Finanziato dall'Unione europea NextGenerationEU

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Comune di Vizzini

Università di Catania

HIGHER EDUCATION FOR SUSTAINABLE Food Production

8th Joint Meeting of Agriculture-oriented PhD Programs

Catania – Vizzini – Ragusa (Italy)

08 – 12 June 2026

Uni ct DiSA

Uni ct STRUTTURA DIDATTICA SPECIALE DI RAGUSA

UNIVERSITÀ DI FOGGIA

UNIVERSITÀ DEGLI STUDI DI UDINE

Erasmus+ BLENDED INTENSIVE PROGRAMME

WARSAW UNIVERSITY OF LIFE SCIENCES

UNIVERSITY OF THESSALY

DEMOCRITUS UNIVERSITY OF THRACE

UCLM Universidad Castilla-La Mancha

UNIVERSITAT JAUME I

Czech University of Life Sciences Prague

Finanziato dal Dipartimento di Agricoltura, Alimentazione e Ambiente dell'Università di Catania, dal Erasmus+/KA131 n. 2024-1-IT02-KA131-HED-000210885 - E39I24000400006, BIP (Blended Intensive Programme), e dall' Avviso pubblico Proposte di intervento per la rigenerazione culturale e sociale dei piccoli borghi storici, da finanziare nell'ambito del PNRR, Missione 1 Componente 3 (M1C3) – Investimento2.1 "Attrattività dei Borghi Storici, finanziato dall'Unione Europea – NextGenerationEU e gestito dal Ministero della Cultura.

HIGHER EDUCATION FOR SUSTAINABLE FOOD PRODUCTION

8th Joint Meeting of Agriculture-oriented PhD Programs UniCT, UniFG and UniUD

ERASMUS + Blendend Intensive Program on the Joint workshop of Agriculture-oriented PhD

08-12 June 2026, Catania

EDITORI:

BIONDI Antonio

CHIARENZA Salvatore

CARLENTINI Morena

GRASSO Alessandro

4 – 12 Giugno 2026

Meeting locations

Di3A, University of Catania

The *Department of Agriculture, Food and Environment* (Di3A) at the University of Catania is rooted in the long-standing academic tradition of the Catanese university, with teaching programs historically aggregated throughout the nineteenth century and consolidated through research in the twentieth and twenty-first centuries. It represents one of the leading centers of excellence in Southern Italy for agronomic, food and environmental research, with particular emphasis on Mediterranean agri-food systems analysis and territorial resilience. Central to the Department is the bioscience cluster, which concentrates interdisciplinary expertise in agricultural biotechnology, plant genomics, molecular analysis and biological characterization applied to agri-food chains. Located between the city of Catania and Mount Etna, Di3A exerts significant influence on agricultural and environmental research across eastern Sicily, connecting directly with major regional agro-ecosystems and operating as a scientific hub for analyzing territorial protected geographical indication systems, agricultural quality frameworks and governance dynamics in territorial supply chains. Its multidisciplinary vocation, spanning agricultural economics, environmental sustainability, biotechnology, rural sociology and supply chain governance, makes it a focal point for researchers and doctoral candidates interested in the territorial, institutional and socio-economic specificities of Sicily and the Mediterranean region.

Borgo della Cunziria, Vizzini

The Borgo della Cunziria in Vizzini represents the heart of the leather-working tradition in south-eastern Sicily, one of the most significant artisanal districts of the medieval and early modern Mediterranean. The term 'cunziria' (in Sicilian language) refers to the art of leather tanning, a practice central to the medieval and modern economy of the Hyblaean territory, connecting mountain pastoralists with urban and international markets. Situated near waterways that provided the motive power and water essential for production processes, the Borough preserves the memory of an artisanal supply chain that deeply shaped local identity and regional commercial networks. Its urban morphology reflects the typical organization of medieval boroughs dedicated to craftsmanship, where private and communal spaces interweave according to logics of functional proximity and quality control. Despite twentieth-century economic transformations that altered the productive landscape, the Borough retains material and symbolic heritage of significant anthropological and historical value: historic buildings, communal spaces, architectural testimony and oral memory narrate productive organization strategies, networks of artisan cooperation, community bonds and systems of craft knowledge transmission. Today, Borgo della Cunziria is the focus of growing interest in urban regeneration, intangible heritage valorization and historical research, becoming a privileged space for narrating the economic, cultural and social transformations of eastern Sicily.

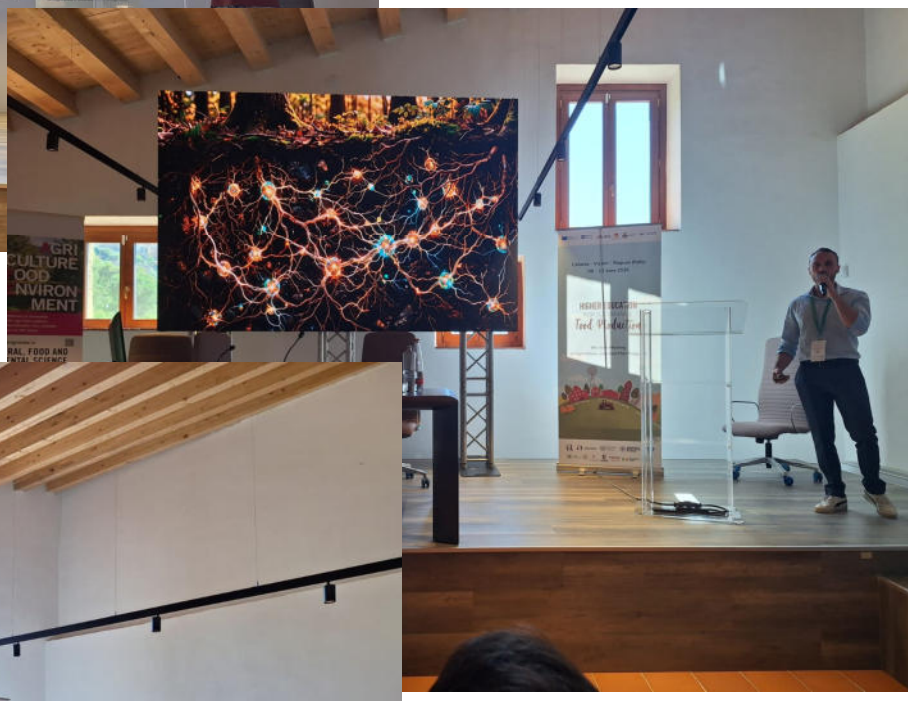
Ragusa Ibla

Ragusa Ibla is one of Sicily's most renowned UNESCO World Heritage sites, internationally recognized for its historical, cultural and architectural value. Originating from the ancient Hyblaean settlement, the city was rebuilt after the 1693 earthquake, becoming one of Europe's finest examples of Baroque urban planning. Located on the Hyblaean plateau in southeastern Sicily, it overlooks the surrounding countryside with terraces descending toward the Dirillo valley.

Its historic center combines elegant public spaces, richly decorated facades and monumental churches, including the Cathedral of San Giorgio, a masterpiece of Sicilian Baroque. Ragusa Ibla preserves strong traditions of civic life and community identity, where squares remain central spaces for social interaction and public life. Today, it represents a living model of heritage preservation, balancing tourism development, territorial authenticity and urban resilience.

Struttura Didattica Speciale di Ragusa

The Special Didactic Structure of Ragusa (SDS Ragusa), part of the University of Catania, was established in 2022 to strengthen higher education, research, and innovation in the Ragusa area while supporting local socio-economic development. It offers multidisciplinary academic programmes in fields such as business and sustainability, agricultural systems, languages and intercultural communication, and sport sciences. Through these activities, SDS Ragusa aims to enhance educational opportunities and contribute to the long-term development of the region.




Why to farm a deer? Deer-based solutions for food and health
Francisco Ceacero


Cheese science is based on microbiota
bacteria, yeasts, filamentous fungi and
bacteriophages

ORGANIZING SCIENTIFIC COMMITTEE

Maria Luisa Amodio (UniFG)

Eliana Barrasso (UniFG)

Antonio Biondi (UniCT)

Stefano Bovolenta (UniUD)

Morena Carlentini (UniCT)

Salvatore Chiarenza (UniCT)

Arianna Del Pino (UniUD)

Alessandra Di Francesco (UniUD)

Alessandro Grasso (UniCT)

Giuseppe Longo (UniFG)

Andrea Amilcare Passarelli (UniUD)

Alessandro Priolo (UniCT)

The authors of the abstracts are responsible for the content of their contributions

8th Joint Meeting of Agriculture-oriented PhD Programs

08-12 June 2026

PROGRAMME AT A GLANCE

BIP Program - ONLINE SESSION Thursday 04.06.26		
15:00-15:15	Antonio Biondi	*Welcoming by Coordinator of the PhD program in Agricultural, Food and Environmental Science*
15:15-15:30	Lucia Zappalà	*Introduction to the University of Catania*
15:30-15:50	Morena Carlentini - Salvatore Chiarenza	*Introduction to the 8th Joint Meeting event by PhD Students local organizers*
15:50-16:00	Break	
16:30-17.00	Luciano M. Santoro - Alessandro Grasso	Between Stone and Story: A Territorial Introduction to the South-East Sicily
17:00-17:30	Q&A	
Monday 08.06.26		
11:00-15:00	Great Hall	WELCOMING - Registration opening at Di3A, Via Santa Sofia 100, Catania
15:00-15:30	Great Hall	Institutional Welcome Enrico Foti, Rector of University of Catania, Mario D'Amico Head of the Department of Agriculture, Food and Environment, Vittoria Catara International and Erasmus Coordinator of the Department of Agriculture, Food and Environment, Antonio Biondi Coordinator of the PhD program in Agricultural, Food and Environmental Science Stefania Mazzone, Deputy Rector of the University of Catania for Master and PhD studies, Mattia Frasca, Deputy Rector of the Erasmus Programs
15:30-16:00	Great Hall	1st Keynote: Salvatore Arpaia, ENEA, TERIN-BBC *Insects: Earth's Oldest Matriarchy*
16:00-16.30	Great Hall	2nd Keynote: Paweł Solarczyk, Jakub Urban, Maciej Kamaszewski, Warsaw University of Life Sciences *Strategies for Sustainable Animal Production and Environmental Protection*
16:30-17:15	Great Hall	presentation #1 - 3
17:30-19:30	Great Hall	Welcome cocktail dinner
19:30-21:00		Bus transfer to the accomodations in Vizzini and Grammichele
Tuesday 09.06.26		
10:00-10:30		Institutional Welcome at *Borgo Cunziria* - Vizzini
10:30-11:00	plenary session	3rd Keynote: Amaya Zalacain, Universidad de Castilla-La Mancha *Guayule crop (Parthenium argentatum A. Gray) and its exploitation, a new alternative for semiarid regions*
parallel sessions 11:00-12:30	room 1	Crop Protection: presentation #4 - 9
	room 2	Animal Science & One Health: presentation #10 - 15
12:30-13:30		Lunch
14:00-14:30	plenary session	4th Keynote: Giuseppe Longo Minnolo, University of Catania *Understanding the Soil–Plant–Atmosphere Continuum through Multi-Scale Approaches in Mediterranean Citrus orchards*
parallel sessions 14:30-15:30	room 1	Food Technology - Processing & Innovation: presentation #16 - 19
	room 2	Consumer & Market studies: presentation #20 - 23
15:30-16:00		Coffee Break
Thesis Flash 16:00-17:00	plenary session	1st year Students 3-minute speach #1 - 12
17:00-19:00		Discover Vizzini Downtown
19:30		Social dinner at *Ristorante La Ruota* – Vizzini

8th Joint Meeting of Agriculture-oriented PhD Programs

08-12 June 2026

Wednesday 10.06.26		
9:30-10:00	plenary session	5th Keynote: Tihomir Kovač, University of Osijek *Circular Bioeconomy in Lion's Mane Mushroom Production and Sustainable Viticulture*
parallel sessions 10:00-11:00	room 1	Plant & Crop science: presentation #24 - 26
	room 2	Sustainability, Circular Bioeconomy & Emissions: presentation #27 - 30
11:00-11:30		Coffee Break
parallel sessions 11:30-12:30	room 1	Plant & Crop science: presentation #31 – 34
	room 2	Sustainability, Circular Bioeconomy & Emissions: presentation #35 - 38
12:30-13:30		Lunch
14:00-14:45	plenary session	6th Keynote: Building an International Research Career through MSCA Fellowships Fabrizio Lisi, Riccardo Raimondo, University of Catania, Italy
parallel sessions 14:45-15:30	room 1	Plant & Crop science: presentation #39 - 41
	room 2	Food Technology - Processing & Innovation: #42 - 44
15:30-16:00		Coffee Break
16:00-16:30	plenary session	7th Keynote: Francisco Ceacero Herrador, Czech University of Life Science Prague *Why to farm a deer? Deer-based solutions for food and healthh*
Thesis Flash 16:30-17:30	plenary session	1st year Students 3-minute speech #13 - 24
17:30-18:00	plenary session	8th Keynote: Krzysztof Klimaszewski, *Warsaw University of Life Sciences* *Integrating Wildlife Management into Agricultural Education: a Key Step Towards Sustainable Agroecosystems*
18:00		Visit and dinner at *Lo Zafferaneto Masseria* - Buccheri
Thursday 11.06.26		
9:30-10:00	plenary session	9th Keynote: Pablo Urbaneja, Universitat Jaume I *Guttation: an emerging resource with effects on insect–plant interactions*
parallel sessions 10:00-10:30	room 1	Crop protection: presentation #45 – 46
	room 2	Consumer & Market studies: presentation #47 - 48
10:30-11:00		Coffee Break
parallel sessions 11:00-12:00	room 1	Crop protection: presentation #49 - 52
	room 2	Animal Science & One Health: presentation #53 - 56
12:00-13:30		Lunch
13:30-14:00	plenary session	10th Keynote: Maria Pappas, Democritus University of Thrace *Plant-Mediated Effects of Beneficial Soil Microorganisms on Herbivorous Pests: Mechanisms and Applications in Biological Control*
parallel sessions 14:00-14:30	room 1	Crop protection: presentation #57 - 58
	room 2	Animal Science & One Health: presentation #59
14:30-15:00	room 1	Crop protection: presentation #60 - 61
15:00-15:30		Coffee Break
15:30-16:00	plenary session	11th Keynote:Antonio Fernandes de Carvhalo, University of Viçosa *How Biodiversity Knowledge Can Improve Cheese Safety*
16:00-16:30	plenary session	12th Keynote: Daniele Nicotra, University of Catania *Translating Research into Real-World Opportunities*
16:30-18:00	plenary session	13th Keynote: Frauke Huber, Uwe H. Martin *LandRush – Ventures into Global Agriculture*
19:30		Dinner & after-party at *Agriturismo A'Cunziria*

8th Joint Meeting of Agriculture-oriented PhD Programs

08-12 June 2026

Friday 12.06.26		
9:00	Bus transfer to Ragusa Ibla	
10:00-12.30	Ragusa Ibla - UNICT Campus - Former Convent of St. Teresa CLOSING CEREMONY	Discover Agricultural Research for Undegraduate students By UNICT PHD STUDENTS
12:30-13:30	Lunch	
13:30-16:00	Discover Ragusa Ibla	
13:30-16:00	Bus transfer to Catania Airport (Bus 1)	
16:00-18:30	Bus transfer to Catania Downtown (Bus 2)	

The Authors wish to thank the funders of the event

WORKSHOP SCHEDULE

THURSDAY, JUNE 4

BIP PROGRAM – ONLINE SESSION

15:00 - 15:15
Welcoming by Coordinator of the PhD program in Agricultural, Food and Environmental Science
Antonio Biondi, University of Catania, Italy

15:15 - 15:30
Introduction to the University of Catania
Lucia Zappalà, University of Catania, Italy

15:30 - 15:50
Introduction to the 8th Joint Meeting event by PhD Students local organizers
Morena Carlentini and Salvatore Chiarenza, University of Catania, Italy

15:50 – 16:00 Break

16:30 - 17:00
Between Stone and Story: A Territorial Introduction to the South-East Sicily
Luciano M. Santoro and Alessandro Grasso, University of Catania, Italy

17:00 – 17:30 Q&A

8th Joint Meeting of Agriculture-oriented PhD Programs

08-12 June 2026

MONDAY, JUNE 8

11:00 - 15:00 Registration opening
Di3A, Via Santa Sofia 100, Catania, Italy

15:00 - 15:30 Institutional Welcome
Enrico Foti, Rector of University of Catania,
Mario D'Amico Head of the Department of Agriculture, Food and Environment,
Antonio Biondi Coordinator of the PhD program in Agricultural, Food and Environmental Science
Vittoria Catara International and Erasmus Coordinator of the Department of Agriculture, Food and Environment,
Stefania Mazzone, Deputy Rector of the University of Catania for Master and PhD studies,
Mattia Frasca, Deputy Rector of the Erasmus Programs

15:30 - 16:00 1st Keynote:
Insects: Earth's Oldest Matriarchy
Salvatore Arpaia, ENEA, TERIN-BBC, Italy

16:00 - 16:30 2nd Keynote:
Strategies for Sustainable Animal Production and Environmental Protection
Paweł Solarczyk, Jakub Urban, Maciej Kamaszewski, Warsaw University of Life Sciences, Poland

AFTERNOON SESSION

Chairpersons: Andrea A. Passarelli, Eliana Barrasso, Morena Carlentini

16:30 – 16:45 *Presentation#1*
Influence of blockchain technology as traceability system for extra virgin olive oil on Italian consumers prejudice of origin: an analysis of willingness to pay and sensory evaluation
Matilde Reitano, UniCT, Italy

16:45 – 17:00 *Presentation#2*
Characterization of Off-Odour Volatile Organic Compounds (VOCs) in In Package Cold Plasma (IPCP) Treated Polymeric Films for the Fresh-Cut Industry
Giuseppe Rosiello, UniFG, Italy

17:00 – 17:15 *Presentation#3*
Environmental drivers of Dobrava-Belgrade orthohantavirus occurrence in Trentino, Italy
Daniele Fabbri, UniUD, Italy

17:30 - 19:30 Welcome cocktail dinner

TUESDAY, JUNE 9

10:00 - 10:30 Institutional Welcome at Borgo Cunziria – Vizzini

10:30 - 11:00 3rd Keynote
Guayule crop (*Parthenium argentatum* A. Gray) and its exploitation, a new alternative for semiarid regions
Amaya Zalacain, Universidad de Castilla-La Mancha, Spain

MORNING SESSION

Room 1: Crop Protection
Chairpersons: Eleftheria Maria Bali, Andrea Amilcare Passarelli

11:00 – 11:15 *Presentation#4*
Exploring volatile compounds for the early detection of Neopestalotiopsis clavispora: emerging grape trunk disease
Filippo Maria Sanna, UniUD, Italy

11:15 – 11:30 *Presentation#5*
Bacillus subtilis influences *Tuta absoluta* population dynamics through bottom-up effects in tomato under semi-field conditions
Mariangela Milordo, UniCT, Italy

11:30 – 11:45 *Presentation#6*
Contamination of bee pollen with mycotoxins - detection and control
Nela Drača, PTFOS, Croatia

11:45 – 12:00 *Presentation#7*
The hidden impact of insecticides on *Nesidiocoris tenuis*: integrating survival, fecundity, and detoxification gene networks
Eya Ben Hmad, UniCT

12:00 – 12:15 *Presentation#8*
Temperature experienced prior to adult emergence modulates adult cold tolerance of the invasive species Bactrocera dorsalis and Bactrocera zonata
Vasilis G. Rodovitis, UTH, Greece

12:10 – 12:30 *Presentation#9*
Multidimensional Management of Multiple Pests in open field tomato in Mediterranean environment (Sicily, Italy)
Ya Liu, Yunnan University, China

Room 2: Animal Science & One Health
Chairpersons: Cristina Stango, Lorenzo Frangini

11:00 – 11:15 *Presentation#10*
Characterization of heterozygosity-rich regions in Sicilian horse breeds
Morena Carlentini, UniCT, Italy

11:15 – 11:30 *Presentation#11*
Validation of commercially available mammalian structural antibodies in teleosts: a systematic review of current research practices
Tofael Ahmed Sumon, UniUD, Italy

11:30 – 11:45 *Presentation#12*
The use of aqueous hybrid supramolecular complexes in poultry production
Wiktoria Kościów, SGGW, Poland

11:45 – 12:00 *Presentation#13*
Gastrointestinal Parasite Fauna in Purebred Guinea Pigs (*Cavia porcellus* (L.)) and Assessment of Skin and Reproductive Tract Microbiota with Consideration of Zoonotic Factors
Daniel Banasiak, SGGW, Poland

12:00 – 12:15 *Presentation#14*
Perturbations in dairy cows: impact of heat stress, lameness, and mastitis on milk yield and feeding behaviour
Anita Cabbia, UniUD, Italy

12:10 – 12:30 *Presentation#15*
Agriculture, biodiversity, and culture nexus: Conflicting views on conserving and controlling threatened ungulates in a Philippine heritage landscape
Jhonnel Villegas, CZU, Czech Republic

12:30 – 14:00 Lunch break

14:00 - 14:30 4th Keynote
Understanding the Soil–Plant–Atmosphere Continuum through Multi-Scale Approaches in Mediterranean Citrus Orchards
Giuseppe Longo Minnolo, University of Catania, Italy

AFTERNOON SESSION

Room 1: Food Technology - Processing & Innovation
Chairpersons: Rosiello Giuseppe

