10.52±0.015; followed by the content of TFA, TFC, TAC obtained at ultrasound bath. The lower content of phenolic compounds in ethyl extracts were obtained at the water bath with the condenser reflux: the TPC (mg GA/g) for *A. eupatoria*–52.21±0.031, *C. intybus*–15.29±0.018; TFC (mg RU/g) for *A. eupatoria*–21.45±0.023, *C. intybus*–10.47±0.035; and TPA reported as caffeic acid (mg CA/g) for *A. eupatoria*–2.15±0.034, *C. intybus*–8.43±0.016.The results indicate that species from the SPCMP collection: *A. eupatoria* and *C. intybus* are rich in polyphenolic compounds and represent a great potential for the pharmaceutical industry. Extraction methods influence the content of phenolic compounds in plant products, and magnetic stirrer extraction with heating is optimal for *Agrimoniae herba* and *Cichorii herba*. Ultrasonic assisted bath and water bath with the condenser reflux, can also serve as alternative methods for the extraction of polyphenolic

compounds from plant products with insignificant deviations. The research was carried out within the project No. PN-IV-P8-8.3-ROMD-2023-0022.

Biography

Cojocaru-Toma Maria, PhD, associate Professor at the Department of Pharmacognosy and Pharmaceutical Botany, Nicolae Testemitanu State University of Medicine and Pharmacy Chisinau, Moldova, head of studies, responsible for the discipline Pharmacognosy. She received her PhD degree in 2000, certificated of the Habilitation and the title of a PhD Supervisor (2020). The scientific expertise is in the field of herbal medicinal products, validated by involvement in international (4) and national (11) research projects (director, co-director, senior scientific researcher) and by holding an expert position in national specialty committees. She has published more than 190 publication, including articles in SCI (E), SCOPUS.

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[2]Department of Biotechnology, Genomics and Plant Breeding, Instituto Murciano de Investigación y Desarrollo Agrario y Medioambiental (IMIDA), La Alberca, Murcia, Spain

Evaluation of resistance to foliar diseases of selected genotypes of *V. vinifera x Vitis SSP* resistant crosses

Powdery mildew, caused by the ascomycete *Erysiphe necator,* and downy mildew, caused by the oomycete Plasmopara viticola, are the main diseases affecting grapevines, leading to significant economic losses in the viticulture sector worldwide. Their control accounts for a high percentage of the annual applications of phytosanitary products used in viticulture, with the consequent negative impact on the environment, including the reduction of the biodiversity of the viticultural ecosystem, and the appearance of resistances that make these products less and less effective. The European Green Pact prioritizes the protection and preservation of the environment, and imposes increasing restrictions on the use of these products. In this context, the development of disease-resistant grapevine varieties, obtained through crosses of *Vitis vinifera* with other resistant species of the Vitis genus, is an alternative for achieving sustainable viticulture. To ensure effective and long-lasting resistance, it is necessary to incorporate multiple resistance genes into the same plant, so that they can provide different defense mechanisms against the pathogen. In this direction, in the Breeding Program developed at the IMIDA, 27 genotypes from crosses between [(Monastrell x Regent) x Kishmish vatkana] (MRomK) and [(Monastrell x Regent) x Solaris] (MRomS) were preselected by Marker-Assisted Selection (MAS), using primers specific for the resistance genes introgressed for the presence of loci Ren1, Ren3, Ren9, Rpv3 and Ren3; Ren9; Rpv3; Rpv10, respectively. The objective of this study was to evaluate the resistance of selected hybrids to powdery mildew and downy mildew by in vitro inoculation assays. This objective is framed within the Shield 4 Grape project (HORIZON-CL6-2023-BIODIV-01-14). Young leaves, previously sterilized, were inoculated with a vacuum tower for powdery mildew and by dilution (105 cfu/ml) for downy mildew. Fungal development was evaluated at 7 and 14 days after inoculation on a scale of 0 to 5 for powdery mildew, and on a scale of 1 to 9 (OIV descriptor 452) for downy mildew. On average, the MRomK genotypes presented a higher level of resistance to powdery mildew than the MRomS family, unlike the downy mildew, where the MRomS family showed a higher level of resistance. The genotypes selected for their resistance, higher than that of their resistant parents, were MRomS1, MRomS7 and MRomS16 for both diseases, and MRomS5, MRomS6, RomS16, RomS17 and MRomS22 for powdery mildew, and MRomK5, MRomK8, MRomK9, MRomK20, RomK24 and MRomK28 for downy mildew. The next step of this work will be to evaluate these genotypes for their agronomic and oenological aptitudes.