14:30 – 14:45 *Presentation#16*
Development of a synbiotic formulation based on germinated brown rice and probiotics suitable to support women's well-being
Georgiana Bosco, UniCT, Italy

14:45 – 15:00 *Presentation#17*
An Intelligent Computational Framework for Estimating Chaotic Overall Distribution Ratio in Scaled Liquid Food Mixing Systems
Santhoshkumar Paramasivam, UniFG, Italy

15:00 – 15:15 *Presentation#18*
Oleogels as Nutritive Improvers of Chocolate and Sweet Spreads
Dario Šarić, PTFOS, Croatia

15:15 – 15:30 *Presentation#19*
Preliminary Assessment of Chemical Parameters Associated with Off-Flavour Occurrence and Shelf Life Reduction in Pistachio
Chiara Alessandra Carmen Rutigliano, UniCT, Italy

Room 2: Consumer & Market studies
Chairpersons: Nour Ouzari, Roberto Carbone

14:30 – 14:45 *Presentation#20*
Narrating the Volcano: Semiotic Clusters and Symbolic Identity in Etna DOC Wine Labels
Alessandro Grasso, UniCT, Italy

14:45 – 15:00 *Presentation#21*
Examining the Adoption of Agricultural Drones Among Pakistani Farmers: A Modified Technology Acceptance Model (MTAM)
Muhammad Ahmed, CZU, Czech Republic

15:00 – 15:15 *Presentation#22*
Extension, innovation, and welfare: Evidence from cultivated forage crops adoption among buffalo farmers in Nepal
Namdev Upadhyay, CZU, Czech Republic

15:15 – 15:30 *Presentation#23*
Understanding Farmers' Intentions to Adopt Sustainability Certification: A Multi-Dimensional Behavioral Analysis in the Sicilian Citrus Chain
Mariaconcetta Ganci, UniCT, Italy

1st YEAR THESIS FLASH

Chairperson: Antonio Biondi

16:00 – 17:00

Poster#1
First taxonomic update of *Salicornia sp. pl.* in the Gargano territory (Puglia, Italy)
Giuseppe Longo, UniFG, Italy

Poster#2
Valorization of Artichoke By-Products for Sustainable Ruminant Nutrition and Evaluation of Animal Product Quality
Ali Aljeratly, UniCT, Italy

Poster#3
Top-down and bottom-up processes in a crowded world: disentangling predator–prey interactions in human-dominated landscapes
Lorenzo Frangini, UniUD, Italy

Poster#4
Legacy and Vanguard: Valorization of Purebred Spanish mare's milk as an indigenous resource for sustainable rural development
Mario Santiago Lara, UCLM, Spain

Poster#5
Algae-based polymers for sustainable agricultural practice
Domenico Soldo, UniFG, Italy

Poster#6
Study of bio-based phase change materials
Fabrizio Rossi, UniFG, Italy

Poster#7
A first approach to combine AI and Predictive Microbiology
Mario Terlizzi, UniFG, Italy

Poster#8
Sustainable Food Packaging: Evaluating Bio-Based Alternatives to Expanded Polystyrene
Mamtha Shafika Ismail, UniFG, Italy

Poster#9
Analysis of Consumer willingness to pay for milk derived from cows fed on agricultural by-products
Nour Ouzari, UniCT, Italy

Poster#10
The role of certification in smallholder-based agricultural value chains in Cambodia
Simona Tomanová, CZU, Czech Republic

Poster#11
Bio-insecticides and environment safe strategies for Integrated Management of Invasive Sap-sucking Insects in European Agroecosystems
Marco Di Domenico, UniCT, Italy

Poster#12
Host-mimicking media unlock VOCs-driven biocontrol in Aureobasidium pullulans
Gabriele Dionis, UniUD, Italy

17:00-19:00 Discover Vizzini Downtown

19:30 Social dinner at *Ristorante La Ruota* - Vizzini

WEDNESDAY, JUNE 10

9:30 - 10:00 5th Keynote
Circular Bioeconomy in Lion's Mane Mushroom Production and Sustainable Viticulture
Tihomir Kovač, Josip Juraj Strossmayer University of Osijek, Croatia

MORNING SESSION

Room 1: Plant & Crop science
Chairpersons: Alba M. Carrión Escudero, Barrasso Antonietta Eliana

10:00 – 10:15 *Presentation#24*
Enhancing red raspberry (*Rubus idaeus*) breeding with molecular tools: integrating SNP maps with preliminary fruit color phenotyping
Andrea Amilcare Passarelli, UniUD, Italy

10:15 – 10:30 *Presentation#25*
Foliar Spray Application of an Extract from Klebsormidium sp. K39 Retrieved by Phycoremediation Process: Biochemical Response to Drought Stress on Tomato Plants
Rossella Saccone, UniCT, Italy

10:30 – 10:45 *Presentation#26*
Guayule crop as a reservoir for argentatins bioactive compounds
Adrián Casas, UCLM, Spain

Room 2: Sustainability, Circular Bioeconomy & Emissions
Chairpersons: Grazia Cinardi, Luciano M. Santoro

10:00 – 10:15 *Presentation#27*
Greenhouse Gas Emissions from Soil and Strategies for Their Mitigation in the agroecosystems in Mediterranean environment
Simona Giannoccaro, UniCT, Italy

10:15 – 10:30 *Presentation#28*
Advancing Methane Recovery from Indian Jujube Waste: Comparative Assessment of Thermal and Alkaline Pretreatment in Anaerobic Digestion
Manvendra Kumar, CZU, Czech Republic

10:30 – 10:45 *Presentation#29*
Unlocking the phytochemical potential of Sicilian pomegranate peels: Enzyme-Assisted Extraction for the recovery of high-value bioactives
Maria Veronica Faulisi, UniCT, Italy

10:45 – 11:00 *Presentation#30*
Greywater Treatment and Reuse in the Mediterranean: Vertical Green Walls as a Nature-Based Solution for Urban Water Management
Vincenzo Scavera, UniCT, Italy

11:00 – 11:30 Coffee break

Room 1: Plant & Crop science

Chairpersons: Simona Giannoccaro, Eliana Barrasso

11:30 – 11:45 *Presentation#31*
Sustainable *Cynara cardunculus* management by biostimulant application
Claudia Formenti, UniCT, Italy

11:45 – 12:00 *Presentation#32*
Influence of Different LED Light Spectra and Biostimulants on Broccoli Microgreens
Agnese Carchiolo, UniCT, Italy

12:00 – 12:15 *Presentation#33*
Breeding *Gossypium spp.* via arbuscular mycorrhizal fungi interaction for enhanced performance under stress conditions
Georgios Papavasileiou, DUTH, Greece

12:15 – 12:30 *Presentation#34*
Assessing Climate Change Adaptation through Regenerative Agriculture in Mediterranean Cereal Systems using Earth Observation Data
Francesco Ciavarella, UniFG, Italy

Room 2: Sustainability, Circular Bioeconomy & Emissions

Chairpersons: Kumar Manvendra

11:30 – 11:45 *Presentation#35*
Predictive Modeling of Ammonia Emissions from Dairy Farms Using ANN-Based Methods
Luciano Manuel Santoro, UniCT, Italy

11:45 – 12:00 *Presentation#36*
Recovery of dietary fiber from Sicilian lemon wastes
Salvatore Chiarenza, UniCT, Italy

12:00 – 12:15 *Presentation#37*
Turning Waste into a Solution: Biochar from Grape Pomace for Meloidogyne Control
Alba María Carrión Escudero, UCLM, Spain

12:15 – 12:30 *Presentation#38*
Integrating Rooftop Grid-connected Photovoltaic and Battery Systems to Reduce environmental impacts in Agro-industrial activities with a focus on Extra Virgin Olive Oil Production
Grazia Cinardi, UniCT, Italy

12:30 – 13:30 Lunch break

14:00 - 14:45 6th Keynote
Building an International Research Career through MSCA Fellowships
Fabrizio Lisi, Riccardo Raimondo, University of Catania, Italy

AFTERNOON SESSION

Room 1: Plant & Crop science

Chairpersons: Claudia Formenti, Francesco Ciavarella

14:30 – 14:45 *Presentation#39*
Impact of Water Deficit on Neofusicoccum parvum Infection in Grapevines: Integrating Proximal Sensing Monitoring and Chitosan-Based Biological Control
Di Pietro Chiara, UniCT, Italy

14:45 – 15:00 *Presentation#40*
Dissection of genetic bases of plant salt response through the study of halophyte plants as model species and application to durum wheat
Gaetana Ricatti, UniGF, Italy

15:00 – 15:15 *Presentation#41*
Citrus response to five-stress combination including macronutrient deficiency, water and heat stress
Lledó Rodríguez Azorín, UJI, Spain

Room 2: Food Technology - Processing & Innovation
Chairpersons: Paramasivam Santhoshkumar

14:30 – 14:45 *Presentation#42*
Effects of Extreme Low-Oxygen Conditions on Volatile Compound Production in 'Pink Lady' Apples
Antonietta Eliana Barrasso, UniFG, Italy

14:45 – 15:00 *Presentation#43*
Sicilian PDO cheeses: an integrated microbial tracking approach identifies a core of lactobacilli in wooden biofilms
Silvia Ruta, UniCT, Italy

15:00 – 15:15 *Presentation#44*
Comparative Effects of Fullerenol Nanoparticles on the Growth of Yeasts, Filamentous Fungi and Macrofungi
Sunčana Včelik, PTFOS, Croatia

15:30 – 16:00 Coffee break

16:00 - 16:30 7th Keynote
Why to farm a deer? Deer-based solutions for food and healthh
Francisco Ceacero Herrador, Czech University of Life Sciences, Czech Republic

1st YEAR THESIS FLASH

Chairperson: Antonio Biondi

16:00 – 17:00
Poster#13
Spatial insights into nutrient interactions: the interplay between iron and nitrogen form in grapevine
Francesco Flagiello, UniUD, Italy

Poster#14
Environmental toxicity of tramadol and paracetamol mixture in aquatic model organisms
Bogumił Łosiewicz, SGGW, Poland

Poster#15
Effects of thermal stress and nutrition on the healthh of Apis mellifera under laboratory conditions
Thea Murkovic, UniUD, Italy

Poster#16
From waste to resource: integrated production of antimicrobials and biomaterials from Apulian Kombucha fermentation
Martina Totaro, UniFG, Italy

Poster#17
Impact of NDF and lipid dietary contents on enteric methane emissions of dairy cows measured in a multi-herd study
Giada Merlini, UniUD, Italy

Poster#18
Effects of Hericium erinaceus Supplementation on Neurocognitive Functions in the Context of Healthhy Aging
Marina Barišić, PTFOS, Croatia

Poster#19
Introduction of non-thermal technology into the nuts supply chain: use of pulsed light to improve the stability of almonds and pistachios
Sebastiano Maria Caldarella, UniCT, Italy

Poster#20
The Role of Land Consolidation Associations in Enhancing Mountain Attractiveness
Rossella Dosso, UniUD, Italy

Poster#21
Effects of insect mass-rearing by-products on tomato herbivorous pests
Anastasia Pantelidou, DUTH, Greece

Poster#22
Biology and ecology of Culex pipiens biotypes in Greece
Kaltsou Stefania, UTH, Greece

Poster#23
Exploring the grapevine microbial endosphere to identify potential biocontrol agents against Flavescence dorée
Iride Malnis, UniUD, Italy

Poster#24
Proposed Research Framework for the Integration of Flow Cytometry and Bioinformatics
Klara Opačak, PTFOS, Croatia

17:30 - 18:00 8th Keynote
Integrating Wildlife Management into Agricultural Education: a Key Step Towards Sustainable Agroecosystems
Krzysztof Klimaszewski, Warsaw University of Life Sciences, Poland

18:00 Visit and dinner at *Lo Zafferaneto Masseria* – Buccheri

THURSDAY, JUNE 11

9:30 - 10:00 9th Keynote
Guttation: an emerging resource with effects on insect–plant interactions
Pablo Urbaneja, Universitat Jaume I, Spain

MORNING SESSION

Room 1: Crop protection
Chairpersons: Eya Ben Hmad, Mariangela Milordo

10:00 – 10:15 *Presentation#45*
Tobacco rootstock-mediated grafting enhances tomato resistance to the key pest *Tuta absoluta* through coordinated behavioral and chemical defenses
Shenglan Gao, Yunnan University, China

10:15 – 10:30 *Presentation#46*
Genome editing strategies to counteract grapevine leaf and vascular pathogens
Andrea Rossetto, UniUD, Italy

Room 2: Consumer & Market studies
Chairpersons: Alessandro Grasso

10:00 – 10:15 *Presentation#47*
Sustainability Certifications and Consumer Choice in the Agri-Food Sector
Lorenzo Nicotra, UniCT, Italy

10:15 – 10:30 *Presentation#48*
From Home Remedy to Self-Care Ritual: Herbal Tea Consumption in Italy
Roberto Carbone, UniCT, Italy

10:30 – 11:00 Coffee break

Room 1: Crop protection
Chairpersons: Vasilis G. Rodovitis, Andrea Amilcare Passarelli

11:00 – 11:15 *Presentation#49*
Plant–insect interactions in cultivated guayule in Castilla-La Mancha: ecological insights and potential applications
Eduardo Jarillo, UCLM, Spain

11:15 – 11:30 *Presentation#50*
Effects of Alternative Food Sources and Different Substrates on the Mass Rearing of *Amblyseius andersoni*
Angelos Bechtsoudis, DUTH, Greece

11:30 – 11:45 *Presentation#51*
Multi-Block Data Integration of Spectral, Metabolomic, and Transcriptomic Profiles for Biomarker Discovery and Prediction of Flavescence Dorée Susceptibility/Resistance in Grapevine
Elias Shewabez Yassin, UniUD, Italy

11:45 – 12:00 *Presentation#52*
Dispersal of the Mediterranean fruit fly and a changing climate
Eleftheria Maria D. Bali, UTH, Greece

Room 2: Animal Science & One Health
Chairpersons: Morena Carlentini, Daniele Fabbri

11:00 – 11:15 *Presentation#53*
Analysis of toxicity induced by phosphodiesterase type 5 inhibitors in aquatic organism models and selected cell lines.
Kacper Kawalski, SGGW, Poland

11:15 – 11:30 *Presentation#54*
Agri-Food By-Products for Climate-Resilient Small Ruminants Farming: Nutritional Strategies to Enhance Welfare in Sheep
Cristina Stango, UniFG, Italy

11:30 – 11:45 *Presentation#55*
Effect of temperature on in vitro protein hydrolysis of insect based diets by the digestive enzymes of rainbow trout (Oncorhynchus mykiss)
Roselida Opere, UniUD, Italy

11:45 – 12:00 *Presentation#56*
The effect of aqueous supra-molecular hybrid complexes of plant extracts administered in ovo on the oxidative and antioxidant potential on development of the domestic chicken embryo
Emilia Lisiecka, SGGW, Poland

12:00 – 13:30 Lunch break

13:30 - 14:00 10th Keynote
Plant-Mediated Effects of Beneficial Soil Microorganisms on Herbivorous Pests: Mechanisms and Applications in Biological Control
Maria Pappas, Democritus University of Thrace, Greece

AFTERNOON SESSION

Room 1: Crop protection
Chairpersons: Eya Ben Hmad

14:00 – 14:15 *Presentation#57*
Re-evaluating SIT components through advanced omic approaches
Dimitris Rallis, UTH, Greece

14:15 – 14:30 *Presentation#58*
Phytophthora monitoring and epiphytic bacteria as biocontrol resources in Mediterranean olive and citrus systems
Cristian Bua, UniCT, Italy

14:30 – 14:45 *Presentation#60*
Assessing binormal model adequacy in applications of the overlap coefficient (OVL) to the European cherry fruit fly *Rhagoletis cerasi*
Eleftheria Maria Alexandri, UTH, Greece

14:45 – 15:00 *Presentation#61*
Development of insecticide resistance and fitness cost evaluation in two phytoseiid predatory mites
Ioannis Bakirtzis, DUTH, Greece

Room 2: Animal Science & One Health
Chairpersons: Morena Carlentini, Daniele Fabbri

14:00 – 14:15 *Presentation#59*
Agro-livestock systems and wildlife in shared landscapes
Lucia Cattani, UniUD, Italy

15:00 – 15:30 Coffee break

15:30 - 16:00 11th Keynote
How Biodiversity Knowledge Can Improve Cheese Safety
Antonio Fernandes de Carvalho, University of Viçosa, Brazil

16:00 - 16:30 12th Keynote
Translating Research into Real-World Opportunities
Daniele Nicotra, University of Catania, Italy

16:30 - 18:00 13th Keynote
LandRush – Ventures into Global Agriculture Frauke Huber and Uwe H. Martin
Frauke Huber, Uwe H. Martin

19:30 Dinner & after-party at Agriturismo A'Cunziria

FRIDAY, JUNE 12

09:00 Bus transfer to Ragusa Ibla

10:00 – 12:30
Discover Agricultural Research for Undegraduate students By UNICT PHD STUDENTS
& CLOSING CEREMONY
At Ragusa Ibla - UNICT Campus - Former Convent of St. Teresa

12:30 – 13:30 Lunch Break

13:30 – 16:00 Bus transfer to Catania Airport (Bus 1)

13:30 – 16:00 Discover Ragusa Ibla

16:00 - 18:30 Bus transfer to Catania Downtown (Bus 2)

CLOSING OF THE 8TH JOINT MEETING OF AGRICULTURE

8th Joint Meeting of Agriculture-oriented PhD Programs

08-12 June 2026

BOOK OF ABSTRACTS

Monday, June 8

1st Keynote

Insects: Earth's Oldest Matriarchy

Salvatore Arpaia – salvatore.arpaia@enea.it
ENEA, TERIN-BBC, Italy

Among insects, which are one of the oldest animal classes to have appeared on Earth, evolution has clearly favored the dominance of females. Female insects excel in every biological arena: they can determine the sex of their offspring, select their mates (often multiple ones), perform the most strenuous labor, and ensure the food supply for themselves or their offsprings. In many species, males are relegated to marginal roles or bypassed entirely through parthenogenesis.
With over a million described species, insects boast the greatest adaptive success in the animal kingdom. They have colonized nearly every corner of the planet—from glaciers to deserts and even man-made environments, such as agroecosystems or livestock farms—with the ocean being their only exception.
The book 'Il matriarcato a sei zampe', explores the natural histories of bees, ants, fireflies, beetles, aphids: tales where the females always come out on top. Through a curated selection of episodes from the book, this lecture will delve into fascinating scientific frontiers such as cryptic female choice, the evolutionary advantage of honeybee worker sterility, and the complex mechanisms of sex determination during embryonic development

2nd Keynote

Strategies for Sustainable Animal Production and Environmental Protection

Paweł Solarczyk - pawel_solarczyk@sggw.edu.pl,
Jakub Urban - jakub_urban@sggw.edu.pl,
Maciej Kamaszewski - maciej_kamaszewski@sggw.edu.pl
Warsaw University of Life Sciences, Poland

Animal production is an important component of the global food system; however, it exerts considerable pressure on environmental resources. Therefore, alternative production strategies that improve environmental sustainability while maintaining high production efficiency and animal welfare are becoming increasingly important. One of the most common approaches involves the use of feed additives that enhance feed efficiency. In ruminants, such additives are applied to modulate rumen fermentation processes. By-products from the food and agricultural industries are of particular interest as alternative feed components because they reduce the consumption of natural resources and support the principles of a circular economy.
In broiler chicken production, herbs and plant-derived additives are commonly used due to their beneficial antidiarrhoeal, antibacterial, and anti-inflammatory properties. Biologically active compounds present in these plants, referred to as phytobiotics, positively affect broiler healthh and performance. These compounds are synthesised by plants, among other functions, as a defence mechanism against pathogens.
Sustainable development of animal production should include not only resource-efficient systems but also measures preventi,ng the introduction of alien and potentially invasive species. At the same time, it is essential to preserve landscape heterogeneity and protected habitats dependent on human activity, such as selected some ecosystems. The condition of these habitats can be assessed using ecological indicators, including bioindicator organisms and environmental monitoring methods. Furthermore, short-term bioassays employing model organisms are useful tools for evaluating the effects of environmental stressors on organism physiology. A holistic approach integrating environmental protection, efficient resource management, and animal healthh is essential for the sustainable development of animal production.

Presentation#1

Influence of blockchain technology as traceability system for extra virgin olive oil on Italian consumers prejudice of origin: an analysis of willingness to pay and sensory evaluation

Matilde Reitano – matilde.reitano@phd.unict.it
Roberta Selvaggi, Gaetano Chinnici
University of Catania, Italy

In recent years consumer demand for transparency and authenticity has shaped the agri-food sector. In Italy, consumers show a strong preference and higher willingness to pay (WTP) for national products, while expressing skepticism toward European (EU) and extra-EU goods. This is crucial in the Extra Virgin Olive Oil (EVOO) market, highly vulnerable to fraud and where origin is synonymous of quality and safety.
Blockchain technology (BCT) emerged as a tool to enhance trust by providing verifiable information on product origin and processes. In this context this study employs a non-hypothetical auction and sensory analysis to assess whether EVOO quality is appreciated without origin bias, how origin affects WTP, and if BCT mitigates negative perceptions toward extra-EU products. The experiment adopted a second-price auction to elicit WTP. The experimental auction consisted of four rounds with different information conditions. Participants tasted EU and extra-EU EVOO samples reported subjective impressions and submitted their WTP. Preliminary results show differences in WTP depending on product origin and BCT traceability. EU EVOO receives higher WTP than extra-EU EVOO, however, in blind tasting, extra-EU EVOO performs similarly or better. This suggests that preferences for EU products may be driven more by prior beliefs than actual quality. The introduction of BCT has a positive effect: when BCT information is provided, WTP increases, suggesting that BCT can partially reduce the negative bias associated with extra-EU origin.

Presentation#2

Characterization of Off-Odour Volatile Organic Compounds (VOCs) in In Package Cold Plasma (IPCP) Treated Polymeric Films for the Fresh-Cut Industry

Giuseppe Rosiello – giuseppe.rosiello@unifg.it
University of Foggia, Italy

In-package cold plasma (IPCP) technology is an innovative solution for food preservation, offering a chemical-free method to inhibit microbial proliferation and extend the shelf life of fresh produce. While preliminary research on table grapes has confirmed its efficacy in maintaining quality, the emergence of undesirable off-flavours remains a primary barrier to industrial adoption. The objective of this research is to identify the specific Volatile Organic Compounds (VOCs) generated after the treatment which are responsible for the off-odour, in order to determine the real-world feasibility of this technology in commercial packaging. Packages of Polypropylene (PP), Polyethylene Terephthalate (PET), and Polylactic Acid (PLA), with dimensions of 17 x 21 cm, were treated for 7 seconds using a frequency of 20 kHz and a voltage of 8 kV. Following the complete degradation of ozone O_3, the headspace of the packages was analysed using SPME-GC/MS to identify the specific VOCs triggered by the ionized gas. The analysis confirmed that the treatment induces the degradation of packaging polymers, significantly increasing the concentration of native compounds and generating a wide array of new volatiles. These compounds belong to various chemical classes, including aldehydes, ketones, organic acids, and alkanes, which are directly responsible for the observed off-odours. Notably, the concentration and specific composition of these VOCs showed a distinct dependency on the type of polymer used during the treatment.

The results highlight that while cold plasma is a promising tool for the "fresh-cut" sector, its success depends on the compatibility between technology and packaging. Future research must prioritize the development of plasma-resistant materials to ensure that microbial safety does not compromise the organoleptic characteristics of the product.

Presentation#3

Environmental drivers of Dobrava-Belgrade orthohantavirus occurrence in Trentino, Italy

Daniele Fabbri – fabbri.daniele@spes.uniud.it
University of Udine, Italy

Dobrava-Belgrade orthohantavirus (DOBV) is also maintained by *Apodemus* hosts, yet its fine-scale environmental dynamics remain insufficiently characterized, particularly in regions where prevalence is low. We investigated the environmental correlates of DOBV occurrence in Trentino to identify ecological conditions associated with virus circulation in wild small-mammal communities.

Trapping data were reorganized into ecologically meaningful sessions from records collected between 2000 and 2015, using a 14-day separation rule, and DOBV occurrence was defined only for sessions with tested Apodemus individuals. Environmental predictors describing terrain, land cover, vegetation, and climate were extracted for current and lagged time windows. Candidate variables were screened using site-blocked elastic net, Boruta, and RF-RFE procedures, then evaluated in a spatiotemporal occupancy framework in which site × year × season represented the latent state and session the replicate. Annual projections were produced for 2003-2015. The final mapping model retained mean session temperature, mean climatic water deficit during the trapping session, and previous-winter runoff as the main environmental correlates of DOBV occurrence. The resulting annual maps provide a biologically interpretable view of interannual variation in DOBV environmental suitability across Trentino. This framework supports targeted wildlife surveillance and offers a basis for anticipating how climatic variability may shape zoonotic risk in mountain landscapes.

Tuesday, June 9

3rd Keynote

Guayule crop (*Parthenium argentatum* A. Gray) and its exploitation, a new alternative for semiarid regions

Amaya Zalacain – Amaya.Zalacain@uclm.es
Manuel Carmona
Universidad de Castilla-La Mancha, *Spain*

Guayule crop (*Parthenium argentatum A*. Gray), originally from Mexico and the southern United States, it is known agricultural alternative in areas where climate change has prevented agriculture from being sustainable, this is the case for large areas in southeastern and central Spain that are becoming desertified, and whose soils, over time, are losing fertility. Since 2017 this crop has adapted very well to the soil and climatic conditions of Castilla-La Mancha (Santa Cruz de la Zarza, Toledo) where it is grown on a semi-industrial experimental basis. But the key to the industrial exploitability of guayule is to find applications for other fractions present in the plant, different from rubber, such as the resin extracted from the stems, the essential oils from the whole plant. Guayule resin contains a wide spectrum of secondary metabolites (sesquiterpene, triterpenes…), and can be used as raw materials for adhesives, wood preservatives or coatings. Recently, it has been demonstrated to exhibit antifungal and insecticidal activity, opening the door to their use as biopesticides or naturally derived plant protection products. Interesting is its pharmacological bioactivity, that may exhibit anti-inflammatory, antioxidant, and antimicrobial activity, making them candidates for the development of pharmaceutical or nutraceutical products.

Guayule essential oils have been recently characterized and demonstrate that their extraction yields are comparable to those of other aromatic species of industrial interest, as well as high compositional variability that allows for the modulation of their biological properties.

Presentation#4

Exploring volatile compounds for the early detection of *Neopestalotiopsis clavispora*: emerging grape trunk disease

Sanna, Filippo Maria, 143014@spes.uniud.it
University of Udine, Italy

This study aimed to characterise the volatile organic compounds (VOCs) profile of *Neopestalotiopsis clavispora,* an emerging grapevine trunk pathogen and to identify characteristic volatile fungal metabolites as potential infection biomarkers.
N. clavispora was cultured on an agar medium containing grapevine wood sawdust (10%) derived from Cabernet Sauvignon and Sauvignon Blanc vines, in sterile vials (10 mL), for seven days at 25 °C. The VOCs in the vial headspace were analysed by SPME-GC–MS. For the *in vivo* assay, fungus was inoculated into Sauvignon Blanc twigs by drilled holes. The inoculated top part was inserted into a sterile plastic box (94 x 94 x 352 mm) to concentrate the VOCs. The twigs were then maintained at 20 °C for 21 days, with a 12-hour light/dark cycle. After incubation, fibre DVB/CAR/PDMS was used to collect the VOCs, which were then analysed using GC–MS. In both the *in vitro* and *in vivo* experiments, the control group comprised agar media and twigs that were not inoculated with the pathogen.
Multivariate analysis revealed distinct clustering of VOCs according to the growth medium, reflecting differences in grapevine cultivar and plant–pathogen interactions. However, the preliminary VOCs profile of grapevine twigs showed qualitative changes in volatile emissions following fungal infection. Overall, these findings provided a basis for identifying specific volatile metabolites as potential biomarkers of infection,

emphasising the importance of VOCs in microorganism–plant interactions.

Presentation#5

Bacillus subtilis influences _Tuta absoluta_ population dynamics through bottom-up effects in tomato under semi-field conditions

Mariangela Milordo[1] – mariangela.milordo@phd.unict.it
University of Catania, Italy

Plant-growth-promoting rhizobacteria (PGPR) can enhance plant defence through induced systemic resistance and the emission of microbe-induced plant volatiles (MIPVs). MIPVs represent a promising tool for integrated pest management (IPM), as they can affect herbivore performance while simultaneously promoting the recruitment of natural enemies. However, the mechanisms underlying bottom-up effects in PGPR-mediated plant-insect interactions remain poorly understood under semi-field or field conditions. Here, we evaluated the impact of *Bacillus subtilis* QST 713 on tomato-insect interactions involving the invasive pest *Tuta absoluta* and its predator *Nesidiocoris tenuis*, in semi-field conditions. Experiments were conducted during the growing cycle in 2025 in southwestern China, testing 600 tomato plants arranged in 60 plots across six treatments: control (C), *T. absoluta* (T), *T. absoluta* + *N. tenuis* (TN), control + *B. subtilis* (CB), *T. absoluta* + *B. subtilis* (TB), and *T. absoluta* + *N. tenuis* + *B. subtilis* (TNB). Three surveys assessed pest and predator population dynamics, canopy traits and phenology, while soil volatile emissions and fruit quality were also quantified. Preliminary results showed that microbial inoculation reduced *T. absoluta* infestation, with the lowest incidence of eggs, larvae and mine in TB and TNB treatments. *Nesidicoris tenuis* did not establish, likely because ecological trade-offs and suboptimal environmental conditions, limiting the top-down control. Microbial inoculated plants (CB, TB and TNB) exhibited enhanced growth and faster phenological development, indicating improved vigour and tolerance to herbivory. These findings highlight the potential of PGPR as a bottom-up tool in IPM and emphasize the context-dependent nature of MIPV-mediated effects, requiring further investigation to optimize their integration with natural enemies in real scenario environmental context.

Presentation#6

Contamination of bee pollen with mycotoxins - detection and control

Nela Drača – nela.draca@gmail.com
Josip Juraj Strossmayer University of Osijek, Croatia

Fresh bee pollen collected by bees from various types of flowers is a favourable substrate for the growth and development of moulds, the presence of which potentially leads to the accumulation of mycotoxins. Mycotoxins are low-molecular-weight toxic secondary metabolites synthesized by certain species of moulds from the genera *Aspergillus*, *Fusarium*, *Penicillium* and *Alternaria*. They represent one of the greatest risks to food safety because, under favourable environmental conditions, they can contaminate products of plant origin. This issue is of significant global importance due to the serious risks and consequences for human and animal healthh. The aim of the study was to determine the concentrations of secondary mould metabolites, including legally regulated mycotoxins, in the pollen of multifloral plants and to identify the dominant mould genera present in the tested samples. Special emphasis was placed on identifying possible causes of contamination, including sources and environmental factors that may contribute to the occurrence of mycotoxigenic moulds and their corresponding secondary metabolites in bee pollen. Fresh bee pollen was collected in two time periods from stationary and migratory apiaries from different geographical locations in Croatia. Analyses were performed on all samples, including the determination of pollen composition, number of mould colonies, water content, ash content, total phenolic compounds, and concentrations of heavy metals and mycotoxins. Research on mycotoxins in bee pollen is of

crucial importance as it enables timely identification of potential risks and development of effective methods to control and prevent their presence.

Presentation#7

The hidden impact of insecticides on *Nesidiocoris tenuis*: integrating survival, fecundity, and detoxification gene networks

Eya Ben Hmad[1] – eya.benhmad@phd.unict.it
University of Catania, Italy

Despite its controversial role, the zoophytophagous predator *Nesidiocoris tenuis* is a cornerstone of Integrated Pest Management (IPM) programs in tomato crops. The compatibility of insecticides commonly used in these systems towards *N. tenuis* is routinely assessed in term of acute toxicity, however, comprehensive assessments integrating physiological and molecular endpoints are lacking. In this study, the lethal and sublethal effects of seven insecticides (acetamiprid, azadirachtin, *Allium sativum* essential oil, *Beauveria bassiana* ATCC74040, chlorantraniliprole, deltamethrin, flupyradifurone) were evaluated on *N. tenuis* adults through a residual exposure bioassay. Mortality was assessed at 72 h post-treatment, and fertility was monitored over time. Transcriptional responses of ten genes involved in detoxification, stress, regulation and neuronal function was assessed through RT-qPCR. Flupyradifurone and acetamiprid caused significant acute mortality in both sexes, with sex-specific differences observed for acetamiprid. All tested insecticides reduced the fertility, with the harmful effects when predators were exposed to acetamiprid, flupyradifurone, and deltamethrin. Transcriptional analyses revealed distinct expression patterns linked to metabolism and cellular stress. Together, these findings highlight that fertility impairments and transcriptional reprogramming of stress and metabolic pathways must be considered when integrating chemical control with *N. tenuis*-based biological control in tomato IPM programs.

Presentation#8

Temperature experienced prior to adult emergence modulates adult cold tolerance of the invasive species *Bactrocera dorsalis* and *Bactrocera zonata*

Vasilis G. Rodovitis[1,2] - email: rodoviti@uth.gr
University of Thessaly, Greece

Thermal conditions experienced prior to adult emergence can induce phenotypic plasticity that shapes adult stress tolerance in insects. Such carry-over effects are important for invasive species of tropical origin that are currently expanding into temperate regions. We investigated how temperature during pupae development affects adult cold tolerance in *Bactrocera dorsalis* and *Bactrocera zonata* (Diptera: Tephritidae).
Pupae were maintained under constant temperatures (15, 20, and 25 °C). Cold tolerance of adults emerged from pupae kept at different temperatures, assessed by measuring the Critical Thermal minimum (CTmin) and Chill Coma Recovery Time (CCRT). Overall CTmin did not vary among temperatures, species and sex. Adults obtained from pupae developed at 15 °C recovered faster from chill coma than those kept at 20 and 25 °C. *Bactrocera dorsalis* displayed stronger temperature-dependent variation and slower overall CCRT than *B. zonata*.
Cooler temperatures enhanced cold tolerance primarily through improved CCRT. The interspecific differences in CCRT reflect distinct cold tolerance patterns, as *B. dorsalis* exhibited higher plasticity while *B. zonata* showed more canalized cold response. Temperature during development can be served as a key aspect of adult response to cold temperatures and invasion potential in tephritids. Incorporating plastic responses into bioclimatic risk models will improve predictions of invasion and range expansion of such species.

Presentation#9

Multidimensional Management of Multiple Pests in open field tomato in Mediterranean environment (Sicily, Italy)

Ya Liu – ya.liu@phd.unict.it

Yunnan University, China

Although the Integrated Pest Management (IPM) pyramid enumerates a spectrum of pest management tools and tactics, these have rarely been effectively integrated under field conditions, resulting in high implementation costs. To promote more integrative research in IPM, the theoretical framework of Multidimensional Management of Multiple Pests (3MP) has been recently proposed. The 3MP framework aims to increase the integration of various control tactics across spatial dimension (bottom-up and top-down effects) and temporal dimension (indirect interactions). Open-field tomato experiments based on the 3MP strategy were conducted in a specialized farm located in a mountainous region of eastern Sicily (Italy), in the municipality of Maniace. Three treatments were established: (a) 3MP, with 40% of chemical fertilizer N replaced by organic fertilizer on an equivalent N basis and with *Sesamum indicum* and *Verbena hybrida* as multi-service companion plants; (b) farmer practice (FP), with 100% chemical fertilizer and pest management mainly relying on chemical control; and (c) untreated control, with 100% chemical fertilizer and no pest management. The performance-economy-environment (PEE) assessment was conducted based on data collected on insect populations (pests and beneficials), foliar chemistry, crop yield and quality, as well as soil surface greenhouse gas emissions (CH_4, CO_2, N_2O).

The results showed that the 3MP strategy achieved pest control performance comparable to that of local farmer practices, while increasing marketable yield by 23% and reducing global warming potential by 4%. In addition, *S. indicum* and *V. hybrida*, used as a multi-service companion plant, supported the conservation of key natural enemies, such as *Orius* spp. and *Nesidiocoris tenuis*, thereby potentially alleviating pest feeding pressure on tomato plants. These findings highlight the potential of the 3MP strategy to achieve effective pest control with reduced chemical dependence and broader ecological benefits in tomato production systems.

Presentation#10

Characterization of heterozygosity-rich regions in Sicilian horse breeds

Morena Carlentini - morena.carlentini@phd.unict.it

Salvatore Bordonaro – Serena Tumino

University of Catania, Italy

Heterozygosity-rich regions (HRRs) are genomic regions of continuous heterozygosity, which may harbor functional genes related to the population's fitness response. The Sicilian horse breeds Purosangue Orientale (PSO), Sanfratellano (SAN) and Cavallo Siciliano (SIC) are known for the adaptability to a wide range of climatic conditions, sometimes even challenging. This study aimed to investigate HRRs distribution in a total of 220 horses (63 SAN; 93 SIC; 64 PSO) genotyped with the Illumina Equine 80K array. The consecutive runs method was used to detect HRRs and the top 0.1% of the SNP in RUNs were considered to define HRR islands per breed. The analysis identified 1944 HRRs in PSO (NHRR 30.38 ± 5.74), 1499 in SAN (NHRR 23.79 ± 5.59) and 2817 in SIC (NHRR 30.29 ± 7.91). The longest HRRs were observed on ECA7 across all three breeds. A total of 16, 16 and 11 HRR islands were identified in PSO, SAN and SIC, respectively. Gene annotation in HRR hotspots showed loci involved in immune response (SAN, PSO and SIC), environmental adaptation (SAN), fertility (SAN and SIC), and sports performance (PSO and SIC). The ECA7 hotspot (from 50.45 to 50.90 Mbps) was shared by the three Sicilian breeds (breeds recurrence >25%) harboring genes involved in the development and differentiation of muscle and bone tissues. QTL annotation, using markers in HRR islands, detected healthh traits in SAN, as well as growth and performance traits in all breeds. The investigation of the regions of the genome-wide

consecutive heterozygous sites could be useful to reveal the traits linked to the balancing selection processes of Sicilian equine breeds and support their conservation plans.

Presentation#11

Validation of commercially available mammalian structural antibodies in teleosts: a systematic review of current research practices

Tofael Ahmed Sumon - sumon.tofaelahmed@spes.uniud.it
Donatella Volpatti - Marco Galeotti
University of Udine, Italy

Antibodies are most frequently used reagents in fish pathological and immunological research, yet the production of fish specific antibodies remains sparse. Researchers are still relying on commercially available mammalian antibodies largely that are central tools for exploring protein structure, tissue organization, immune function and disease progression. However, their extension to non-mammalian lineages, particularly from mammals to teleosts, remains inadequately validated.
A systematic literature search was conducted according to PRISMA guidelines utilizing Scopus, Science Direct and Google Scholar databases. The search strategy included a combination of the following search terms: (teleost OR fish) AND (“mammalian antibody" OR antibody) AND (“antibody validation" OR cross-reactivity OR specificity) AND (immunohistochemistry OR western blot).
When performing the search on the Scopus database, categories were refined to (LIMIT-TO (DOCTYPE, "ar") AND (LIMIT-TO (LANGUAGE, "English”) AND (LIMIT-TO (SRCTYPE, "j"). Retrieved literature was consolidated into a single Endnote (v.21.2.0.19537, Clarivate Analytics) library for subsequent systematic screening. The included studies were conducted across 13 countries, with Italy contributing the highest number of studies (n = 14), followed by Spain (n = 4) and Russia (n = 3). Germany, Brazil, Hungary, and Japan each contributed 2 studies, while Czech Republic, Switzerland, New Zealand, Portugal, Greece, and Egypt each contributed 1 study. In terms of publication year, the studies ranged from 2001 to 2025, with the greatest number published in 2022 and 2023 (n = 6 each), followed by 2021 and 2024 (n = 5 each).
Specifically, 23 studies used only IHC in their experiment and only 4 used WB and other techniques along with IHC, which strongly validate the scope of this review to use a secondary technique to validate target antibodies. This inconsistency of not employing a secondary technique highlights a wider methodological gap utilizing commercially available mammalian antibodies in teleost research. Collectively, this review provides a critical synthesis for improving antibody validation practices and supports the generation and utilization of more accurate, reproducible, and biologically meaningful findings in fish immunology and pathology research.

Presentation#12

The use of aqueous hybrid supramolecular complexes in poultry production

Wiktoria Kościów - wiktoria_kosciow@sggw.edu.pl
Emilia Lisiecka, Monika Łukasiewicz-Mierzejewska
Warsaw University of Life Sciences, Poland

One of the main healthh problems in poultry is associated with the presence of footpad dermatitis (FPD) – a contact dermatitis affecting primarily the plantar surface of the feet and the hock joints of chickens. One of the main causes of this condition is the poor quality of litter on which the birds are kept. So far, there is no effective method to maintain high hygienic standards of litter in poultry farming. To treat already existing lesions, and sometimes also as a preventive measure, antibiotic-based products are commonly used. However, in the long term, this carries negative consequences for both consumers and the environment. One of the most innovative alternatives to antibiotics is the use of precious metals nanoparticles.

As part of the PhD project, it is planned to develop three products based on silver nanoparticles and plant extracts – neem, mint, and eucalyptus. The planned research can be divided into two main stages. In the first stage, *in vitro* tests will be conducted to assess the effects of substrates that could potentially be used in test mixtures on the development of chicken embryos. Based on the obtained results, products will be developed and subsequently tested on poultry farms.
We anticipate that, due to their strong antibacterial and antifungal properties, the products will eliminate the negative effects of harmful microorganisms specific to the animal housing environment. Their application will improve sanitary conditions, thereby significantly supporting disease prevention in poultry farming. This will improve animal healthh by ensuring proper hygienic conditions and will have a significant positive impact on production performance. The products will also contribute to reducing the use of antibiotics in poultry production.

Presentation#13

Gastrointestinal Parasite Fauna in Purebred Guinea Pigs (*Cavia porcellus* (L.)) and Assessment of Skin and Reproductive Tract Microbiota with Consideration of Zoonotic Factors

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Purebred guinea pigs (*Cavia porcellus*) are increasingly kept both as companion and breeding animals. Despite the growing popularity of this species, there is still a lack of comprehensive studies on gastrointestinal parasites and the microbiota of the skin and reproductive tract, particularly in the context of zoonotic risks and reproductive disorders. Gastrointestinal parasites may lead to digestive disturbances, reduced animal condition, and may also pose a potential public healthh risk.
The study includes purebred guinea pigs from breeding facilities in Poland, the Czech Republic, and Slovakia. Gastrointestinal parasite analysis is based on a minimum of 1,000 fecal samples collected during exhibitions. Diagnostic procedures are performed using Faust's centrifugal flotation method followed by microscopic examination. Additionally, the microbiota of the skin and reproductive tract is assessed using swabs and hair samples. Bacterial identification is performed using MALDI-TOF, while selected reproductive pathogens are detected using PCR techniques. The analysis includes bacteria from the following groups: *Enterobacteriaceae, Pseudomonas, Staphylococcus, Streptococcus,* and *Enterococcus*.
Preliminary findings indicate that the nematode *Paraspidodera uncinata* is the most prevalent gastrointestinal parasite identified. Infections are often asymptomatic but may reduce animal welfare and breeding value. Microbiota analysis will help assess zoonotic risk and identify factors affecting reproductive efficiency. The results may support prevention programs and healthh recommendations for breeders.