Biography

Dr. María del Mar Hernández studied Biology (in the specialty of biochemistry) at the University of Valencia, and graduated in 1987. She later joined the research group of Professor Eduardo Primo Yúfera at the Polytechnic University of Valencia where received her PhD in 1995 at the same institution. She is currently working in the Department of Agriculture and Food at the University of La Rioja. She has published more than 15 research articles in SCI (E) journals.

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[1]Laboratory for Molecular Genetics and Physiology, Maize Research Institute Zemun Polje, Belgrade, Serbia

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Marker assisted breeding for beta carotene rich maize hybrids

The results presented here are a part of the breeding program conducted at the Maize Research Institute Zemun Polje with the aim to convert the Standard Maize (SM) to Beta Carotene Rich (BCR) genotypes using the marker assisted backcross breeding. This breeding strategy gained immense importance as it precisely selects desirable plants and eliminates large scale biochemical estimation in the segregating generations. Two commercial SM hybrids and their BCR counterparts were the subjects of this research. Parental lines of BCR hybrids were developed through marker-assisted introgression of crtRB1-3′TE allele. The conversion process included three generations of backcrossing and two generations of selfing. Biochemical evaluation of resulting improved hybrids was performed to estimate beta carotene, tryptophan and protein contents. In both BCR hybrids, BC content was significantly higher ($p<0.01$) in comparison with the standard hybrids, confirming the success of the conversion process. Unlike the SM where tryptophan is a deficient amino acid, in BCR hybrids it was increased for 15.04% and 19.93%, respectively. Quality Index (QI), defined as tryptophan to protein ratio, was also elevated for 13.75% in BCR1 and for 9.39% in BCR2. Being the major indicator of protein quality, increased QI implies improved nutritional quality of the protein in BCR hybrids. Furthermore, highly significant correlation ($p<0.01$) was identified between QI and BC, indicating the possibility of simultaneous selection and improvement of these traits in our breeding material. These two beta carotene enriched hybrids with improved protein quality can be used in the biofortification programs.

Biography

Dr. Marija Kostadinović has completed her PhD in Genetics at the University of Belgrade, Serbia. She is working as a Senior Research Associate in the Laboratory for Molecular Genetics and Physiology at the Maize Research Institute Zemun Polje in Belgrade, Serbia. Her research focus is on the marker assisted selection for development of maize with high nutritive value. She is included in genetic characterization of maize lines, hybrids and populations, as well as in biochemical testing of the grain quality. Also, she investigates impact of biotic and abiotic stress on maize at the morphological, physiological and biochemical level.

Marija Sigurnjak Bureš[1*], Jelena Horvatinec[2], Marina Bubalo Kovačić[2], Danijela Školjarev[2], Marko Reljić[2], Ema Kostešić[2], Benjamin Atlija[2], Monika Zovko[2], Sanja Stipičević[3], Maja Jakšić[1*], Bojan Bajić[1], Gabrijel Ondrasek[2]

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Meta-analysis of biochar effects on plant yield and soil nutrient dynamics across agroecological systems