Presentation#14

Perturbations in dairy cows: impact of heat stress, lameness, and mastitis on milk yield and feeding behaviour

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Dairy cows typically respond to stressors by altering their behaviour, such as reducing eating time (ET) and rumination time (RT). Although declines in milk yield (MY) have been extensively studied, models to quantify perturbations in ET and RT are still lacking. This study adopts a smoothing approach to identify and characterize perturbations in MY, ET, and RT in response to main primary stressors: heat stress (HS), lameness (L), and mastitis (M), while evaluating the influence of parity and stage of lactation. A total of 350

Italian Simmental cows were monitored in farms equipped with automatic milking systems and accelerometers. Within this population, cows with a lactation period of at least 150 days were selected. A double-curve smoothing model (λ = 100 and λ = 10,000) was applied to calculate response and recovery times and to quantify production and feeding behaviour losses. The results indicate that L causes the longest (30.6 d and 28.8 d, respectively) and most difficult to recover from perturbations for both MY and ET. The was also the cause of the greatest loss in milk production (14.7 kg). While HS caused the greatest losses regarding feeding behaviour (ET: 175.2 min and RT: 210.3 min). In general, M had a lower impact, likely due to the timeliness of treatments. Primiparous cows showed faster responses to stress, but slower recovery times compared to multiparous ones. The method proved effective for quantifying resilience and opens new perspectives in healthh monitoring, allowing for the identification of both economic loss and each animal's capacity to cope with pathological and environmental events, improving the overall sustainability of the dairy farm.

Presentation#15

Agriculture, biodiversity, and culture nexus: Conflicting views on conserving and controlling threatened ungulates in a Philippine heritage landscape

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Francisco Ceacero

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The Philippines is home to endemic ungulates: the Philippine brown deer (*Rusa marianna*) and Philippine warty pig (*Sus philippensis*), both listed as IUCN Vulnerable and PRL Endangered. We conducted 3,730 camera-trap nights in Aliwagwag, a protected landscape overlapping the heritage lands of the Mandaya people in Davao Oriental. Foot patrols documented hoofprints, wallows, dens, etc. Anecdotal evidence was also obtained through interviews with cultural experts, rangers, and hunters. Results confirmed that Aliwagwag is a suitable habitat, with the warty pig showing higher relative abundance than the brown deer. Also, both species are sacred parts of the Mandaya ancestral lands (*yutang kabilin*) and gifts from the Creator (*Yatag ni Magbabaya*). However, because Aliwagwag is unfenced, both species invade agricultural landscapes, affecting food security and livelihoods. Crop raiding influences residents' perceptions of wildlife and stems human-wildlife conflicts. Residents reported population declines due to overhunting, forest loss, and, for warty pigs, African Swine Fever. Although locals support conservation, they perceive hunting as a form of population control. We propose an Agriculture, Biodiversity, and Culture framework for community-led management. Culture is embedded within agriculture and biodiversity practices. There is a need to balance agricultural development, biodiversity conservation, and cultural preservation through meaningful Indigenous participation. Future research should prioritise long-term population monitoring and stronger involvement of Indigenous communities.

4th Keynote

Understanding the Soil–Plant–Atmosphere Continuum through Multi-Scale Approaches in Mediterranean Citrus Orchards

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Climate change is exacerbating drought events in Mediterranean regions, strongly affecting irrigated agriculture. In Sicily, recent hydrological years have highlighted severe water scarcity conditions with significant impacts on citrus cultivation, one of the most important agroecosystems of the Mediterranean Basin. Improving irrigation sustainability requires integrated approaches for monitoring the Soil–Plant–

Atmosphere Continuum (SPAC) across multiple spatial scales.
This contribution presents research on SPAC monitoring in Mediterranean citrus orchards through proximal sensing, UAV-based remote sensing, satellite observations, agro-hydrological modelling, and climate reanalysis datasets. At field scale, regulated deficit irrigation and organic mulching were investigated to improve water use efficiency under semi-arid conditions. Crop water status was assessed using plant-based measurements, low-cost thermal and multispectral sensors, and UAV imagery for detecting water stress and delineating irrigation management zones. At district scale, Sentinel-2 imagery, agro-hydrological modelling, and ERA5-Land data were integrated to map irrigated areas and estimate irrigation water requirements under the European Water Framework Directive. These studies highlight the potential of multi-scale approaches for interpreting SPAC dynamics in Mediterranean citrus systems. The integration of field, proximal, UAV, and satellite observations with climate datasets provides a robust framework for precision irrigation, water use efficiency, and enhancing the climate resilience of irrigated agriculture under increasing climatic pressure.

Presentation#16

Development of a synbiotic formulation based on germinated brown rice and probiotics suitable to support women's well-being

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The interest in natural approaches to maintain overall healthh has brought nutraceuticals to the forefront of research. Among cereal-derived prebiotics, germinated brown rice (GBR) exhibits a valuable content of nutrients which could also support the growth of beneficial bacteria. The aim of the present study was to develop a synbiotic formulation based on GBR and probiotics with healthh-promoting benefits.
Four probiotic strains (*Lacticaseibacillus rhamnosus* CA15, *Limosilactibacillus fermentum* CS57, *Lactiplantibacillus plantarum* IMC510, and *Bifidobacterium animalis* subsp. *lactis* BLC1) were selected and *in vitro* tested for the ability to survive in the simulated gastrointestinal tract. The GBR was investigated for antioxidant, anti-inflammatory, glycogen release, and cell proliferation abilities. Synbiotic formulations, based on a blend of the four selected probiotics and GBR at three different concentrations were set up to evaluate the survivability of the probiotics and the antagonistic activity against gastrointestinal pathogens. Results revealed a good survivability of the probiotic strains under *in vitro* simulated gastrointestinal transit and in presence of different GBR concentrations. The synbiotic formulation containing the lowest GBR concentration showed the broadest spectrum of antagonistic activity against the tested pathogens. The GBR exerted cell proliferation, glycogen release, and anti-inflammatory effect, confirmed by the decrease of IL-6 and the increase of both IL-10 and SIRT-1 expression levels. In conclusion, the present work provided new insight into developing a synbiotic formulation that could represent a promising supplement with healthh-promoting benefits suitable to support women's well-being.

Presentation#17

An Intelligent Computational Framework for Estimating Chaotic Overall Distribution Ratio in Scaled Liquid Food Mixing Systems

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Conventional 2-DOF planetary mixing suffers from spatial isolation and volumetric efficiency losses during laboratory-to-production scale-up. Achieving homogeneity requires extreme rotational velocities that impose excessive shear stresses on shear-sensitive food matrices and non-Newtonian fluids. This study introduces a

novel 4-DOF chaotic-mixing approach exploiting continuous chaotic advection generated by a delta-robot manipulator. A high-fidelity 3D voxel-based algorithmic digital twin was developed in MATLAB to compare the spatial flow topologies of 13 chaotic attractors against a 2-DOF planetary baseline. Mixing performance was quantified by continuously computing the ODR across a 60 min batch cycle, examining tool geometry (dispersive disk vs. propeller), motor speed (400-1600 RPM), feed rate (3000-18000 mm/min), and vessel scale (180 mm vs. 360 mm). The 2-DOF baseline exhibited marked scale-up degradation, with ODR declining from ~25% in small tanks to 16-18% in large tanks. Chaotic trajectories proved strongly scale-resilient: Aizawa–disk and Rössler–disk reached plateaus of 60-64% and 55-60%, limiting losses to under 10% points. The dispersive disk outperformed the propeller by ~8–9% ODR points. Winner-finder analysis at 60 min yielded 41.0% (disk) vs. 32.6% (propeller), ranking Aizawa, Rössler, Sprott A, and Guckenheimer–Holmes as top trajectories (≥54% ODR) against 16.1% for the circular baseline. Both tools plateaued within 20-25 min. The digital twin offers an efficient pre-screening tool for optimizing chaotic mixing trajectories and enabling rational, shear-safe scale-up.

Presentation#18

Oleogels as Nutritive Improvers of Chocolate and Sweet Spreads

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Đurđica Ačkar

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Currently, a high intake of saturated and trans fatty acids leads to healthh problems, such as an increased risk of cardiovascular diseases and type II diabetes. To reduce these risks, oils can be used. As oils are high in unsaturated fatty acids, they exhibit liquid-like behaviour at room temperature. Therefore, oils are unsuitable for certain applications, such as spreads and desserts, where solid fats are preferred. Consequently, food specialists face the challenge of finding adequate replacements for solid fats without altering their processing characteristics or sensorial and technological qualities. One approach to oil structuring is oleogelation, a technique in which a gel is formed using an oleogelator. In this way, oleogels can provide the functionality of fats while achieving the nutritional profile of liquid oils. The aim of this research is to examine the potential for fat substitution in chocolate and sweet spreads through the application of oleogels structured with food industry by-products as oleogelators. Oleogels will be prepared using the emulsion template method with food industry by-products, cocoa shell and spelt chaff, as structuring agents (oleogelators). The isolation of fibre from cocoa shell and spelt chaff, and their application in oleogels will also be explored. Materials will be modified by High-Voltage Electrical Treatment (HVED) to enhance their oil binding capacity, a key property in oleogel formulation. In addition, rheological and textural properties will be determined to characterise the oleogels. Preliminary studies demonstrated that emulsion-templated oleogels were successfully produced with appropriate rheological and textural properties. Furthermore, the oil binding capacity of spelt chaff and cocoa shell was enhanced by HVED, demonstrating the potential of HVED as a green physical treatment for material modification. Further research is required to optimise the process for oleogel production and fibre isolation, as well as the incorporation of oleogels into chocolate and sweet spreads. These preliminary results indicate the potential for the valorisation of food industry by-products and the development of healthhier confectionery products. Conventional 2-DOF planetary mixing suffers from spatial isolation and volumetric efficiency losses during laboratory-to-

Presentation#19

Preliminary Assessment of Chemical Parameters Associated with Off-Flavour Occurrence and Shelf Life Reduction in Pistachio

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The shelf life of pistachio nuts is influenced by various factors associated with kernel quality parameters. The composition of kernel oil, the storage conditions (temperature, light, relative humidity, oxygen concentration), moisture and water activity have been demonstrated to affect hull staining, lipid oxidation, microbial contamination, limiting quality, nutritional value and sensory characteristics.
The quality of pistachio is influenced by a combination of preharvest and postharvest factors. Each of these factors has the capacity to influence bitterness, rancidity, and overall flavour intensity, which can be characterised by the occurrence of off-flavour. To the best of our knowledge, off-flavour has never been identified in pistachios. The objective of this research activity was to preliminary monitor the quality of pistachio raw material in order to establish a correlation between chemical parameters and the occurrence of the reduction of shelf life, as identified by the presence of undesirable flavours.
Chemical analysis was conducted in order to assess the degree of oxidation of pistachio kernels and flours. In particular, following the extraction of with solvents, the free acidity, peroxide number, and anisidine value were determined. Furthermore, the pH and acidity levels of an aqueous extract were measured. Further analysis was conducted to assess moisture, water activity, colour parameters and total polyphenols.
The presence and identification of undesirable flavour notes in the raw material appear to be associated with the oil's high free acidity. However, a detailed analysis of the lipid and phenolic components is required in order to establish a correlation between the chemical composition and the sensory characteristics of defect-free samples and those with defects.

Presentation#20

Narrating the Volcano: Semiotic Clusters and Symbolic Identity in Etna DOC Wine Labels

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Geographical Indications (GIs) function as institutional devices for territorial identity construction; yet the symbolic-discursive mechanisms through which producers encode place into product imagery, and how such imagery articulates with market positioning, remain empirically understudied. Wine labels constitute a privileged semiotic site where territorial narratives and place-based imaginaries signal quality, differentiation and origin. This study offers the first systematic semiotic analysis of a complete DOC label corpus, examining how Etna DOC producers narrativise a symbolically dense volcanic territory and how distinct narrative strategies relate to differential market reach.
A corpus of 548 labels from 129 producers, stratified across the four slopes of the Etna DOC zone, was coded through a mixed deductive-inductive semiotic framework applied to textual and visual elements. Inductive clustering identified seven narrative clusters, spanning landscape, cultural heritage, myth and legend, geological-scientific, agro-productive and further emergent registers. Each producer was simultaneously classified along a four-level Market Reach Level (MRL) protocol, and the two dimensions were cross-analysed. The central finding is twofold and partly counterfactual. Contrary to the landscape-dominance assumption prevalent in terroir communication literature, literary and mythological registers emerge as a primary semiotic anchor for Etna DOC producers, systematically outweighing scenic, geological and agro-productive references. Moreover, narrative cluster membership shows a structured association with MRL categories, indicating that symbolic strategies are unequally distributed across producers with different

market reach. These results carry direct implications for GI governance, consortium branding and the institutional production of symbolic capital in quality wine appellations.

Presentation#21

Examining the Adoption of Agricultural Drones Among Pakistani Farmers: A Modified Technology Acceptance Model (MTAM)

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Small-scale farmers in Pakistan continue to rely on traditional practices, yet the use of agricultural drones is gradually increasing as part of precision farming. This study investigates the factors influencing drone adoption and evaluates their economic viability for farmers. A survey of 130 farmers from Rahim Yar Khan district was analyzed using Structural Equation Modeling (SEM) in SmartPLS, complemented by a benefit–cost analysis. Behavioral intention to adopt drones was positively shaped by perceived usefulness (B=0.537), subjective norms (B=0.435), and results demonstrability (B=0.106), while perceived cost exerted a negative effect (B=–0.141). Subjective norms and results demonstrability significantly enhanced perceived usefulness, which mediated the overall model. Economic assessment confirmed viability: farmers saved an average of 5,728 PKR per acre in input costs, increased yields by 131 Maunds, and reduced fertilizer, pesticide, and labor expenses, resulting in a benefit–cost ratio of 1.64. Smartphones were the primary source of information; improved crop quality was the most cited benefit, while maintenance costs remained the main barrier. The findings suggest that drone companies should reduce prices, introduce membership schemes, and conduct demonstration programs to accelerate adoption in rural Pakistan.

Presentation#22

Extension, innovation, and welfare: Evidence from cultivated forage crops adoption among buffalo farmers in Nepal

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Buffalo productivity and its contribution to household welfare are constrained by chronic feed shortages, poor-quality fodder, and high feed costs. In this context, cultivated forage crops (CFs) are a critical yet underutilized innovation among smallholders. Our study examines the factors influencing the adoption of CFs innovations and their association with farm performance and welfare outcomes. The study used a multistage sampling technique to select 990 buffalo-farming households from six districts in Nepal's eastern Terai region. The results from the propensity score-matching model revealed that the adoption of cultivated forage crop innovations is significantly and positively associated with social capital, including farmers' social networks and access to village livestock promotion services. Along with other forms of resource endowments such as human capital (e.g., education), financial capital (e.g., record keeping), natural capital (e.g., farm size), and physical capital (herd size, ruminant diversity, irrigation availability). Our results from the estimated differences between the matched adopter sub-sample groups with similar households with non-adopters of CFs indicate that CFs innovation adopters have 22% higher milk productivity, a 1-month longer lactation period, and 24% higher annual livestock return, and 7% less likely to fall below the international poverty line ($2.5) compared to the counterfactual. We conclude that technology adoption is influenced by farmers' resource endowments and the effectiveness of delivery systems. The study recommends that policymakers strengthen farmers' social networks and community-based extension services. Additionally, enhancing farmers' record-keeping skills further facilitates the adoption of improved technologies, ultimately enhancing farm performance and welfare outcomes.

Presentation#23

Understanding Farmers' Intentions to Adopt Sustainability Certification: A Multi-Dimensional Behavioral Analysis in the Sicilian Citrus Chain

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This study investigates the determinants of sustainability certification adoption among Sicilian citrus growers, a strategic tool for enhancing the sector's environmental, social, and economic performance. Drawing on an extended Theory of Planned Behavior (TPB) framework, widely employed to analyze individual decision-making processes, the research examines how the traditional constructs of attitude, subjective norms, and perceived behavioral control interact with two additional dimensions: perceived certification benefits and general sustainability orientation. This multi-dimensional approach aims to identify the behavioral drivers shaping farmers' intentions to transition toward certified production systems. Data were collected from a sample of 137 respondents, predominantly male (89.05%), with a mean age of 51 years, reflecting the generational profile typical of the Italian agricultural workforce. Regarding current farm management practices, 65.69% of the surveyed farms already hold at least one certification, of which Organic certification is the most prevalent (47.45%), followed by GlobalG.A.P. (31.39%) and SQNPI (8.03%). The findings indicate that, while traditional TPB constructs significantly influence behavioral intentions, the inclusion of sustainability orientation provides deeper insight into the ethical motivations underlying certification adoption. These results offer valuable guidance for policymakers and stakeholders in designing targeted interventions to promote sustainable practices and strengthen the competitiveness of the Sicilian citrus supply chain in international markets.

Wednesday, June 10

5th Keynote

Circular Bioeconomy in Lion's Mane Mushroom Production and Sustainable Viticulture

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Josip Juraj Strossmayer University of Osijek, Croatia

The circular bioeconomy is a sustainable production model based on efficient resource use, waste reduction and by-product reuse. One example is the production of *Hericium erinaceus*, a medicinal mushroom valued for its nutritional and neuroprotective potential. Sustainable viticulture also contributes through the application of mycorrhizal fungi, which improve soil quality and plant resilience. Research on these topics is conducted at the Biotechnology Laboratory, Faculty of Food Technology Osijek, University of Osijek, Croatia. Agricultural and wood residues such as sawdust, straw, corn stalks and coffee grounds are used as substrates for lion's mane cultivation. After cultivation, the spent substrate is reused as fertilizer, compost or feedstock for biogas production. Sustainable viticulture practices include mycorrhizal fungi application in grapevine cultivation, improving nutrient uptake and resistance to environmental stress. Additional practices include renewable energy use, water recycling and greenhouse gas reduction.

Circular bioeconomy principles in mushroom cultivation and viticulture provide environmental and economic benefits. Reusing agricultural by-products reduces waste while creating high-value products. Mycorrhizal fungi improve soil fertility and plant resilience, reducing the need for fertilizers and pesticides. These approaches support climate change mitigation, rural development and the bioeconomy sector.

Circular bioeconomy principles in lion's mane production and sustainable viticulture enable environmentally sustainable and economically efficient use of biological resources. By integrating biotechnology, agriculture and environmental protection, these approaches contribute to sustainable development and green transition.

Presentation#24

Enhancing red raspberry (*Rubus idaeus*) breeding with molecular tools: integrating SNP maps with preliminary fruit color phenotyping

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Red raspberry demand is growing, but short shelf life limits marketability. Our project develops Marker-Assisted Selection (MAS) tools for key pomological traits and disease resistance. Within this framework, year two focuses on the genetic dissection of fruit color dynamics, a primary driver of consumer preference and a critical indicator of post-harvest stability.

An F1 population was developed via cross pollination between dark red and light yellow genotypes. Genomic DNA from 190 samples was ddRAD-sequenced to construct high-density SNP linkage maps. After culling for poor vigor, 153 robust plants were established in the field. Priority was intentionally given to primocane-fruiting genotypes (95 primocane, 58 floricane). Fruit color (CIELab*: L*, C*, h°) was assessed at 1 and 5 days post-harvest (DPH) using 5 replicates/genotype, alongside standardized photography to visually track color evolution. Adverse late-season climate limited the harvest; thus, only 46 primocane individuals yielded sufficient fruits. We are developing three preliminary "test" QTL maps: 1 DPH, 5 DPH, and their delta (difference). Integrating these phenotypes with the 190-sample SNP map will allow us to identify the loci controlling initial fruit color and determine if they are the same as those associated with post-harvest color loss. This test mapping validates our analytical pipeline. Comprehensive sampling is scheduled for the June-July 2026 harvest at full production. Integrating multi-temporal data and delta-value mapping will increase statistical power to identify robust QTLs for absolute color and storage stability,

providing markers that can be implemented in MAS breeding programs.