Biochar is a carbon-rich, porous, and alkaline material produced through the pyrolysis of organic biomass. Due to its unique physicochemical properties, biochar has emerged as a promising soil amendment with the potential to enhance soil fertility, sequester carbon, and support sustainable agricultural practices. Its application is particularly beneficial in agroecosystems characterized by degraded, acidic, or nutrient-deficient soils, where conventional inputs may be less effective or environmentally taxing. In this study, we conducted a comprehensive meta-analysis to quantitatively assess the effects of biochar application on plant yield and biomass mineral composition under varying agroecological conditions. A total of 71 peer-reviewed studies were selected from an initial pool of 2,725 publications retrieved from major scientific databases, including Web of Science, Scopus, and Science Direct. The selection criteria were based on relevance, data quality, and the presence of comparable experimental parameters. We employed a random-effects model to account for heterogeneity across studies and used non-aggregated (raw or individual) datasets to ensure a robust statistical analysis. This positive effect is likely attributable to improvements in soil physical and chemical properties, such as enhanced soil structure, increased water-holding capacity, elevated cation exchange capacity, and greater nutrient availability. In particular, biochar was found to markedly increase soil Potassium (K) levels, potentially due to the release of potassium from biochar's ash fraction and its mineral surfaces. This enrichment can be especially advantageous in potassium-deficient soils, contributing to improved plant growth and resilience. Conversely, the analysis revealed no statistically significant effect of biochar on soil Nitrogen (N) content. This outcome may stem from the inherently low nitrogen content of most biochars, coupled with the high mobility and susceptibility of nitrogen to leaching and volatilization in soil systems. These findings underscore the need for integrated nutrient management strategies when using biochar, especially in nitrogen-limited environments.

Overall, this meta-analysis highlights the agronomic value of biochar, particularly for improving yield and potassium dynamics in soils. However, it also points to the importance of considering biochar's limitations and the variability of its effects across different contexts. Future research should focus on optimizing biochar formulations, application rates, and combinations with other soil amendments to maximize its benefits while mitigating nutrient imbalances.

Biography

Dr. Marija Sigurnjak Bureš earned her Master of Science degree in Chemical Engineering from the University of Zagreb, Croatia, in 2015. She completed her PhD in Chemistry in 2021 at the same institution under the mentorship of Prof. Dr. Sc. Šime Ukić. Following a two-year postdoctoral fellowship at the Faculty of Agriculture, University of Zagreb, she began working as a researcher at Innovation and Development Ltd. She has published 12 research articles indexed in the Scopus database.

Rui Deng[1,2], Yao Li[1,2], Naijie Feng[1,2,3*], Dianfeng Zheng[1,2,3], Youwei Du[1,2], Aaqil Khan[1,2], Yingbin Xue1,2, Jianqin Zhang[1,2], Yanan Feng[1,2]

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Integrative analyses reveal the physiological and molecular role of prohexadione calcium in regulating salt tolerance in rice

Salinity stress severely restricts rice growth. Prohexadione Calcium (Pro-Ca) modulation can effectively alleviate salt stress in rice. In this study, we explored the effects of Pro-Ca on enhancing salt tolerance in two rice varieties, IR29 and HD96-1. The results revealed that Pro-Ca markedly enhanced root and shoot morphological traits and improved plant biomass under salt stress. Chlorophyll a and b content were significantly increased, which improved photosynthetic capacity. Transcriptomic and metabolomic data showed that Pro-Ca significantly up-regulated the expression of genes involved in E3 ubiquitin ligases in IR29 and HD96-1 by 2.5-fold and 3-fold, respectively, thereby maintaining Na^+ and K^+ homeostasis by reducing Na^+. Moreover, Pro-Ca treatment significantly down-regulated the expression of Lhcb1, Lhcb2, Lhcb3, Lhcb5, and Lhcb6 in IR29 under salt stress, which led to an increase in photosynthetic efficiency. Furthermore, salt stress+Pro-Ca significantly increased the A-AAR of IR29 and HD96-1 by 2.9-fold and 2.5-fold, respectively, and inhibited endogenous cytokinin synthesis and signal transduction, which promoted root growth. The current findings suggested that Pro-Ca effectively alleviated the harmful effects of salt stress on rice by maintaining abscisic acid content and by promoting oxylipin synthesis. This study provides a molecular basis for Pro-Ca to alleviate salt stress in rice.