Presentation#25

Foliar Spray Application of an Extract from *Klebsormidium* sp. K39 Retrieved by Phycoremediation Process: Biochemical Response to Drought Stress on Tomato Plants

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One of the main objectives of agriculture is to improve crop production and mitigate oxidative damage caused by climate change, such as water stress. This study evaluated the potential use of *Klebsormidium* sp. K39 extract (Kleb), obtained by phycoremediation treatment, to address these agricultural challenges.
The experimental trials involved the application of Kleb at 1 mg C_{org} L^{-1} through foliar spray, under standard or water stress (WS) conditions. The effect of Kleb was evaluated by monitoring growth parameters, antioxidant activities, and lipid peroxidation. The quality parameters of the tomato fruits were also evaluated. The application of *Klebsormidium* extract enhanced tomato growth while maintaining root development and canopy cover under water stress conditions, suggesting that Kleb may act as a biostimulant to improve crop resilience. Moreover, treated plants under water stress conditions had an increase in yield of around 35% with respect to untreated stressed plants. Although fruit quality parameters were not significantly affected, polyphenol content significantly increased under both conditions. In treated plants, lipid peroxidation decreased by 58% in the leaves and 19% in the fruits under WS conditions, suggesting a significant reduction in oxidative damage. In the fruits, correlation analysis revealed positive relationships among key stress markers. These findings suggest that Kleb extract enhances resilience to water stress in tomato plants by modulating antioxidant responses and secondary metabolite production, making it an eco-friendly approach to sustainable crop management under climate-related stressors.
Red raspberry demand is growing, but short shelf life limits marketability. Our project develops Marker-Assisted Selection (MAS) tools for key pomological traits and disease resistance. Within this framework, year two focuses on the genetic dissection of fruit color dynamics, a primary driver of consumer preference and a critical indicator of post-harvest stability.
An F1 population

Presentation#26

Guayule crop as a reservoir for argentatins bioactive compounds

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The guayule (*Parthenium argentatum A. Gray*) is a shrub native to the Chihuahuan Desert of northern Mexico and the southern United States, that since 2017 is now adapted to the edaphoclimatic conditions of Castilla-La Mancha, making this region suitable for its cultivation. This plant has been used historically as an alternative source of natural rubber and hypoallergenic latex, and recently other fractions such as resins or essential oils are arousing industrial interest. A diversity of compounds studied by our research group (GgLab) are found in guayule resin, making it a valuable natural source of secondary metabolites with potential biological properties such as antibacterial activity, anti-inflammatory effects, immunomodulatory activity, analgesic effects, and anticancer activity, the latter being the most relevant biological property studied by our research group. The main family of natural compounds exhibiting these biological properties in guayule resin and studied for this PhD thesis are the argentatins, a family of approximately 33 triterpenoid compounds. Chromatographic techniques are commonly employed to isolate compounds from guayule resin,

starting with normal-phase fractionation with silica gel followed by recrystallization or reverse-phase chromatography depending on the compound present in the fractions of the first chromatography. Argentatin A and B are the major compounds within the resin and have previously been isolated, whereas other argentatins like C or other secondary metabolites such as guayulins (sesquiterpenes) require characterization by mass spectrometry and nuclear magnetic resonance (NMR). The objective is to isolate these argentatins from guayule resin and to evaluate their effects, mainly on cell viability.So far, it has been successfully isolated argentatin C, a potential 16-deoxyargentatin A, and a new guayulin, enabling their evaluation in biological assays. Due to solubility limitations in some cases, the next challenge is to derivatize their structure, mainly argentatins A and B, and thus increase the activity of the compounds already studied. Furthermore, our research group will take advantage of the fungal metabolism of some genera such as *Penicillium* and *Aspergillus* to modify the chemical structure of argentatins and expand the scope of study of these compounds.

Presentation#27

Greenhouse Gas Emissions from Soil and Strategies for Their Mitigation in the agroecosystems in Mediterranean environment

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Conventional farming with intensive inputs and poor soil management accelerates soil degradation and contributes 10–14% of anthropogenic greenhouse gas (GHG) emissions, including CH_4, N_2O, and CO_2. Therefore, sustainable soil management is central to climate mitigation and adaptation strategies, with practices such as crop rotation, optimized fertilization, and soil tillage playing a key role in reducing emissions while maintaining productivity. This study evaluates the effects of these practices on crop growth, yield, and GHG fluxes at the soil– and leaf–atmosphere interfaces.

The experiment was conducted at the Experimental Farm of the University of Catania (37°24'N, 15°03'E, 10 m a.s.l.) in a representative Sicilian cereal area. Monoculture was compared with rotations including durum wheat (Triticum turgidum subsp. durum), faba bean (Vicia faba), safflower (Carthamus tinctorius), and crambe (Crambe abyssinica). Fertilization treatments included mineral (400 kg ha^{-1} NPK 20-10-10), organic (3200 kg ha^{-1} composted residues 2.5-2-2.5), and an unfertilized control. Crop growth was monitored using NDVI. GHG emissions were measured with a photoacoustic gas analyzer (Innova 1512, Lumasense), and leaf gas exchange with a LI-COR 6800. Sustainable agriculture requires the mitigation of GHG emissions from soils. Crop rotation and organic fertilization can reduce emissions while maintaining productivity and improving soil healthh.

Their effectiveness depends on local soil and climate conditions, highlighting the need for targeted management and standardized monitoring. Integrating these practices can support resilient and environmentally efficient agroecosystems. This study provides insights into soil and crop management for more sustainable Mediterranean farming systems.

Presentation#28

Advancing Methane Recovery from Indian Jujube Waste: Comparative Assessment of Thermal and Alkaline Pretreatment in Anaerobic Digestion

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Anaerobic digestion (AD) is an established method for converting organic waste into renewable energy in the form of biogas. However, the efficiency of AD depends heavily on the biodegradability of the feedstock.

Indian jujube (*Ziziphus mauritiana*) fruit waste, while abundant and nutrient-rich, is lignocellulosic in nature and thus poorly degradable.
To improve its digestibility, pretreatment techniques and co-digestion strategies are often applied. This study aimed to evaluate the effectiveness of thermal and alkali (NaOH) pretreatments, along with co-digestion at varying substrate-to-inoculum ratios, to enhance methane production and process performance.
Six mesophilic batch reactors were operated for 22 days. Treatments included one control (inoculum only), three co-digestion setups with jujube waste at different substrate-to-inoculum ratios (IS1, IS2, IS3), and two pretreated samples (thermal and alkali). Gas volume and composition (CH_4, CO_2, H_2S) were monitored daily to assess digestion performance. Thermal pretreatment achieved the highest methane concentration (75%) and gas volume (578 mL/day), sustaining strong performance until Day 17. IS1 and IS2 also performed well, reaching CH_4 peaks of 60% and 63.2%, respectively. IS3 and NaOH-pretreated setups showed poor stability and a rapid decline in methane production. NaOH-treated reactors produced minimal biogas overall.
Thermal pretreatment and moderate co-digestion ratios significantly enhanced biogas yield and methane concentration from Indian jujube waste. These strategies offer promising avenues for efficient organic waste valorization and decentralized renewable energy production.

Presentation#29

Unlocking the phytochemical potential of Sicilian pomegranate peels: Enzyme-Assisted Extraction for the recovery of high-value bioactives

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Pomegranate (*Punica granatum* L.) peels, once considered waste, are now recognized as an important source of bioactive compounds with a wide range of biological activities. Bioactives present in pomegranate peels are divided into two main groups: phenolic compounds and carotenoids. Among phenolics, hydrolysable tannins - especially ellagitannins - are the predominant group, with punicalagin as the most abundant and characteristic compound. One of the main objectives of this work is to highlight the rich diversity of Sicilian cultivars (Monaco Bucalo, Primosole, and Violetto) by comparing them with the most widely used cultivar (Wonderful). From a circular economy perspective, a sustainable approach is essential for the recovery of these bioactives to evaluate their potential as functional ingredients; for this purpose, Enzyme-Assisted Extraction (EAE) was applied. EAE was carried out by varying several parameters (pH, temperature, time, and enzyme concentration). The resulting extracts were analyzed using HPLC-ESI-UV-MS/MS, and a quali-quantitative characterization was performed. The preliminary results obtained have shown that Sicilian cultivars contain higher amounts of bioactives, especially punicalagin isomers and ellagic acid. Furthermore, compared to the control, the extracts obtained with EAE showed an increase in the ellagic acid content. Although the preliminary results are promising, further analysis is needed to confirm the actual applicability of these extracts as natural food additives.

Presentation#30

Greywater Treatment and Reuse in the Mediterranean: Vertical Green Walls as a Nature-Based Solution for Urban Water Management

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Mediterranean cities face increasing flooding and water scarcity due to climate change and urbanization, requiring integrated water management strategies. Among Nature-based Solutions (NbS), Vertical Greenery Systems (VGS) transform building envelopes into active systems. Beyond thermal regulation, they can

function as vertical constructed wetlands, treating greywater (GW) and rainwater for reuse and pollutant removal (Fernández-Cabanás et al., 2025). Within this context, the Ferla pilot project represents a practical NbS application addressing water scarcity through a full-scale VGS for GW treatment at the Istituto Comprensivo Statale "Valle dell'Anapo" in Ferla (Sicily, Italy). The 30 m² system treats approximately 1.3 m³/day of GW. The system is a vertical subsurface flow constructed wetland operating under unsaturated batch-fed conditions. The treated effluent is reused for toilet flushing and irrigation. Monthly monitoring activities (starting 2025) assess physicochemical and microbiological characteristics of the treated wastewater to evaluate system performance. Samples from the Green Wall inflow (GW-I) and outflow (GW-O) are analyzed to assess treatment efficiency. Preliminary results indicate pH values averaging 7.9 in GW-I and 8.3 in GW-O, while EC ranged from 118 to 550 µS/cm and from 440 to 558 µS/cm, respectively. TP varied between 0.05 and 0.85 mg/L. TSS decreased from 24 mg/L in GW-I to 7.5 mg/L in GW-O, and COD from 21 mg/L to 11 mg/L. *Escherichia coli* concentrations were reduced from 12 to 0.6 CFU/100 mL, with GW-O values ranging between 0 and 2 CFU/100 mL. Overall, these findings indicate that VGS is operating effectively, improving greywater quality to levels suitable for safe reuse.

Presentation#31

Microbial Bioproducts for Sustainable Disease Management of Gummy Stem Blight and Growth Promotion of Cantaloupe (*Cucumis melo* L.)

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Cynara cardunculus L., which includes globe artichoke, wild and cultivated cardoons, is an interesting species due to its ability to produce biomass and bioactive phytochemicals (*e.g.* polyphenols and sesquiterpene lactones). To overcome the constraints of Mediterranean agroecosystems - notably water scarcity and progressive reduction of soil fertility, Arbuscular Mycorrhizal Fungi (AMF) are increasingly employed to enhance plant nutrient uptake and resilience, while stimulating the bioactive compounds biosynthesis. Accordingly, this study evaluated the effectiveness of this sustainable strategy in improving yield and nutraceutical quality of *C. cardunculus* under the typical stress conditions in Mediterranean areas.

Experimental trials on globe artichoke assessed the effects of biostimulant treatments compared with a (non-inoculated) control, by collecting capitula throughout the crop growing season and the residual biomass at the end of the cycle. First-year data have been collected, and second-year data collection is ongoing. In parallel, trials on cultivated cardoon evaluated AMF-treated and control plants under 2 planting densities (2 vs. 4 plants m_{-2}) and subjected to 7 sequential cuttings over 2 growing seasons. Morphological monitoring was conducted to assess the progressive adaptation of cutting stress. Comprehensive phytochemical analyses were performed using HPLC. Preliminary findings highlighted the potential of AMF symbiosis as a viable strategy to enhance plant productivity and stimulate the accumulation of bioactive compounds in *C. cardunculus*. Further research is needed to elucidate the integration of these practices for improving the sustainability and nutraceutical quality of *C. cardunculus* cropping systems.

Presentation#32

Influence of Different LED Light Spectra and Biostimulants on Broccoli Microgreens

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The study investigated the impact of different light wavelengths (red, blue, and white) combined with biostimulant applications (borage, crithmum, and moringa leaf extracts) on the yield and quality of 'Broccolo Nero' microgreens under vertical farming conditions using Hortiled® Multi 4Dim LED lamps.

A randomized design with three replicates per treatment assessed morphobiometric traits, pigment content, sugars, phenols, nitrates, and glucosinolate profiles. The results demonstrated that modulation of the light spectra can positively influence both yield and certain product characteristics. Red light produced the best results in terms of dry biomass, pigment content, and total sugars. Blue light promoted seedling vigour. Differences were observed in total phenol content; red light with crithmum or moringa extracts yielded the highest values (up to 167.1 and 172.7 mg GAE 100 g^{-1} f.w., respectively). The highest nitrate content was observed under red light with moringa extract (346 mg kg^{-1} f.w.). Significant differences were observed for glucosinolates (GLSs). Red light, particularly in combination with moringa or borage extracts, was associated with the highest total GLS amounts (up to 41.32 and 40.52 µmol g^{-1} f.w., respectively) and with an increased level of the aliphatic GLS glucoraphanin, which reached 25.38 µmol g^{-1} f.w. under red light with moringa. Differences between the tested biostimulant extracts were slight, although better results were obtained with borage and moringa. Overall, modulating light spectra, particularly red light, in combination with specific biostimulants, can enhance both yield and nutritional quality of 'Broccolo Nero' microgreens.

Presentation#33

Breeding *Gossypium* spp. via arbuscular mycorrhizal fungi interaction for enhanced performance under stress conditions

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Cotton (*Gossypium* spp.) is an essential resource for a wide range of consumer and industrial goods manufactured worldwide. Greece covers 80% of the EU cotton production, a fact that makes it economically extremely important. Greek cotton stands out for its high-quality fiber and though a subtropical crop, conditions in Greece favour its cultivation. However, abiotic and biotic stress factors account for 15–20% production losses annually both in terms of yield and fiber quality. A sustainable and environmentally friendly method that has been recently gaining ground is priming resistance through symbiosis with mycorrhizal fungi [mycorrhiza-induced resistance (MIR)], that follows similar biochemical pathways with systemic acquired resistance (SAR) triggered by pathogen infection, and induced systemic resistance (ISR) prompted by non-pathogenic rhizobacteria. Cotton breeding in combination with mycorrhizal fungi is investigated under normal and low input conditions in different cotton genotypes. Analyses include mycorrhizal colonization and functionality, as well as cotton yield and fiber quality characteristics. Regarding cotton tolerance to stress, agronomic traits of the plant are measured in relation to mycorrhizal diversity. Cotton and mycorrhizal fungi symbiosis represent a critical frontier for sustainable agriculture in Greece. The research conducted so far shows that application of mycorrhizal inoculum not only improves plant structural resilience and agronomic performance but serves moreover as a potent biological control agent. Implementing these findings at a field scale could effectively safeguard the economic vitality of the Greek cotton industry against the escalating challenges of climate change, biotic and abiotic stress.

Presentation#34

Assessing Climate Change Adaptation through Regenerative Agriculture in Mediterranean Cereal Systems using Earth Observation Data

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Climate change is increasingly undermining agricultural stability, particularly in Mediterranean region exposed to rising temperatures and severe drought. Intensive tillage accelerates soil degradation, reducing water retention, nutrient cycling, and long-term productivity. Conservation Agriculture (CA), including minimum tillage (MT) and no-tillage (NT), can improve soil healthh and resource efficiency. Long-term studies are essential to validate their agronomic and environmental benefits and to support evidence-based policy. A long-term field experiment (2014–2026) was established at the "Manfredini" farm (CREA-CI, Foggia) to evaluate the effects of MT and NT on durum wheat under seasonal climatic variability. Treatments were replicated four times with 1 ha elementary plots. Earth observation data from Landsat 8 and Sentinel-2 was processed in Google Earth Engine, extracting spectral bands and computing vegetation indices such as NDVI, EVI, SAVI, and MCARI. These were correlated with field measurements including plant biomass, height, grain yield, Leaf Area Index (LAI), phenological stages, and grain quality traits (protein content, gluten index, test weight). Earth observation derived indices showed good correlations with field observations, confirming the robustness of remote sensing for long-term CA monitoring. NT show higher NDVI values during terminal drought phases, particularly from stem elongation to grain filling, indicating improved crop vigour and drought resilience compared to MT. This performance is likely linked to enhanced soil moisture retention, reduced evaporation due to residue cover. Durum wheat yield in NT has been characterized by a greater stability than MT and a light superiority in drought conditions. Preliminary results suggest that increased soil organic carbon content and water retention are key drivers of CA benefits. The integration of multi-temporal satellite data with field observations provides a robust framework for analysing soil, plant and weather interactions over time. Results demonstrate the potential of conservation agriculture to enhance resilience under drought prone Mediterranean conditions. The dataset improves calibration of remote sensing models and supports the development of precision agriculture tools.

Presentation#35

Predictive Modeling of Ammonia Emissions from Dairy Farms Using ANN-Based Methods

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Understanding the relationship between environmental variables and gas concentrations in livestock production is essential for assessing the impact of pollutants on farm environments and surrounding areas. Artificial Neural Networks (ANNs) are particularly well-suited for this task due to their capacity to model complex, non-linear relationships within large datasets. This study evaluated the feasibility of ANNs for predicting ammonia (NH_3) concentrations in a naturally ventilated Mediterranean dairy barn across different seasonal conditions ("hot weather" and "cold weather") and assessed model performance using datasets of varying temporal lengths. Ten input variables were employed, including indoor and outdoor air temperature and relative humidity, indoor air speed and direction, outdoor wind speed and direction, historical NH_3 concentration, and time of day. The ANN architecture was based on a Multilayer Perceptron (MLP) trained using the Levenberg-Marquardt (LM) and Bayesian Regularization (BR) algorithms. Model performance was evaluated using the coefficient of determination (R^2), correlation coefficient (R), mean absolute error (MAE), mean square error (MSE), and root mean square error (RMSE). Results demonstrated strong predictive capabilities. The cold weather dataset achieved superior performance, with R^2 values ranging from

0.84 to 0.92, R from 0.93 to 0.96, MAE from 0.28 to 0.36, MSE from 0.25 to 0.50, and RMSE from 0.50 to 0.70. The hot weather dataset yielded R^2 values from 0.82 to 0.84, R from 0.91 to 0.92, MAE from 0.32 to 0.47, MSE from 0.45 to 0.54, and RMSE from 0.67 to 0.73. These findings confirm that MLP models are effective tools for predicting NH_3 concentrations in dairy barns, offering valuable support for precision livestock farming strategies aimed at enhancing environmental sustainability, animal welfare, and public healthh.

Presentation#36

Recovery of dietary fiber from Sicilian lemon wastes

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Citrus processing industry generates a large quantity of byproducts, the main ones include peels, pulp and seeds. These are a rich source of polyphenols, essential oils, pectin and dietary fiber (DF). The aim of the research is the recovery and valorisation of citrus byproducts whose current destination causes serious environmental damage or, alternatively, a reckless destruction of resources still available to the community. The added value comes from the possibility of generating greater financial returns, reducing disposal costs, and developing products with numerous healthh benefits in food, cosmetics and pharmaceutical sectors. The production of DF from fresh lemon peel involves treatment in a heated environment at alkaline pH, which enhances the bleaching effect of hydrogen peroxide (H_2O_2) which simultaneously breaks down the cellular structure of the peels. The lemon peels were homogenised using an Ultra-Turrax, resulting in a finely dispersed and homogeneous suspension of the matrix. This is followed by acidification, precipitation with ethanol, washes, and oven drying. The tests showed a good yield in terms of powdered fibre, with a white-yellow straw colour determined using a colorimeter, good water-binding capacity (highest value 10.06 g_{H2O}/g_{powder}) and lower oil-binding capacity. Tests conducted with varying concentrations of hydrogen peroxide revealed no significant differences in the colour of the powdered fibre obtained at higher concentrations compared to that produced at lower concentrations. The H_2O_2 content was also determined to ensure food safety in future uses as a functional ingredient in food formulations such as baked goods.

Presentation#37

Turning Waste into a Solution: Biochar from Grape Pomace for *Meloidogyne* Control

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Root-knot nematodes (*Meloidogyne spp.*) are obligate plant parasites that affect a wide range of economically important crops, causing significant yield losses worldwide. The infective second-stage juvenile (J2) penetrates plant roots, migrates to the vascular cylinder, and induces the formation of multinucleated giant cells that function as feeding cells. This process leads to root galling, impairing water and nutrient uptake and ultimately reducing plant growth and productivity. Due to restrictions on chemical nematicides in the European Union, sustainable alternatives are required. Within this framework, during my PhD I investigate the use of biochar produced from red grape pomace, obtained through pyrolysis at 350 °C, as a potential strategy for controlling *Meloidogyne spp*. Biochars from two consecutive harvests (2021 and 2022) were physicochemically characterized, and pot experiments were conducted to assess effects on *Meloidogyne javanica*. Additionally, RNA-seq analysis in tomato was performed to investigate plant responses. Both biochars showed consistent composition in carbon content and showed mineral enrichment after pyrolysis. In pot experiments, biochar 0,75% significantly reduced nematode reproduction (64–98%), inhibited egg hatching, and decreased juvenile mobility, consistently between biochars of different harvests,

including an earlier biochar previously characterized. Moreover, RNA-seq analysis revealed transcriptomic reprogramming including the activation of genes related to defense pathways, hormonal signalling, and redox regulation which together constitute a "priming response". These findings support grape pomace-derived biochar as a sustainable and effective strategy for nematode management with potential for standardization.

Presentation#38

Integrating Rooftop Grid-connected Photovoltaic and Battery Systems to Reduce environmental impacts in Agro-industrial activities with a focus on Extra Virgin Olive Oil Production

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Agro-industrial activities require adaptations of technological energy systems to enhance competitiveness and meet the European Sustainable Development Goals. These activities typically show a seasonal and discontinued consumption profile, leading to the necessity of precise environmental assessments. This study aims at investigating the use of photovoltaic (PV) energy in different existing olive mills to assess their carbon footprint (CF) reduction. Specifically, this study compares the CF when electricity is supplied by the national grid (NG) and when it is provided by either a rooftop PV system or by PV combined with a battery energy storage system (BESS). The study further explores the role of BESS in promoting self-consumption of the renewable energy produced. To this end, an optimisation algorithm was developed as a decision-making tool for energy systems in agro-industrial activities. The proposed methodology for CF reduction allows for replicability across other industrial activities, having different energy consumption profiles, even with seasonal and discontinued consumption paths, since it is based on an hourly energy consumption evaluation. The energy simulation revealed that the potential energy self-consumed by the mill ranged from 11% to 18.1%, and the renewable energy produced covered between 11% and 84.7% of the mill's energy consumption. Moreover, the CF reduction resulted between 22% and 119%, depending on the CF system boundaries considered. Indeed, the PV energy produced and delivered to the NG can be considered effective in reducing the CF of the NG energy, thus mitigating the overall CF of the olive oil mill.

6th Keynote

Building an International Research Career through MSCA Fellowships

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Marie Skłodowska-Curie Actions (MSCA) post-doctoral fellowships represent one of the most internationally oriented and competitive funding schemes for early-career researchers in Europe and worldwide. Beyond their financial support, these programmes offer the opportunity to develop scientific independence, expand international networks, and experience research environments characterized by interdisciplinarity, mobility and innovation. Through the personal experiences of past and present MSCA fellows, this workshop aims to highlight both the professional and human dimensions of the MSCA journey, encouraging PhD candidates to approach international funding opportunities with motivation, ambition and confidence. The interactive workshop will also provide an overview of the main MSCA opportunities for early-career researchers, focusing on eligibility, proposal structure, evaluation principles, and selected aspects of grant design. Particular attention will be devoted to the impact of living and conducting research abroad, including cultural adaptation, networking, interdisciplinary collaboration, scientific independence and personal growth. Finally, the discussion will emphasize how the skills acquired during the preparation of an MSCA proposal are highly transferable to other competitive funding schemes, including ERC and

national excellence-oriented programmes.

Presentation#39

Impact of Water Deficit on *Neofusicoccum parvum* Infection in Grapevines: Integrating Proximal Sensing Monitoring and Chitosan-Based Biological Control

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Water deficit and grapevine trunk diseases are major threats under climate change. *Neofusicoccum parvum* is among the most aggressive pathogens causing wood necrosis and vine decline. Proximal sensing technologies and chitosan-based treatments offer promising tools for early stress detection and sustainable disease management. This preliminary study evaluated the combined effects of drought and *N. parvum* infection on grapevine physiology, emphasizing the protective role of chitosan.
The experiment was conducted in a greenhouse at the University of California, Davis, on *Vitis vinifera* cv. Cabernet Sauvignon. A total of 120 plants were subjected to full irrigation (100%) or water deficit (35%), with inoculated plants treated or not with chitosan. Physiological responses were assessed using the LI-COR 6800 and 600 systems, a pressure chamber, an ASD FieldSpec TREK spectroradiometer, and an InfraTec thermal camera.
Prolonged water deficit likely increased grapevine susceptibility to *N. parvum* through progressive physiological impairment before inoculation. Chitosan showed a clear protective effect, significantly limiting lesion development under combined abiotic and biotic stress, supporting its role as an effective resistance inducer. In parallel, thermal and hyperspectral sensors successfully detected stress-related physiological changes, confirming their value for early, non-destructive monitoring. Overall, the integration of chitosan treatments with proximal sensing tools represents a promising strategy for sustainable disease management and precision viticulture.

Presentation#40

Dissection of genetic bases of plant salt response through the study of halophyte plants as model species and application to durum wheat

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Climate change increases abiotic stresses such as soil salinity, affecting crop yield and quality. This project uses the halophyte *Cakile maritima* as a model to identify candidate genes (CG) involved in salt responses and further evaluate their role in durum wheat (*Triticum turgidum* var. *durum*) genotypes with varying salt tolerance, to detect differences in gene sequences or expression. The project aims to deepen knowledge on genetic adaptation to salt in plants and develop molecular markers for the selection of salt-resilient wheat varieties for a sustainable Mediterranean agriculture. A de novo transcriptome analysis of *C. maritima* was performed using RNA-seq technology on plants grown under control (0 mM NaCl) and stressed conditions (100, 400 mM NaCl) at 0, 6, 24, 48, and 72 hpt to identify differentially expressed genes (DEG) involved in salt stress response. Promising DEG and literature-derived CG were validated by RT-qPCR. Orthologous CG were isolated in *T. durum* using public databases (NCBI, Ensembl Plants, Phytozome). In parallel, a panel of diploid, tetraploid, and hexaploid wheat genotypes including wild accessions, cultivars, and landraces, was screened with molecular markers (SCAR and SNP) reported to be associated to salinity tolerance. RNA-seq data were quality-checked, assembled, and functionally annotated (GO, COG, KEGG) with CDS prediction, identifying several DEG in *C. maritima* under salinity. RT-qPCR on selected DEG and CG

provided functional validation, supporting their role in salt stress response. CG sequences from *T. durum* were compared using bioinformatic tools with those from *C. maritima* and *Arabidopsis thaliana*, revealing molecular conservation and divergence among the glycophyte, halophyte, and model species. Screening wheat genotypes with markers linked to salinity tolerance will identify resilient and susceptible lines, supporting early selection and breeding for salt adaptation.

Presentation#41

Citrus response to five-stress combination including macronutrient deficiency, water and heat stress

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Climate change is increasing the frequency of extreme weather events, negatively affecting plant performance. Multiple stress combination has been observed to drastically reduce plant survival, triggering specific responses to each stress combination. In this study, citrus response to a complex stress scenario has been studied by exposing Carrizo citrange plants to five stresses and their combinations: nitrogen, phosphorus and potassium deficiencies, water and heat stress. Stress accumulation induced detrimental effects at phenotypic, physiological and biochemical levels, especially under three or more simultaneous stresses. Plants under five stresses showed a specific galactose metabolism gene expression pattern which could be crucial for survival under these conditions. The analysis of responses associated with each stress combination revealed that nitrogen deficiency caused the highest damage, followed by water stress, supported by RNA-Seq analysis. Molecular changes suggested that individual phosphorus or potassium deficiency did not produce major transcriptional changes under these conditions. However, when both deficiencies were combined with each other and/or with water stress, they played an important role in stress response, activating a resistance mechanism through the enhanced biosynthesis of jasmonic acid, abscisic acid and proline, reinforcing a positive feedback relationship among them and promoting leaf accumulation. In contrast, nitrogen limitation seems to inhibit this resilience mechanism. Overall, results demonstrate that stress accumulation has a severe impact on citrus performance, and nutrient deficiency importantly modulates citrus responses to water and heat stress.

Presentation#42

Effects of Extreme Low-Oxygen Conditions on Volatile Compound Production in 'Pink Lady' Apples

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Dynamic Controlled Atmosphere (DCA) storage, characterized by extreme hypoxia, has emerged as a pivotal strategy for maintaining fruit quality. However, effectively monitoring fruit metabolism under the stressed gas conditions remains a significant challenge. This study evaluates the synergy between spectral-based non-destructive techniques and the analysis of fermentative volatile organic compounds (VOCs) as a robust framework for monitoring the metabolic state of 'Pink Lady' apples. A total of 800 'Pink Lady' apples were stored at 1 °C under four controlled atmosphere conditions: (T1) anoxic (100% N_2), (T2) 0.5% O_2 + 95% N2, (T3) 1% O_2 + 99% N2, and (T4) air as control. The evaluation on product quality was conducted after 2, 4, 8, 10, 30 and 45 days of storage, assessing respiration rate, firmness, total soluble solids (TSS), titratable acidity (TA), color, ethanol and acetaldehyde content and volatile compounds profile. At each sampling apple were subjected to acquisition with hyperspectral imaging (HSI) system equipped with 2

detectors (VIS-NIR at 400-1000 nm and NIR at 900-1700 nm).
The preliminary results indicate that statistical analysis applied to the spectral data effectively discriminated among the various storage treatments, further validated by the observed increases in acetaldehyde and ethanol concentrations. These promising preliminary results warrant further data integration to enhance model robustness and reliability for industrial scaling. In parallel, a multivariate classification model on specific volatile organic compounds (VOCs) identified key discriminant compounds among the four treatments as potential biomarkers for monitoring oxygen-dependent changes in aroma profiles. The findings underscore the pivotal role of oxygen availability in regulating volatile biosynthesis and highlight the importance of precise oxygen control in dynamic controlled atmosphere (DCA) storage systems.

Presentation#43

Sicilian PDO cheeses: an integrated microbial tracking approach identifies a core of lactobacilli in wooden biofilms

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The production of artisanal cheeses often relies on natural fermentation, in many contexts influenced by microorganisms inhabiting traditional wooden tools. Zooming on Sicilian artisanal cheeses with the Protected Designation of Origin (PDO) status, the use of wooden tables during curd acidification is common for Provola dei Nebrodi PDO and Ragusano PDO cheeses. Biofilm microbial consortia present on such wooden tables remain poorly investigated. In this study, an integrated microbial tracking approach was applied across cheese-making stages by combining culture-dependent and culture-independent methods. Wooden tables showed high load of lactic acid bacteria, while isolations revealed substantial strain-level diversity. In both systems, biofilms were dominated by *Lactobacillus*, particularly *Lactobacillus kefiranofaciens*, alongside *Lactobacillus gasseri*, *Limosilactobacillus fermentum, Lactobacillus helveticus*, and *Limosilactobacillus reuteri*, whereas pre-acidification curds were mainly dominated by *Streptococcus* and *Lactobacillus delbrueckii*. After acidification, *Lactobacillus* increased markedly, and a selective enrichment of the main biofilm-associated species was observed by ITS profiling and confirmed by species-specific qPCR assays. Overall, both cheese systems shared dominant *Lactobacillus* species, supporting a core biofilm-associated signature potentially involved in natural fermentation dynamics.

Presentation#44

Comparative Effects of Fullerenol Nanoparticles on the Growth of Yeasts, Filamentous Fungi and Macrofungi

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Carbon-based nanoparticles, particularly fullerene derivatives such as fullerenol $C_{60}(OH)_{24}$, have attracted scientific interest due to their redox properties and influence on fungal growth and metabolism. Their effects differ among yeasts, filamentous fungi and macrofungi. In filamentous fungi such as Aspergillus, Fusarium and Penicillium spp., fullerenol nanoparticles can alter oxidative stress responses and secondary metabolism. Low concentrations may reduce mycotoxin production, while higher concentrations may stimulate fungal growth and toxin biosynthesis. Yeasts appear more sensitive to carbon-based nanoparticles, whereas macrofungi remain insufficiently studied. This study was conducted as a narrative literature review focused on the biological effects of fullerenol $C_{60}(OH)_{24}$ on different fungal groups. Relevant studies were collected from PubMed, Scopus and Web of Science using keywords related to fullerenol nanoparticles,

fungi, oxidative stress and mycotoxins. The effects on fungal growth, metabolism and mycotoxin production were compared. Hydroxylated fullerene derivatives have shown inhibitory effects against Candida albicans through membrane disruption and oxidative stress induction, depending on nanoparticle concentration and exposure conditions. In contrast, preliminary findings suggest that fullerene and fullerenol nanoparticles may stimulate mycelial growth in medicinal macrofungi. Overall, the biological effects of fullerenol nanoparticles are species- and concentration-dependent. Filamentous fungi mainly exhibit metabolic alterations, while macrofungi may show growth-promoting responses. Further studies are needed to better understand nanoparticle–fungus interactions and their applications in biotechnology and agriculture.

7th Keynote

Why to farm a deer? Deer-based solutions for food and healthh

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The question "Why to farm a deer?" challenges conventional livestock paradigms in a context of climate change and fragile food systems. In Europe, farmed red deer (*Cervus elaphus*) and fallow deer (*Dama dama*) present a sustainable, low-emission alternative. Deer convert coarse, marginal vegetation into premium venison rich in omega-3 fatty acids, with a methane footprint significantly lower than that of beef. Thriving on low-productivity lands unsuitable for conventional livestock species, deer farming eases pressure on arable soils, enhances food security and diversification, and boosts rural incomes while maintaining biodiverse, semi-natural habitats. With minimal housing and routine veterinary care needs, deer systems fit perfectly into low-input, circular agriculture. These benefits alone justify serious attention, yet the most compelling dimension lies in the deer's unique biology. Deer antlers are the only mammalian organs that fully regenerate annually. The pre-calcified velvet widely used in Asian traditional medicine (but not only) is a reservoir of growth factors, cytokines, collagen, minerals, and multipotent stem cells. Recent studies show that antler stem cells accelerate wound closure, drive bone and cartilage repair, and stimulate neurogenesis. Furthermore, velvet extracts exert selective anti-proliferative effects on cancer cells at similar or even higher efficiency than current standard treatments. The underlying mechanism, a tightly regulated cell division that never progresses to neoplasia, offers a living model for novel cancer therapeutics. Unravelling how these cells avoid senescence and oncogenic transformation could revolutionise regenerative medicine and oncology. Last but not least, the first success in bone regeneration in mice based on antler stem cell treatments has recently been achieved. This dual identity, low-impact livestock and regenerative-medicine bioreactor, positions the deer as an extraordinary bioresource.

8th Keynote

Integrating Wildlife Management into Agricultural Education: a Key Step Towards Sustainable Agroecosystems

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Agriculture in the 21st century operates within dynamic socio-ecological systems, where food production, biodiversity conservation and climate adaptation are deeply interconnected. Sustainable agriculture can no longer be understood solely through the lens of productivity; it requires a landscape-scale perspective that integrates ecological processes, ecosystem services and human dimensions. Despite this, agricultural education still often lacks a systematic integration of wildlife management and conservation. This gap limits the ability of future professionals to effectively respond to key challenges such as biodiversity loss, habitat fragmentation, climate change and increasing human–wildlife conflicts. Understanding population dynamics, species interactions and spatial processes is essential for designing resilient agroecosystems and implementing nature-based solutions. Integrating wildlife-oriented knowledge into agricultural curricula

enhances interdisciplinary thinking and supports evidence-based decision-making. It equips students with tools to balance production and conservation, improve ecosystem functioning and engage with diverse stakeholders. In practice, this means moving from sectoral approaches towards adaptive, landscape-level management that aligns agricultural practices with biodiversity objectives and EU environmental policies. The MSc programme “Wildlife Management and Conservation”, developed and delivered by the Institute of Animal Sciences at the Warsaw University of Life Sciences (SGGW), directly addresses these needs by providing advanced training in population ecology, conservation genetics, GIS, monitoring and applied conservation planning. By linking such competencies with agriculture-oriented PhD training within the BIP framework, we can educate a new generation of scientists capable of bridging disciplines and delivering innovative, science-based solutions. Embedding wildlife management into agricultural education is therefore not an optional extension, but a prerequisite for achieving truly sustainable agriculture.

Thursday, June 11

9th Keynote

Guttation: an emerging resource with effects on insect–plant interactions

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Plant guttation, understood as the exudation of xylem- and phloem-derived fluids through hydathodes, is a widespread phenomenon in many cultivated plant species, although its ecological relevance has so far received little or no attention. Far from being merely a physiological by-product of the plant, guttation may constitute a trophic resource of interest for insects present in the system, providing water and nutritional compounds such as carbohydrates, amino acids, and proteins. At the same time, it may also contain potentially harmful substances, such as residues of systemic pesticides. Moreover, its quantity, composition, and temporal dynamics vary markedly among species, genotypes, and environmental conditions. In this work, plant guttation is addressed as a resource capable of influencing insect–plant interactions across different cropping systems. Recent studies show that, in crops such as blueberry and peach, guttation can act as a relevant nutritional source for insects from different trophic levels, promoting their survival and improving several biological parameters. In contrast, in tomato, its nutritional value appears to be more limited. We have also observed that domestication can significantly modify both the amount and composition of guttation, reinforcing the idea that this resource is biologically dynamic and ecologically relevant. Overall, this work provides evidence positioning guttation as an emerging component of multitrophic networks in agroecosystems and highlights its potential importance in ecology and conservation biological control.

Presentation#45

Tobacco rootstock-mediated grafting enhances tomato resistance to the key pest *Tuta absoluta* through coordinated behavioral and chemical defenses

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Grafting is a widely adopted agronomic practice in Solanaceous crops that modulates plant growth and stress resilience. However, its potential to confer resistance to herbivorous insects remains largely unexplored. Here, we investigated whether grafting onto Solanaceous rootstocks could enhance tomato resistance to the key tomato pest *Tuta absoluta*. Moreover, the mechanisms underlying the graft-induced resistance was explored. Graft combinations using the rootstocks of seven Solanaceous species were compared in terms of pest oviposition preference, larval developmental duration, and pupal weight. Volatile, transcriptomic, and metabolomic profiling was then integrated to identify candidate defence factors associated with antixenosis and antibiosis. We found that, among all tested graft combinations, the tomato variety Ailsa Craig scion grafted onto *Nicotiana tabacum* rootstock exhibited the strongest resistance to *T. absoluta*. This result was supported by antixenosis (reduced host preference by *T. absoluta* larvae and adults) and antibiosis (reduced leaf consumption by *T. absoluta* larvae and suboptimal development) phenomena. Specifically, the tobacco rootstock reconfigured the scion volatile blend by enhancing terpene emission and thereby conferring antixenosis. It also promoted systemic nicotine accumulation and elevated defensive metabolites, including flavonoids and anthocyanins, thus reinforcing chemical resistance. Our findings provide new insight into how heterologous grafting reshapes plant resistance to insect herbivores and identify tobacco rootstock-induced resistance as a promising strategy for insect pest management.

Presentation#46

Genome editing strategies to counteract grapevine leaf and vascular pathogens

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Viticulture requires sustainable strategies to address climate change–related biotic and abiotic stresses. EU policies are encouraging the reduction of chemical inputs for grapevine disease management. In my PhD work, we applied new genomic techniques to (i) enhance grapevine endogenous defences, specifically stilbenes, well-known antimicrobial compounds against pathogens, and (ii) develop strategies to control Grapevine leafroll–associated viruses (GLRaVs), for which no cures are currently available. CRISPR-Cas9–edited Chardonnay plants were generated *via Agrobacterium*-mediated transformation targeting the *VvWRKY8* transcription factor, a negative regulator of stilbene biosynthesis. To overcome the limitations associated with stable transgene integration following *Agrobacterium*-mediated transformation, a heat-shock–inducible Cre-lox recombinase system was employed to enable transgene excision. In parallel, a new construct featuring Cas12 protein is under design to overexpress *VvPAL*, a key gene involved in stilbene biosynthesis. Putative edited embryos are currently under regeneration.

To control GLRaVs, PCAP and expansins, were targeted to impair viral cell-to-cell movement. Embryogenic callus of the susceptible Merlot cultivar was similarly transformed using a heat-shock–inducible Cre-lox excision system combined with a GRF-GIF expression cassette to enhance regeneration efficiency.

Future work will focus on the recovery of transgene-free edited lines, a crucial step toward field validation. This represents a key prerequisite for the development of resilient grapevine varieties contributing to both viticultural sustainability and human healthh.

Presentation#47

Sustainability Certifications and Consumer Choice in the Agri-Food Sector

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Sustainability certifications are increasingly relevant in the agri-food sector because they translate environmental and social attributes into signals for consumer choice. This study examines how Italian consumers perceive sustainability certifications and how these perceptions relate to socio-demographic traits, knowledge, and purchasing behaviour. A survey of 1,000 Italian consumers collected data on socio-demographics, certification knowledge, and purchase frequency of sustainable agri-food products across retail channels. Data were analysed through one-way ANOVA and principal component analysis. Results show that engagement with sustainability certifications is not homogeneous. Higher education is associated with more frequent purchases of organic, certified, and designation-of-origin products, while older consumers report lower knowledge levels. Factor analysis identifies two certification dimensions: one linked to technical certifications and one to more familiar consumer-facing labels such as Organic, Rainforest Alliance, and Fairtrade. Two purchasing logics also emerge: a mainstream pattern linked to organized retail and a proximity-based pattern linked to traditional and specialized channels. Overall, certifications influence consumer choice, but their effectiveness depends on familiarity, clarity, and retail context.

Presentation#48

From Home Remedy to Self-Care Ritual: Herbal Tea Consumption in Italy

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Herbal tea in Italy is moving from traditional home remedy to everyday self-care practice. This study explores the cultural, emotional and ritual meanings attached to consumption and how these meanings vary across generations. A sequential exploratory mixed-methods design was adopted. Twenty semi-structured online interviews were conducted with Italian consumers differing in age, area and consumption profile. Interviews were analysed through thematic analysis and a means-end chain approach linking attributes, consequences and values. The qualitative results informed three product concepts for a later national survey. Herbal tea consumption is shaped by four main registers: domestic memory and continuity; self-care and time management; authenticity and trust; and selective openness to innovation. Older participants more often linked herbal tea to family transmission and comforting routines, while younger consumers associated it with intentional pauses, wellbeing, sustainability and sensory exploration. Innovation was accepted when coherent with the cultural grammar of herbal tea, especially recognisable ingredients, credible claims and territorial identity. Overall, herbal tea in Italy emerges as both a culturally rooted beverage and a contemporary micro-ritual, offering useful implications for product development and market positioning.

Presentation#49

Plant–insect interactions in cultivated guayule in Castilla-La Mancha: ecological insights and potential applications

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Since 2017, guayule (*Parthenium argentatum* A. Gray) cultivation has been adapted to the edaphoclimatic conditions of Castilla-La Mancha, but scientific knowledge about the arthropod communities associated with this crop is limited. A study conducted in the 1980s identified 107 species across 13 orders and 60 families in guayule plantations in the USA; 56% were herbivores (not necessarily harmful to guayule), 36% predators, 6% parasites, 1% detritivores, and 1% omnivores. Although it is still premature to fully characterize the interactions among insect groups identified in an experimental guayule crop in Santa Cruz de la Zarza (Toledo, Spain), preliminary observations suggest that insects may play a beneficial role, mainly through pollination carried out by hymenoptera, diptera, or coleoptera. However, some species, such as certain hemiptera, may negatively affect the plant by feeding on its tissues. Additionally, pollination experiments have been conducted in greenhouses using dipteran species (*Sphaerophoria rueppellii* and *Lucilia sericata*) commonly found in guayule habitat, to assess how pollination influences seed production and germination rates. The objective of this thesis is therefore to improve the understanding of the insect-plant interactions in guayule crops in Castilla-La Mancha, evaluate their role in pollination processes, and determine their potential impact on the production of secondary metabolites relevant to the industrial development of this crop.