Biography

Professor Feng Naijie is a member of the South China Center of the National Salt-Tolerant Rice Technology Innovation Center. Her main research fields are the creation of chemical control products for crop stress resistance and disaster reduction, as well as the integration and demonstration promotion of technologies for improving crop quality and efficiency. She has successively presided over and participated in more than 30 national and provincial-level scientific research projects, published 4 academic monographs, and obtained 5 authorized invention patents. She have published over 150 academic papers as the first author or corresponding author in domestic and international journals.

Nani Goginashvili[1*], Natalia Togonidze[2]

[1]Agroforestry Research Division, Scientific-Research Center of Agriculture, PhD, Head of division, Tbilisi, Georgia

[2]Institute of Botany, Ilia State University, PhD, Assistant Researcher, Tbilisi, Georgia

Study of the populations of *Pterocarya fraxinifloia* in Georgia to identify conservation areas

Caucasian wingnut (*Pterocarya fraxinifloia* (Lam.) Spach) is a relict species, of the family Juglandaceae. In eastern Georgia, it grows in the Alazani River basin, and also forms small groups in wet areas on the banks of valleys. Since the natural populations of the species have not been fully evaluated in Georgia, the goal of our study was to describe, inventory the locations of P. fraxinifloia and identify the best areas for conservation.

Small groups of Caucasian wingnut are also found in western Georgia along river banks. However, its range extends to the territories of Southern Dagestan, Azerbaijan and Iran at an altitude of 500–800 m above sea level. In deciduous forests, this species is often found mixed with Alnus, Fagus orientalis, Carpinus betulus and Fraxinus exelsior.

The species is Vulnerable (VU) according to the IUCN Red List, and in Georgia it is also assigned the status of Vulnerable due to its small and fragmented range.

As a result of the research, maps of the distribution of the *P. fraxinifloia* in Georgia were prepared using GIS software, seeds were collected and processed for storage in a seed bank, a database was prepared in Georgian-English, and the best population was identified in Telavi Municipality-Lapankuri, where in-situ conservation is possible.

This work was implemented with the financial support of Shota Rustaveli National Science Foundation of Georgia (Grant # FR-22-2188).

Biography

Nani Goginashvili graduated from the Faculty of Biology of Tbilisi State University. She has been working at the V. Gulisashvili Forestry Institute since 1985. She received her PhD in 2001. From 2011, she has been an associate professor at the Agraricultural University of Georgia, giving lectures students of bachelors and masters degree. Since 2014 she has been working at the Scientific-Research Center of Agriculture, and since 2017 she works on the position of the head of Resesearch Devision of Agro-Foretry Cultures of this center. She is author of more then hundred scientific papers, brochures, books, and recommendations. She leads local and international scientific project.

Božena Sedláková, Pavel Matušinsky*, Aleš Lebeda

Department of Botany, Faculty of Science, Palacký University in Olomouc, Olomouc, Czech Republic

Efficacy of essential oils against plant pathogenss

The efficacy of various Essential Oils (EOs) is being tested against biotrophic pathogens affecting vegetable crops, including powdery mildew (*Podosphaera xanthii*) and downy mildew (*Pseudoperonospora cubensis*). Additionally, the study includes necrotrophic pathogens from the genera Fusarium and Alternaria. The tested EOs originate from diverse plant species, such as *Zingiber officinale, Valeriana officinalis, Artemisia absinthum, Citrus reticulata, Picea abies,* and *Thuja orientalis.*

A modified leaf disc bioassay was employed for screening biotrophic pathogens using a highly susceptible cucumber cultivar, while necrotrophic pathogens were tested on fruit fragments. The EOs were applied in multiple concentrations to assess their potential efficacy and phytotoxicity. Preliminary findings indicate promising potential for some EOs in managing these pathogens.