Presentation#50

Effects of Alternative Food Sources and Different Substrates on the Mass Rearing of *Amblyseius andersoni*

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This study examines how different diets and rearing substrates affect the performance of the predatory mite *Amblyseius andersoni*, an important biological control agent. It evaluates the impact of various pollen types and frozen *Carpoglyphus lactis* on the development, survival, and reproduction on both leaf discs and artificial substrates. Additionally, it investigates the long-term effects of mass rearing over five generations using alternative and natural prey-based diets. The findings aim to improve mass-rearing practices and ensure the effectiveness and quality of the predator in biological control. Experiments were carried out under controlled laboratory conditions using a colony of *A. andersoni* collected from tomato fields in Greece. Predators were reared on two substrates (tomato leaf discs and Plexiglas) and fed different diets, including various pollens and frozen *C. lactis*. Tomato plants were grown in climate-controlled rooms and used to prepare standardized experimental arenas. Development, survival, reproduction, and predation were monitored daily, while predator fitness was also evaluated over five consecutive generations under different feeding regimes. The performance of *A. andersoni* was mainly influenced by food source rather than rearing substrate, as no significant differences were found between leaf discs and Plexiglas. Diets based on *T. angustifolia* pollen and frozen *C lactis* supported faster development, higher reproduction, and greater population growth compared to other pollens. Rearing on factitious food for five generations did not reduce predator fitness or its ability to utilize natural prey. These results highlight the suitability of alternative diets for efficient, cost-effective mass rearing without compromising biological control potential. *A. andersoni* showed high performance when reared on cattail pollen (*T. angustifolia*) and *C. lactis*, with no short-term negative effects from artificial diets. These results support their use in efficient and cost-effective mass rearing. They also contribute to improving sustainable biological control strategies. Further research is needed to assess long-term and field-level effects.

Presentation#51

Multi-Block Data Integration of Spectral, Metabolomic, and Transcriptomic Profiles for Biomarker Discovery and Prediction of Flavescence Dorée Susceptibility/Resistance in Grapevine

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Flavescence dorée (FD) is one of the most destructive phytoplasma diseases in European viticulture. Key constitutive biomarkers of FD susceptibility remain poorly defined, limiting risk prediction without inoculation trials. Here, we combined spectral, transcriptomic, and metabolomic data in a multi-block integration framework to find constitutive biomarkers linked to FD susceptibility and resistance.

Potted plants from seven grapevine cultivars were used in this research grown under greenhouse conditions. Three data blocks were collected. Block I consisted of 24 spectral vegetation indices. Block II covered constitutive expression of 24 defense-related genes. Block III included 99 metabolites. Each block was analyzed separately with ANOVA, PCA, PLS-DA, and hierarchical clustering. The three blocks were then integrated using DIABLO. Cross-block Pearson correlations ($|r| \geq 0.85$) were used, and classification accuracy was tested by LOOCV. DIABLO identified 33 refined biomarkers from all three data layers showing strong cross-block correlations. LOOCV confirmed robust classification.

Among spectral indices, BI, NI/PI/SI, VOG2/VOG3, CI Green/NBI, NPCI642, and PRI had the highest

number of connections. Several metabolites also showed dense cross-block links, including (+)-catechin, procyanidin B2, (-)-epicatechin, proCyanidin T2/T3/C1B, and geraniol-pentosyl-hexoside. Among defense genes, GLR3.3 had 23 connections, GOX had 16, and SEOB had 5. Overall, multi-omics integration proved effective for screening of FD susceptibility in grapevine, detecting constitutive defense signatures before contact with the pathogen.

Presentation#52

Dispersal of the Mediterranean fruit fly and a changing climate

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Dispersal is a key ecological and evolutionary process influencing species range expansion, gene flow, and adaptation to changing environments. It is influenced by both biotic and abiotic factors, with temperature being the most important. Beyond current conditions, thermal history may further modify dispersal through phenotypic plasticity. To gain a better understanding of factors regulating dispersal of insect species, we examined how thermal acclimation and environmental conditions affect both flight performance and field dispersal of the Mediterranean fruit fly (*Ceratitis capitata*), which is used as model organism. Adults were acclimated at 20, 25, or 30°C. Flight performance was assessed with flight mills at corresponding ambient temperatures, while dispersal was evaluated through release–recapture experiments in two habitats: a mixed-fruit orchard (with host plants) and an olive orchard (without host plants). Marked flies were released and monitored across seasons using trapping grids. In the flight mill lad trials, higher ambient temperatures increased flight speed of adults while heavier individuals showed improved performance. In the release-recapture trials, the overall recapture rate was 14.8%, with males recaptured more often. Recaptures increased at higher ambient temperatures and with the presence of host plants. Most flies recovered near release points within ten days. In both experiments, thermal acclimation was not a significant predictor flight performance. These findings contribute towards the understanding of temperature-driven dispersal and can support predictions on dispersal potential of *C. capitata* in relation to climate change.

Presentation#53

Analysis of toxicity induced by phosphodiesterase type 5 inhibitors in aquatic organism models and selected cell lines

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Phosphodiesterase-5 inhibitors (PDE5i) are widely used and can reach aquatic environments via wastewater. Comparative ecotoxicological evidence across biological levels is limited, especially when considering light conditions and different compound forms. This study compares sildenafil and tadalafil using an integrated multi-model approach. Cytotoxicity was assessed in human HepG2 and MRC-5 cells after 24 h exposure using MTT, supported by May–Grünwald–Giemsa morphology. Developmental toxicity was examined in zebrafish Fish Embryo Acute Toxicity (FET; 96 h) under light vs dark, recording survival, hatching and malformations. Growth inhibition was assessed in the freshwater microalga *Acutodesmus obliquus* (72 h) using growth rate and UV–Vis absorbance spectra (400–750 nm).

Sildenafil showed no cytotoxicity up to 100 mg/L in HepG2 and affected MRC-5 only at the highest dose, whereas tadalafil reduced metabolic activity in both lines already at low mg/L. In FET, overall effects were mild at lower concentrations; the strongest decrease in survival/hatching was observed at the highest tadalafil concentration in light, indicating modulation by exposure conditions. In microalgae, sildenafil significantly reduced growth rate at intermediate concentrations, while tadalafil did not significantly inhibit

growth within the tested range; spectral profiles were consistent with these trends. The results highlight compound- and model-dependent responses and support including primary producers and light/dark conditions in screening-level hazard assessment of PDE5i.

Presentation#54

Agri-Food By-Products for Climate-Resilient Small Ruminants Farming: Nutritional Strategies to Enhance Welfare in Sheep

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Climate change is a significant challenge to livestock systems in Mediterranean regions. Sheep demonstrate a certain capacity for adaptation, but prolonged exposure to heat can compromise metabolism, the immune system and production. In this context, diet is a tool for improving resistance to heat stress and regulating physiological responses. The study analyses the effects of alternative feeding strategies, such as supplementation with AIPB on the physiological and immune responses of dairy sheep.
An *in vivo* trial was conducted on dairy ewes divided into three experimental groups: one group was fed a conventional diet (CON); group was fed the same basic diet supplemented with a hydroalcoholic extract of rosemary (REO); and group was fed exclusively on legume-based forage (LEG). Environmental conditions and physiological parameters, such as rectal temperature and respiratory rate, were monitored continuously, and the THI was calculated to quantify heat stress levels. Blood samples were collected and plasma analysed to determine the cytokine profile in order to evaluate the animals' welfare. The integration of environmental and physiological parameters has enabled a comprehensive assessment of the impact of heat stress. Dietary interventions exerted a modulatory effect on immune function and physiological responses in sheep exposed to heat stress. These findings support the potential role of sustainable feeding strategies, including the use of AIPB, in improving animal welfare, increasing resilience to heat stress and promoting more sustainable sheep dairy production systems in the context of climate change.

Presentation#55

Effect of temperature on *in vitro* protein hydrolysis of insect based diets by the digestive enzymes of rainbow trout (*Oncorhynchus mykiss*)

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In vitro digestion assays could represent a reproducible and ethical approach to estimating protein bioaccessibility under controlled conditions, allowing rapid and reliable evaluation of novel ingredients and feeds also in the aquaculture sector. In this specific area environmental factors, such as temperature, can significantly influence animal digestive physiology and enzymatic activity. Although *in vitro* models should ideally mimic species-specific physiological conditions, including rearing temperature, many studies adopt a standardized temperature (37°C) to accelerate protein hydrolysis.
This study simulated the digestion of insect-based diets (*Hermetia illucens* and *Tenebrio molitor*) as well as the corresponding meals alone, under different temperature regimes (18°C, 25°C, 37°C) using digestive enzyme extracts from rainbow trout (*Oncorhynchus mykiss*). Digestions were carried out for 180 minutes, with sampling every 30 minutes. The release of free amino acids over time and the degree of protein hydrolysis were evaluated. Temperature significantly affected both free amino acid release and degree of hydrolysis across all tested diets and insect meals. The highest values were observed at 37°C, while 25°C showed intermediate results, generally close to those obtained at 18°C, which yielded the lowest values.

Regarding the degrees of hydrolysis, 37°C resulted in the highest degree of hydrolysis over time, while 25°C and 18°C resulted in the lowest values for *Hermetia illucens* containing diet while no significant temperature effect was observed for the other diets. Overall, 25°C appears to be the most suitable temperature for *in vitro* digestion assays in rainbow trout, as it provides results comparable to those obtained at 18°C, which is close to the species' optimal rearing temperature, while avoiding potential overestimation associated with 37°C.

Presentation#56

The effect of aqueous supra-molecular hybrid complexes of plant extracts administered *in ovo* on the oxidative and antioxidant potential on development of the domestic chicken embryo

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Modern broiler chicken farming focuses on maximising production output, which leads to rapid weight gain in the birds over a short period of time. As a result, numerous healthh problems arise, often involving disproportionate bone and muscle development, which leads to conditions such as osteoporosis, spinal curvature or limb deformities, which leads to a reduction in mobility and welfare. Herba Epimedii and *Magnolia officinalis* contain active compounds such as icariin, magnolol and honokiol, which exhibit osteogenic properties and anti-inflammatory, antioxidant and antibacterial effects.
The aim is to determine the effect of calcium carbonate and plant complexes derived from Herba Epimedii and *Magnolia officinalis*, administered *in ovo*, on the development of the chicken embryo, production performance, meat quality and the locomotor system of broiler chickens on day 42 of rearing. First, hydrocolloids will be prepared and administered *in ovo* into the eggs. In the second stage, selected concentrations will be used, and the chickens will be reared until 42 days of age, after which selected parameters will be analysed. Preventing diseases such as lameness, dysplasia and osteoporosis will enable broiler farmers to maintain good welfare of animals and production efficiency, as they face financial losses on their farms due to the high prevalence of musculoskeletal disorders. By using plant extracts and calcium carbonate, natural substances will help reduce the amount of antibiotics used in poultry industry.

10th Keynote

Plant-Mediated Effects of Beneficial Soil Microorganisms on Herbivorous Pests: Mechanisms and Applications in Biological Control

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Plants are not passive victims of herbivory. Over millions of years of co-evolution, they have developed sophisticated defence strategies both direct and indirect to cope with the diverse community of organisms that feed on them. At the same time, the soil hosts a rich community of beneficial microorganisms whose influence extends well above ground, shaping how plants grow, respond to stress, and defend themselves against attack. This talk explores the fascinating and increasingly well-documented ability of beneficial rhizosphere microorganisms including plant-growth promoting fungi, rhizobacteria, and arbuscular mycorrhizal fungi to modulate plant defences against herbivorous arthropods. By colonising plant roots, these microbes can prime or activate a broad spectrum of plant defence pathways, altering both direct defences (such as the production of defensive metabolites and physical barriers) and indirect defences (such as the emission of herbivore-induced plant volatiles that attract natural enemies of the pest). Furthermore, drawing on laboratory, greenhouse, and field-level evidence, we will highlight the potential of selected

microbial strains as sustainable, plant-mediated tools for integrated pest management. We will also address the challenges that remain: the variability of microbial effects across pest species, crop systems, and environmental contexts, and the importance of rigorous risk assessment before deployment. By the end of this talk, participants should have a clearer picture of how soil microbiology, plant physiology, and arthropod ecology intersect and why this intersection represents one of the most promising frontiers in sustainable agriculture.

Presentation#57

Re-evaluating SIT components through advanced omic approaches

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Tephritid fruit flies comprise a large family of species of significant agricultural importance, many of which are considered major pests. As a result, considerable efforts have been directed towards the development of eco-friendly and species-specific population control methods. The Sterile Insect Technique (SIT) has been an effective alternative measure employed against the Mediterranean fruit fly *Ceratitis capitata.* SIT can reduce the reproductive potential of a local population through mass-releases of sterile males. However, the success of SIT relies heavily on the ability to produce competitive male-only sterilized cohorts. Despite its efficacy in Medfly control, its species-wide application had been hindered by limitations in male separation during rearing and sexual competitiveness of sterilized males in the field. Current omics technologies enable a comprehensive re-evaluation of SIT components by leveraging advanced genomic and transcriptomic approaches. In this context, we first focused on describing the sequence and content of sex chromosomes, and especially the male-specific Y chromosome. Its exclusive presence in males provides a landscape for linking and expressing selectable markers there, achieving the sexual separation of males from females. We describe two novel computational methods, R-CQ and KAMY, for detecting both genomic and transcriptomic Y-linked elements. These tools are coupled with a manual curation pipeline to assess the accuracy of predictions, the quality of Y chromosome assembly, and to provide accurate Y-linked genomic sequences. Using this framework, we successfully characterized the sequence and structure of sex chromosomes of five important Tephritidae pest species. The incorporation of transcriptomic data further revealed insights of the transcriptomic landscape for several of these species. In parallel, to identify molecular markers associated with the quality and mating competitiveness of sterile males used in SIT, we performed a comparative transcriptomic analysis between the most commonly used in medfly SIT programs Vienna 8 strain and the WT EGII laboratory strain. In addition, we examined transcriptomic differences under normal and a probiotic-supplemented diet, to assess the effect of microbiome-isolated probiotics on gene expression. Overall, our analysis has led to the identification of a set of QC transcriptomic markers which are currently expanded and functionally validated for their applicability in SIT optimization.

Presentation#58

***Phytophthora* monitoring and epiphytic bacteria as biocontrol resources in Mediterranean olive and citrus systems**

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In the Mediterranean region olive and citrus crops are increasingly facing more intensive cropping systems, environmental pressures and emerging plant diseases. Among soilborne pathogens, *Phytophthora* spp. represent a major concern. This Ph.D. project focuses on (i) the ecology of *Phytophthora* in soil of citrus and olive groves, and (ii) the isolation and selection of

bacteria from the carposphere and phyllosphere of olive and citrus fruit as candidate biocontrol agents (BCAs). To the first aim, soil and root samples were collected from olive groves in Sicily and Malta to assess the diversity and seasonal pattern of *Phytophthora* populations. Local meteorological data were recorded to highlight the relationships between environmental conditions and the dynamics of *Phytophthora* populations, as a preliminary step toward developing predictive model. To the second aim, bacterial strains were isolated from leaves and fruit of olive and citrus and screened *in vitro* for antagonistic activity against major fungal pathogens of these crops. Selected isolates were characterized to assess their potential as BCAs.
Results indicate that both the structure and dynamics of *Phytophthora* populations are influenced by environmental conditions, suggesting potential for climate-informed risk prediction. Several epiphytic bacterial isolates proved to be promising BCAs. Overall, these findings confirm the importance of monitoring pathogens and natural microbial resources for a more sustainable disease management in Mediterranean olive and citrus cultivation systems.

Presentation#59

Agro-livestock systems and wildlife in shared landscapes

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European agricultural landscapes are undergoing a process of marginal areas abandonment, in turn leading to increasing wildlife populations. This has transformed areas where agro-livestock activities are present into shared landscapes, resulting in human-wildlife conflicts such as livestock predations and wild-domestic ungulate negative interactions. This poses an increased threat to the sustainability of extensive farming systems and the ecosystem services they provide. The project aimed to analyse these dynamics through a systematic review of the literature and an analysis of stakeholder attitudes and perceptions. Following the PRISMA guidelines, a systematic review was conducted to identify and summarise existing European studies about agricultural damage, trophic competition, and spatio-temporal interactions between wild and domestic ungulates. Furthermore, structured interviews were conducted with mountain dairy farmers to understand their perceptions towards the presence of both wild ungulates and large carnivores, as well as their vision on the current compensation schemes, and indirect damages. The review highlighted that wild boar and red deer were the most problematic species.
The first is mainly responsible for agricultural damage due to its rooting activity, while the latter mainly causes biomass losses due to forage consumption. In parallel, the results of the interviews showed that 60% of the farmers had suffered wildlife damages. Of these, 26% experienced damage from both large carnivores and wild ungulates, 37% from large carnivores only, and another 37% from wild ungulates only. The results also revealed a general dissatisfaction with the current compensation schemes, especially due to the failure in the evaluation of indirect damages. These findings suggest that an integrated approach is necessary when managing such situations. Specifically, combining information on prevention and landscape configuration, and including stakeholders in decisional processes, can minimise the negative effects that may threaten both wildlife and agro-livestock activities, enhancing the long-term human-wildlife coexistence.

Presentation#60

Assessing binormal model adequacy in applications of the overlap coefficient (OVL) to the European cherry fruit fly *Rhagoletis cerasi*

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Understanding differences between populations of the European cherry fruit fly is important for agricultural research and pest management. Focusing on data from female *Rhagoletis cerasi* populations of originating from three distant areas of the Greek mainland, this study develops a global goodness-of-fit test for the overlap coefficient (OVL), a key measure of similarity between distributions. The test is based on the difference between empirical and binormal parametric estimates of the OVL. The empirical estimate is obtained using both histograms and kernel density estimators, while the parametric estimate is considered with and without the Box-Cox transformation. To ensure numerical stability, a logit transformation is applied, and the bootstrap method is used to estimate the standard error of the difference. Simulation results across a wide range of sample sizes and distributions further support the effectiveness of the proposed test. Overall, the method provides a simple, interpretable and statistically sound approach for assessing the binormal model in OVL estimation.

Presentation#61

Development of insecticide resistance and fitness cost evaluation in two phytoseiid predatory mites

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Integrated Pest Management (IPM) combines biological control agents with selective pesticides. Predatory mites of the Phytoseiidae family such as *Euseius finlandicus* and *Amblyseius swirskii* are frequently exposed to insecticides in orchards and greenhouse crops, respectively. This study investigated resistance development in widely used pesticides and potential fitness costs in both species.

Five populations of *E. finlandicus* collected from Northern Greece and a commercial population of *A. swirskii* were used in the experiments. Bioassays were conducted with abamectin, acetamiprid and pirimicarb using fresh leaf residues. Afterwards, pirimicarb was selected for *E. finlandicus* and abamectin for *A. swirskii* for further study, with laboratory selections being applied for six consecutive generations.

Developmental time, survival and oviposition were recorded to estimate the intrinsic rate of population increase (r_m). Resistance to pirimicarb increased 3.24-fold in *E. finlandicus*, while resistance to abamectin increased 9.90-fold in *A. swirskii* after the selections. No significant differences were observed in developmental time, survival, fecundity or r_m values between the initial and selected populations in either species, indicating the absence of detectable fitness costs. These findings suggest that resistance can be enhanced without compromising biological performance, supporting the integration of resistant predatory mites in IPM programs. Further research will provide insights into the underlying resistance mechanisms and potential field or greenhouse applications.

11th Keynote

How Biodiversity Knowledge Can Improve Cheese Safety

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Biodiversity studies of microorganisms associated with dairy products are essential to improve cheese safety, to reduce spoilage and to support the development of sustainable preservation strategies. Dairy environments harbour complex fungal and bacterial communities that include spoilage and pathogenic microorganisms, such as *Cladosporium*, *Aspergillus* and *Listeria monocytogenes*, but also beneficial lactic acid bacteria (LAB) with technological and bioprotective potentials. Understanding the microbial ecology of cheese production environment is fundamental for identifying contamination sources and selecting autochthonous cultures of interest for clean-label dairy products. Studies conducted in dairy environments evaluated fungal biodiversity through ITS sequencing and characterized LAB isolates from artisanal cheeses using molecular, phenotypic and technological analyses. Antifungal, antibacterial and antibiofilm activities of LAB-derived cultures and extracts were investigated in vitro and in simulated cheese matrices against spoilage fungi and pathogenic bacteria commonly associated with dairy products. The studies revealed high microbial diversity in dairy products and processing environments, including *Weissella* and *Lactiplantibacillus* species. Knowledge of this biodiversity enabled the identification of beneficial LAB strains capable of inhibiting fungal growth, biofilm formation, and foodborne pathogens through the production of organic acids and antimicrobial metabolites. These findings support the development of clean-label bioprotective cultures and natural preservation approaches, contributing to extended shelf life, reduced food waste, and improved cheese safety and quality.