An Internal Grant from Palacký University, project number IGA_PrF_2025_001 and the Ministry of Agriculture of the Czech Republic, project number QK21010064, supported the research.

Biography

Pavel Matusinsky studied natural sciences and obtained his PhD in 2004. In 2025, he completed his habilitation in the field of phytopathology. He is based at Palacký University, focusing on phytopathology, cereal diseases, and plant-fungi interactions. His research interests are mainly centred on endophytic fungi and their potential applications in plant protection.

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A model for studying plant-endophyte interactions

Interactions between endophytic fungi and plants are crucial in plant biology and ecology. These relationships can significantly influence stress tolerance and resistance to pathogens. Identifying suitable model systems that enable detailed experimental analyses is essential for advancing our understanding in this field. We propose ideal plant-endophyte partnerships and highlight their importance in improving our knowledge of these interactions. Our research focuses on identifying and utilizing model systems based on *Brachypodium distachyon* and *Microdochium bolleyi* to study host-endophyte relationships. The proposed model allows us to conduct experimental analyses that contribute to a deeper understanding of interaction mechanisms and their potential applications in plant protection.

An Internal Grant from Palacký University, project number IGA_PrF_2025_001 and the Ministry of Agriculture of the Czech Republic, project number QL24010008, supported the research.

Biography

Pavel Matusinsky studied natural sciences and obtained his PhD in 2004. In 2025, he completed his habilitation in the field of phytopathology. He is based at Palacký University, focusing on phytopathology, cereal diseases, and plant-fungi interactions. His research interests are mainly centred on endophytic fungi and their potential applications in plant protection.

Reinaldo Demesio Alemán Pérez
Faculty of Earth Sciences, Amazonian State University, Puyo, Pastaza, Ecuador

Sustainability assessment of production systems in two communities of Pastaza Canton, Ecuadorian Amazon

Sustainability is a critical factor in production systems due to its role in environmental conservation. The Amazon region, one of Ecuador's most biodiverse areas, harbors approximately 8% of the world's species and possesses vast natural resources that require sustainable management. This region has highlighted that the expansion of the agricultural frontier with the consequent destruction of its forests represents the greatest socio-environmental impact on the Amazon region. This situation has allowed the establishment of agricultural systems (livestock and agricultural) that impact natural resources such as vegetation, fauna, and especially the quality and fertility of the soil component through changes in its physical, chemical, and biological properties. In addition, the establishment of agricultural systems (livestock and agricultural) impacts natural resources such as vegetation, fauna, and especially the quality and fertility of the soil component through changes in its physical, chemical, and biological properties. Within the framework of the project entitled: Implementation of a Technological Innovation System in Agricultural Production in the Province of Pastaza, the objective is to evaluate the sustainability of farms with agricultural management systems, through a methodological proposal adapted to Amazonian conditions and that considers indicators in its four dimensions (environmental, sociocultural, economic, political). The research was carried out in the parishes of El Triunfo and Teniente Hugo Ortiz, located in Pastaza Canton, Pastaza Province, Ecuador. In each parish, 10% of the total agricultural production units (UPAs) dedicated to permanent and transitory crops were selected in collaboration with local associations and communities. These UPAs were chosen as model units to represent the region's agricultural dynamics and support its productive development. Seven production units were selected from two indigenous-mestizo communities (Allishungo and El Esfuerzo 2).

The Methodology to Evaluate Sustainability in the Ecuadorian Amazon Region (MESRAE) was employed. The collection and processing of the information included the following stages: a) Collection and quantification of environmental, socio-cultural, economic, political indicators and critical points of the agricultural production units; b) Determination of the systemic model of the agricultural production units and c) Obtaining the index and sustainability class of the agricultural production units. With the application of this methodology, the 7 UPAs were typified in terms of sustainability, and the systemic model, potentialities, and critical points were obtained as key elements to advance towards the construction of a sustainable management model.

Results indicate that the selected communities exhibit a moderate level of sustainability. The dimensions with less attention and less prioritization have been the economic, socio-cultural, and political dimensions. One of the strongest dimensions in the communities was the environmental dimension, which can be used as a reference for replication in other communities to improve production processes; however, it is necessary to implement agricultural innovation practices to optimize the levels of sustainability found in the indicators.

Biography

Dr. Reinaldo Alemán studied Agronomy at the Universidad Central de Las Villas, Cuba, graduated MSc in sustainable agriculture and a PhD in Agricultural Sciences at the same institution. He has directed 24 research projects. Academician of the International Academy of Science, Technology, Education and Humanities and HONOR Member of the Iberoamerican Network of Environment (REIMA A.C.). He has published more than 100 scientific articles in indexed journals, 10 scientific books, and 4 book chapters. Tutor of 35 master's theses and six doctoral projects. He is a Senior Professor at the Universidad Estatal Amazónica del Ecuador.

Tytus Berbec

Department of Bioeconomy and Agrometeorology, Institute of Soil Science and Plant Cultivation- State Research Institute, Pulawy, Poland

The use of spectral measurements in experiments and agricultural production

In recent years, the agricultural sector in Poland has experienced a technological revolution, largely attributable to the implementation of unmanned vehicle systems. These unmanned aerial (UAVs) and ground (UGVs) vehicles, outfitted with sophisticated multi-purpose systems, are fundamentally transforming crop management paradigms. Their applications range from terrestrial cultivation operations to aerial tasks integral to precision agriculture, such as high-resolution field mapping, targeted spraying, and variable-rate fertilizer distribution. The evolution of drone technology offers novel opportunities for the optimization of agronomic processes. UAVs are commonly equipped with advanced geospatial mapping systems, facilitating the generation of detailed topographic models and the analysis of multispectral or hyperspectral data. By employing specialized sensors and cameras, these platforms can acquire critical data on various crop biophysical parameters, including vegetation indices, canopy density, physiological health, and stress levels. Furthermore, these data acquisition systems allow for seamless integration with Geographic Information Systems (GIS) and other analytical software utilizing machine learning algorithms. The geospatial data collected can be leveraged to create highly customized, site-specific fertilization prescriptions. These prescriptions are informed by detailed soil analysis—encompassing composition, moisture content, pH, and other edaphic factors—and can be refined using crop health maps derived from spectral imagery, which enable the early detection and mapping of disease outbreaks or pest infestations.

The acquisition of high-resolution spectral imagery, performed in a non-destructive manner, enabled a precise and multifaceted assessment of key agricultural crops. This analysis extended beyond evaluating plant health status and determining fertilization requirements to include the observation of other critical factors impacting final yield, such as soil heterogeneity and the estimation of soil moisture content. Furthermore, imagery acquired via Unmanned Aerial Vehicles (UAVs) facilitated a more accurate delineation of drought-affected areas within a specific study plot when compared to traditional, costly methods reliant on in-situ measurements. The appropriate combination of spectral bands allowed for the calculation of the Normalized Difference Vegetation Index (NDVI). This index was instrumental for conducting both quantitative and qualitative analyses of vegetation status, which in turn provided a basis for monitoring dynamic changes within the crops throughout the growing season.

Biography

Tytus Berbec is an agronomist, agrometeorologist, agroclimatologist, auditor, pilot, and a father to two wonderful children. His professional focus is on research assessing the use of cutting-edge technology to enhance soil moisture during periods of agricultural drought. He utilizes non-invasive methods based on high-altitude (satellite imagery), low-altitude (multispectral imagery captured by various aerial vehicles), and ground-based remote sensing (via spectroradiometer). His expertise includes spectral signature analysis, the creation of digital elevation models (DEMs), and GIS mapping. Furthermore, he oversees meteorological stations, ensuring high-quality data, and is actively involved in implementing Agriculture 4.0 and introducing the concept of Agriculture 5.0 in Poland.

Vladimir Todiraș[1*], Maria-Loredana Soran[2], Svetlana Jamba[1], Tatiana Erhan[1], Ildiko Lung[2], Ocsana Opriș[2], Adina Stegarescu[2]

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The effectiveness of new plant protection means in organic greenhouse pest management

Conventional and new means were tested in order to elaborate a pest management system for organic production in greenhouses. The studied pests were the most important insects for a large range of plants: aphids (Hemiptera: Aphididae), mites, greenhouse whitefly (*Trialeurodes vaporariorum*) and diseases downy mildew and powdery mildew. Our direction of the research was optimization of preparation and characterization of plant root and seeds extracts as natural insecticides and fungicides in greenhouses. A first stage the studies were focused on optimization of *Reynoutria sachalinensis* extracts for organic pestspests' management. This was done using Minitab 19 software applying and different ratios of ethanol: water, temperature and, contact time. And surfactants concentration. The best extract was mixed with different concentrations of surfactant in aim to obtain an efficient composition of the system applied for pest management. In the present work, the polyphenolic extracts of from leaves and stems of *Reynoutria sachalinensis* were studied as antifungal agents on powdery mildew disease of cucumber and tomatoes. Efficacy of recol (new formulation–chelate, of and plant extract *Reynoutria sachalinensis* plant extract) was applicated followed to prevent the powdery mildew. It has been shown that the addition of surfactant based on fatty acid ethyl esters obtained from natural oils can improve the fungistatic and fungicidal effect of *Reynoutria sachalinensis* extracts in greenhouses. The possibility to use funecol (liquid copper fungicide, 8% metallic copper) in comparison with Cuproxat 34.5 % tribasic Copper copper sulfate (19% metallic metallic copper) was estimated against downy mildew. During three consecutive years we noted synergistic effects of fungicides funecol and recol in control of downy and powdery mildew. The best result was obtained using mixture of funecol 4 l/ha + and recol 8 l/ha. The Pelecol-microemulsion (fatty acids esters) was tested against mites and moths. Polecat has been shown to be effective in controlling mites. It was concluded that the addition of surfactant based on fatty acid ethyl esters obtained from natural oils can improve the fungistatic and fungicidal effect of *Reynoutria sachalinensis* extracts in greenhouses.

Biography

Dr. Vladimir Todiraș studied agriculture at Timireazev agricultural Academy, Russian Federation and graduated as MS in 1980. He then joined the research group of Prof. James at the Institute of Plant Physiology and Biochemistry, Moldavian Academy of Sciences. He received PhD degree in 1996 at the same institution. After one year he obtained the position of Head head of laboratory. Now he is working as head of laboratory in the Institute of Genetics, Physiology, and Plant protection, State University of Moldova, Chisinau, Moldova. He has published more than 80 research articles in SCI journals.

Jia Song[1], Ying Liu[1,2], Wangxiao Cai[3], Silin Zhou[3], Fan Xi[3], Hanqiao Hu[1,2], Lei Ren[1,2], Yingbin Xue[1,2*]

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Unregulated GmAGL82 due to phosphorus deficiency positively regulates root nodule growth in soybean

Nitrogen fixation, occurring through the symbiotic relationship between legumes and rhizobia in root nodules, is crucial in sustainable agriculture. Nodulation and soybean production are influenced by low levels of phosphorus stress. In this study, we discovered a MADS transcription factor, GmAGL82, which is preferentially expressed in nodules and displays significantly increased expression under conditions of Phosphate (Pi) deficiency. The overexpression of GmAGL82 in composite transgenic plants resulted in an increased number of nodules, higher fresh weight, and enhanced soluble Pi concentration, which subsequently increased the nitrogen content, phosphorus content, and overall growth of soybean plants. Additionally, transcriptome analysis revealed that the overexpression of GmAGL82 significantly upregulated the expression of genes associated with nodule growth, such as GmENOD100, GmHSP17.1, GmHSP17.9, GmSPX5, and GmPIN9d. Based on these findings, we concluded that GmAGL82 likely participates in the phosphorus signaling pathway and positively regulates nodulation in soybeans. The findings of this research may lay the theoretical groundwork for further studies and candidate gene resources for the genetic improvement of nutrient-efficient soybean varieties in acidic soil.

Biography

Yingbin Xue graduated from South China Agricultural University with a PhD degree in agronomy (plant nutrition). After graduation, he joined the South China Branch of National Saline-Alkali Tolerant Rice Technology Innovation Center, mainly engaged in the study of physiological and molecular mechanisms of rice, soybean and other crops adapted to abiotic stresses such as salt damage and nutrient deficiency. He has published more than 20 papers in Journal of Experimental Botany, International Journal of Molecular Sciences, Journal of South China Agricultural University and other journals, co-edited two books, and authorized two national invention patents and two utility model patents.

Yoel Rodríguez Guerra
Faculty of Earth Sciences, Amazon State University, Puyo, Pastaza, Ecuador

Effect of worm castings on the vegetative development and agricultural yield of *Solanum lycopersicum var*. airton under seedbed and field conditions in the Sucúa Canton, Morona Santiago Province, Ecuadorian Amazon

The Amazon region, Ecuador's most biodiverse region, plays a key role in the country's ecological balance. However, sustainable horticultural production faces limitations such as low soil fertility, high humidity, pests, lack of infrastructure, and restricted access to organic inputs and appropriate technologies. Furthermore, deforestation and climate change affect ecosystem stability. In this context, the use of worm castings is presented as a sustainable alternative, improving soil quality, retaining moisture and providing essential nutrients, reducing the need for chemical fertilizers. This research aims to evaluate the effect of worm castings on the vegetative development and agricultural yield of Solanum lycopersicum variety Airton, under nursery and open-field conditions. The research was conducted in the Ecuadorian Amazon Region in the city of Sucúa, a canton of the same name, in the province of Morona Santiago. The methodology used was experimental, carried out in two stages, the first in seedbed conditions under two types of cover in five different substrates up to 35 days and the second in the open field with a randomized block design with different dosages of worm humus, for the production of tomato crops in field conditions, preliminary calculations were made in relation to the nutritional requirements of this vegetable during its biological cycle to establish the treatments to be applied. The results obtained revealed that, at the seedbed level, in each variable studied, the best treatment was the one where worm humus and soil were used in a proportion of 25% and 75% respectively under plastic cover, with an average height (16.1 cm), stem diameter (3.9 mm), number of leaves per plant (5 leaves), and the best germination. In open field conditions, the best results were obtained using a dose of worm humus of 8.8 kg/m², achieving adequate yield indicators in terms of the number of fruits per bunch (5 to 6), number of bunches per plant (5 to 6) and a yield of 29,259.0 kg/ha, which shows that under Amazonian conditions it is possible to obtain good results with the application of organic fertilizers, especially with worm humus. Its application promotes microbial biodiversity and reduces the environmental impact, promoting a more resilient and balanced agricultura.

Biography

Dr. Yoel Rodríguez Guerra holds a degree in Agricultural Engineering from the University of Pinar del Río, Cuba, a Master's degree in Agroecology from the Institute of Ecology and Systematics in Havana, and a PhD in Forestry Sciences. He has directed several research projects in the agricultural and forestry fields. He has published more than 50 scientific articles in peer-reviewed journals and has supervised more than 40 undergraduate theses and six master's theses. He is a Full Professor at the Amazon State University of Ecuador, holding various teaching and management positions.

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