12th Keynote

Translating research into real-world opportunities

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The plant microbiome represents one of the most complex frontiers in agricultural science. Yet, much of the scientific effort remains focused on simply mapping its code rather than running its applications. My doctoral research began within this traditional framework, mainly focusing on deciphering the structural and functional dynamics of the tomato rhizosphere microbiome under biotic and abiotic stressors, also with the aim to identify beneficial strains that could be used as bio-based solutions. However, a critical question emerged: can these insights survive the transition from a peer-reviewed paper to a real-world field application? The current academic paradigm often rewards the production of papers as an end goal, leading to a "sterile" research cycle where valuable knowledge remains trapped in archives. A fundamental shift toward applied research and technology transfer as the ultimate validation of scientific production is needed. Driven by the necessity to bridge this "lab-to-field" gap, our research group translated years of microbiome insights into a multidisciplinary *startup* (i.e. an innovative company pursuing scalable growth). Our approach integrates biological expertise with biotechnology, agricultural economics and machine learning (ML) to solve a critical problem: translating “anonymous”, often inaccessible, academic indicators of microbial healthh into actionable intelligence for the agricultural sector. By leveraging Artificial Intelligence, we aim to transform raw metagenomic data into a decision-support system that empowers farmers and stakeholders. A PhD project can – and should – be more than a scholarly achievement; it can be the catalyst for a technological shift, moving beyond traditional descriptive research to turn high-level science into tangible, high-precision tools for a more sustainable and resilient global agriculture.

13th Keynote

LandRush – Ventures into Global Agriculture

Frauke Huber, Uwe H. Martin - www.landrushproject.com

Since 2007, the artist duo Frauke Huber and Uwe H. Martin have been developing LandRush, a long-term documentary project spanning five continents that examines seed, water, and land rights, environmental justice, climate change, and the future of agriculture. Living and collaborating for months at a time with farmers, farmworkers, fishers, herders, scientists, indigenous peoples, and activists, they return to the same people and places over years as circumstances change.

In this multimedia keynote, they share what nearly two decades on the ground have revealed about the forces reshaping agriculture worldwide, and reflect on the role of art and journalism in making structural violence and systemic dependency visible.

LandRush is on exhibition as an 8-channel multimedia installation at La Cunzeria throughout the conference.

1st YEAR THESIS FLASH

(Tuesday, 9 June 2026)

Poster #1

First taxonomic update of *Salicornia* sp. pl. in the Gargano territory (Puglia, Italy)

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Wetland ecosystems are natural areas, supported at global level by the Ramsar Convention (1971), characterized by a high variability in halophytic and sub-halophytic species that identify habitat types according to the Directive 92/43 EEC. In Apulia, the Gargano territory reports, at coastal level, numerous halophytic vegetation types of high conservation value, including communities dominated by *Salicornia* group. Lately, the northern Gargano region - specifically around Torre Mileto locality - has seen a surge in the cultivation of *Salicornia* species; a trend that is significantly driving an increase in consumer demand. Nevertheless, both domestication and marketing of glasswort take place without knowing the correct taxonomical identification, using many times improperly the scientific name *Salicornia europaea* L. The nomenclature adopted follows the Portal to the Flora of Italy (2025), while for taxonomical identification were used the Italian and European dichotomous keys.

In the studied area, we verified the presence of the following taxa: *S. perennis* Mill. subsp. *perennis*, *S. perennans* Willd. subsp. *perennans*, and *S. fruticosa* (L.) L. Instead, in cultivation we have ascertained the presence of *S. perennans* subsp. *perennans* (= *S. europea* auct.) and *S. perennis* subsp. *perennis*. The preliminary results highlight that further studies are needed to verify the presence of other taxa at natural and domestication level in the Gargano.

Poster #2

Valorization of Artichoke By-Products for Sustainable Ruminant Nutrition and Evaluation of Animal Product Quality

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The increasing demand for sustainable livestock systems requires innovative strategies to reduce feed costs and environmental impacts while maintaining product quality. Agro-industrial by-products represent a promising resource within circular bioeconomy frameworks. Artichoke (*Cynara scolymus* L.) processing generates substantial residues rich in fiber and bioactive compounds, which may be valorized as ruminant feed. This study investigates the use of artichoke by-products in ruminant diets through silage production. Chemical composition, fermentation characteristics, and silagability parameters will be evaluated. The effects on dairy quality will be assessed through detailed analysis of milk composition, including fat, protein, and fatty acid profile. Cheese produced from the obtained milk will be examined for physicochemical properties, coagulation behavior, and oxidative stability. The inclusion of artichoke by-products in ruminant feeding systems is expected to enhance resource efficiency and support sustainable livestock production. The presence of bioactive compounds may influence milk composition and improve the nutritional and technological quality of dairy products, particularly cheese. This approach contributes to waste valorization and aligns with current priorities in sustainable agri-food systems and dairy innovation.

Poster #3

Top-down and bottom-up processes in a crowded world: disentangling predator–prey interactions in human-dominated landscapes

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Disentangling the relative roles of top-down and bottom-up processes in shaping ecological communities remains a key challenge in ecology. Apex predators have long been seen as major drivers of trophic regulation, but growing evidence shows these dynamics are context-dependent and increasingly mediated by human activities. In modern landscapes, humans act as pervasive ecological agents, influencing resource availability and predation risk. As a result, predator–prey interactions can vary across contexts, yet integrative empirical approaches remain scarce. This PhD project aims to investigate how human activities – e.g., hunting and livestock practises - modulate species interactions in the mammalian communities through a multidisciplinary framework. Using two areas with comparable communities but contrasting wolf presence, we would expect that humans negatively affect all trophic levels, mainly the apex predators', lowering their top-down effect on mesopredators and prey. Moreover, we would expect that this may vary under different ecological contexts and levels of human pressure. Ungulate foraging behaviour will be used to assess the "landscape of fear" linking browsing patterns and diet quality to perceived risk from predators and humans. Trophic interactions will be reconstructed through diet analyses. Spatial patterns of occurrence will be evaluated using large-scale camera trapping, assessing how species' space use responds to interspecific interactions and human disturbance. These approaches will be integrated using structural equation modelling to disentangle causal pathways and quantify the relative importance of top-down and bottom-up processes. By combining multiple methods, this project will provide a holistic understanding of trophic dynamics in human-modified systems. It explicitly incorporates humans as components of food webs and evaluates their role in mediating predator–prey relationships. The expected outcomes will advance ecological theory on multitrophic interactions providing key implications for wildlife management and conservation.

Poster #4

Legacy and Vanguard: Valorization of Purebred Spanish mare's milk as an indigenous resource for sustainable rural development

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While traditionally viewed as recreational, breeding Purebred Spanish Horses (PRE) is a cultural and economic cornerstone in Castilla-La Mancha, Spain, with historically underutilized productive potential. Mare's milk is an "albumin-rich milk" offering superior digestibility, closely resembling human milk. It contains exceptional levels of lysozyme and lactoferrin, presenting a strategic opportunity for the bioeconomy through high value-added products. The main objective of this thesis is to enhance the commercial activity of PRE farms by studying the natural microbiota of mare's milk and developing fermented dairy products. Specific objectives include isolating indigenous lactic acid bacteria (LAB) with probiotic potential, developing fermented milks (kefir or kumis type), and evaluating their bioactivity.
In this initial phase, biotechnological feasibility was validated through successful kefir production from PRE mare's milk, optimizing fermentation kinetics despite its low casein concentration. Furthermore, 16S rRNA gene sequencing successfully isolated native LAB strains, consolidating a regional genetic reservoir for future probiotic starter cultures.

Physicochemical characterization revealed that PRE mare milk is slightly alkaline (pH 7,3) with high lactose (6.47%) and low fat (0.17%) and protein (1.65%) contents, with a mean content of total solids of 8.56%. The milk showed excellent hygienic quality with a total mesophilic count of 4.37 $\log^{10}$ CFU/mL and 9.8×10^3 somatic cells/ml. Microbiological analysis identified a diverse microbial profile, highlighting species with probiotic potential like *Lb. paracasei* and *Pediococcus pentosaceus*.

Poster #5

Algae-based polymers for sustainable agricultural practice

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Seaweeds are receiving increasing attention in the European Union as promising resources to support sustainable production and valorisation into biostimulants and other high-value products for agriculture and industry. Growing interest reflects efforts to expand the blue bioeconomy and meet sustainability goals; seaweeds rich in polysaccharides and phytohormones are promising biopolymer sources for agriculture. Their high carbohydrate content enables extraction of polymeric hydrogels three-dimensional cross-linked hydrophilic polymers with high water-holding capacity. In agriculture, these biodegradable hydrogels reduce irrigation, boost seed germination, promote plant growth, and enrich soil. Since each genus produces specific polymers, seaweeds offer diverse biopolymer potential; this project aims to produce, characterize, and compare polymeric hydrogels for agricultural use from native Adriatic species Gracilaria gracilis and Ulva laetevirens and the non-native Rugulopteryx okamurae within a sustainable biorefinery approach. To optimize the benefits and functionality of the extracted polymer hydrogels, a thorough biochemical characterization of the starting seaweed biomass is required. This includes proximate and ultimate analyses using LECO TGA 801 and LECO CHNSO 628, structural carbohydrate analysis by HPLC, plant growth regulator and phenolic profiling by HPLC-MS, and lipid composition analysis by GC-MS. Hydrogels will be extracted using green techniques, specifically microwave-assisted and ultrasound-assisted extraction. The resulting hydrogels will then be characterized for plant growth regulator content, sugar composition, porosity, and surface area using a 3P Instruments analyzer, and their morphology and elemental composition will be examined by SEM-EDX. In the longer term, further in-depth analyses will be conducted to evaluate the agronomic potential of the extracted hydrogels, and a green, scalable method for polymer hydrogel extraction will be proposed. In addition, the residual seaweed biomass will be characterized for the recovery of further high-value products, in full alignment with the principles of sustainability and the circular economy.

Poster #6

Study of bio-based phase change materials

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The transition to sustainable energy systems requires advanced solutions to optimise energy resources. In this context, developing thermal storage systems with innovative materials is increasingly vital. Specifically, using Phase Change Materials (PCMs) in Latent Heat Thermal Energy Storage (LHTES) systems offers high efficiency, high energy density, and a long operational life. However, commercial fossil-based PCMs have significant environmental and final-waste issues. Consequently, there is a necessity to transition to bio-based PCMs derived from agricultural waste, vegetable oils or natural fats. These materials are renewable, biodegradable, and non-toxic, while exhibiting thermodynamic properties analogous to traditional PCMs.

A full analysis of PCMs will be conducted using an approach that combines both experimental and numerical methods The experimental tests are designed to characterise the thermophysical properties of bio-based PCMs and their physical behaviour in LHTES systems. In parallel, numerical analysis will be carried out using two different methods: lumped codes and CFD simulations.
The first phase of the study will involve identifying the most suitable bio-based PCMs. The second step will be an experimental characterisation of the selected PCMs. This will enable us to determine their thermophysical properties and operational lifespan. Subsequently, their performance will be compared with that of a standard fossil-based PCM to assess their competitiveness. Lumped models are used to integrate PCMs with their corresponding properties into various fields of application in a simple and flexible way. CFD simulations are utilised to conduct a detailed study of heat exchange with the external environment and heat accumulation within the PCM, as well as to optimise the geometries of LHTES systems and the tank containing the PCM.

Poster #7

A first approach to combine AI and Predictive Microbiology

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This study analyzes the application of predictive microbiology as a strategic tool for risk assessment and the optimization of food shelf-life, focusing on a first approach for the development of a unified third-level predictive model capable of estimating the behavior of *Listeria monocytogenes* based on multiple environmental and technological variables.
The methodology initially involved a simulation phase conducted using two reference software programs, FSSP and PMP, based on a multivariate experimental design (DoE).
Variables such as temperature, pH, NaCl concentration, nitrite, lactic acid, and initial microbial load were analyzed. The data obtained were processed using the Gompertz equation to extract kinetic parameters, mainly t_{100}, which represent the time required for a 100-fold increase in the microbial population.
Multivariate statistical analysis, conducted through Pareto chats and response surfaces, highlighted that temperature and pH are the primary determinants of growth rate, while nitrite exerts the most significant inhibitory effect. In the final phase, the integration of data through computational algorithms and the support of generative artificial intelligence allowed for the comparison of various regression models.
The non-linear logistic model was selected as the most effective due to its robustness and biological consistency, proving superior to purely mathematical models like Random Forest in its ability to avoid aurealistic extrapolations. The results confirm that an integrated approach combining predictive software and advanced statistics serves as a fundamental support for designing HACCP self-control systems and for the proactive management of food safety within the Industry 4.0 framework.

Poster #8

Sustainable Food Packaging: Evaluating Bio-Based Alternatives to Expanded Polystyrene

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The cold chain packaging sector relies heavily on expanded polystyrene (EPS), a petroleum-derived material with superior thermal insulation. Yet EPS persists for centuries, fragmenting into microplastics and leaching styrene, raising critical regulatory and food safety concerns. Any viable replacement must meet equivalent thermal performance, structural stability, moisture resistance, food contact safety, and scalability within existing cold chain infrastructure. Building on multidisciplinary approaches, the PhD project aims to design

and develop innovative bio-based materials as enablers to substitute EPS and to enhance impact on the food chain. A critical review of the state-of-the-art has been performed to identify the most promising solutions in sustainable packaging manufacturing and to prepare a first review paper. Different bibliometric approaches and software have been utilized. Representative emerging approaches include the development of polysaccharide-derived aerogels, seaweed-based bio-foam, bio-based phase changing materials, and mycelium seaweed hybrid bio-composites considered for their thermal insulation, barrier performance, thermoregulatory capacity, structural robustness, and end-of-life composability. The obtained information will feed the design of experiments developed in collaboration with Innova Srl, encompassing technical, economic, safety, and sensory aspects of food packaging. We scrutinized the existing state-of-the-art and relevant international patents in the field of sustainable packaging as a replacement for EPS. The obtained results allow us to depict a clear and robust representation of current advancement and critical gaps in sustainable packaging manufacturing. This information, in collaboration with the Company Innova, will feed into the design of the experimental activities to be performed.

Poster #9

Analysis of Consumer willingness to pay for milk derived from cows fed on agricultural by-products

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In recent years, the concept of "circular economy" has gained support in the majority of countries to reduce waste generation and to manage food by-products. However, preventing food loss generation is the first step towards minimising it; meanwhile, reusing it for human consumption and/ or animal feed is the optimum alternative. Yet, animal feed may represent the most efficient way because it needs minimal infrastructure and transforms agro-industrial by-products into high-protein feed. Since this production process deviates from conventional feeding practices, products derived from cattle fed on by-products can be classified as novel foods under Regulation (EU) 2015/2283. In this context, this research aimed to understand how consumers perceive products derived from cattle fed on by-products, particularly milk, and to examine how additional information (e.g., climate change mitigation) shapes consumer decision-making, compared to a basic factual description of the feed. A structured questionnaire was developed to evaluate consumer perceptions and Willingness to Pay (WTP), which was administered to a sample of 1800 Italian consumers through a specialized survey agency, comparing a control version (C) with an experimental version (T1) that emphasised the environmental sustainability benefits. However, to assess consumers' WTP, a price scale for milk with €0.10/L intervals was created, starting at €0.60/L. Respondents were asked to indicate whether they would purchase the specified quantity of product at each proposed price range. The results show that providing information (T1) has a positive influence on WTP. Key drivers of WTP include perceived nutritional value, environmental sustainability, income, frequency of milk consumption, and safety perceptions. However, neophobia has a negative effect on WTP. Despite pro-environmental attitudes, actual WTP remains below the market price, highlighting a discrepancy between awareness and action. Targeted communication on tangible benefits is needed.

Poster #10

The role of certification in smallholder-based agricultural value chains in Cambodia

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Agri-food value chains are increasingly driven by quality and safety criteria, given the growing demand for safe, traceable, and sustainably produced food products. Certification systems, such as organic and GlobalGAP, are critical tools in defining market access, the organization of value chains, and the allocation of economic gains (Henson & Jaffee 2008; Tennhardt et al. 2024). As agri-food systems shift toward formalized supply chains, certification is critical in tracking and rewarding agri-production (Enthoven & Broeck 2021; Meemken et al. 2021). Despite this, participation is remarkably disparate, with low levels among small farmers (Reich & Musshoff 2025; Hoang 2020).

The research uses a theory-driven sequential exploratory mixed-methods design, integrating the Theory of Planned Behaviour, Transaction Cost Economics, and Social Capital Theory. Phase I comprises semi-structured interviews and focus groups to investigate trust, leadership, and hidden transaction costs. Phase II consists of a quantitative study employing Structural Equation Modelling to evaluate the theoretical framework using SmartPLS software. A target sample size of 400 farmers will be sought, determined using the Cochran Formula. Findings from Asia suggest farmers are reluctant to adopt certification despite consumer demand and market advantages (Reich & Musshoff 2025; Tennhardt et al. 2024).

A poor understanding remains regarding how social capital influences collective adoption of certification in cooperatives (Rizal & Nordin 2022). This research aims to generate empirical evidence on farmers' decision-making regarding food quality and safety certification. The findings will be useful in shaping certification and cooperation development policies and improving the understanding of certification as a collective process.

Poster #11

Bio-insecticides and environment safe strategies for Integrated Management of Invasive Sap-sucking Insects in European Agroecosystems

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Climate change and globalization have accelerated the spread of invasive and quarantine pests critical for European agriculture and the excessive use of chemical insecticides has caused widespread issues, including insect resistance, environmental contamination, and toxic effects on beneficial organisms. Furthermore, the EU has progressively restricted the number of approved active compounds, thereby driving research towards eco-friendly alternatives. In this context, the effectiveness of plant-based formulations and entomopathogens, as assessed via lab, semi-field and field trials, will be evaluated in the control of harmful pests (i.e. *Bemisia tabaci* Gennadius, *Phenacoccus solenopsis* Tinsley, *Empoasca vitis* Goethe, *Trioza erytreae* Del Guercio).

In parallel, the same formulations will be tested to highlight any potential side effects on beneficial arthropods via bioassays (i.e. spray, residual, contact, etc.) and, throughout the electrical penetration graph analysis, will be also investigated the interactions between the selected compounds and the target pests. In addition, the ecotoxicological impact on bioindicator organisms will be evaluated. This research addresses the urgent need for sustainable integrated pest management (IPM) strategies. Expected outcomes include: (i) efficacy evaluation of natural-based insecticides against the considered pests; (ii) analysis of side effects on non-target organisms using selectivity criteria; (iii) improved IPM protocols combining bioinsecticides with

natural enemies; (iv) mechanistic insights into bioinsecticide-pest interactions through EPG analysis. The results will serve to develop harmonized IPM protocols, reducing chemical dependency while protecting ecosystems.

Poster #12

Host-mimicking media unlock VOCs-driven biocontrol in *Aureobasidium pullulans*

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Aureobasidium pullulans is a ubiquitous fungus widely recognized for its biocontrol potential, due to its ability to produce a wide range of bioactive volatile (VOCs) and non-volatile metabolites active against plant pathogens. Among susceptible crops, strawberry production relies heavily on chemical pesticides to control major pathogens such as *Botrytis cinerea*. In contrast, the closely related woodland strawberry exhibits enhanced resistance, likely resulting from a combination of genetic traits and the protective action of associated microbial communities, including *A. pullulans*.

This study investigated the VOCs production in three woodland strawberries-derived *A. pullulans* strains across Czapek-Dox, YPD and a host-mimicking strawberry medium. The strains were previously classified for their biocontrol efficacy against *B. cinerea* through dual culture assay. Antagonistic activity was assessed by measuring pathogen growth after three days of VOCs exposure, and VOCs profiles were analyzed by SPME-GC-MS. The results revealed a strong influence of growth substrate on VOCs production and anti-fungal activity. The highest inhibition was observed on a strawberry-like medium, while the lowest effect occurred on Czapek-Dox medium. This trend was consistent across all tested strains, with only minor differences in overall efficacy despite detectable variations in their metabolic profiles. GC–MS analysis indicated that VOCs blends were mainly composed of alcohols, esters, ketones, and terpenoid-related compounds. Overall, VOCs production in *A. pullulans* is strongly shaped by growth conditions, with amino acid–rich media enhancing metabolite diversity and host-mimicking conditions unlocking full biocontrol potential.

(Wednesday, 10 June 2026)

Poster #13

Spatial insights into nutrient interactions: the interplay between iron and nitrogen form in grapevine

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Iron (Fe) deficiency is a major limitation in viticulture, especially in calcareous–alkaline soils. Tolerant grapevine rootstocks (e.g., Fercal) are widely used due to their ability to activate Fe acquisition mechanisms. This study investigated the interplay between nitrogen (N) form and Fe nutrition, with spatial resolution of nutrient distribution and molecular responses in roots and leaves.

Grapevine rootstocks (1-year-old Fercal) were hydroponically grown for two weeks, with N supplied in the form of nitrate or ammonium–nitrate and under different Fe levels (10, 50, 100 µM Fe-EDTA). After two weeks, some plants were exposed to complete Fe deficiency (−Fe), while others were maintained at the same Fe concentration as before. Ammonium–nitrate nutrition mitigated Fe deficiency symptoms, resulting in higher Fe accumulation in roots and leaves compared to nitrate alone. This was associated with reduced chlorosis, improved chlorophyll retention, and increased root biomass under low Fe conditions. Enhanced ferric chelate reductase activity further indicated an increased capacity for Fe remobilization.

Under low Fe availability (10 µM/−Fe), nitrate-fed plants accumulated higher levels of K, Mg, Mn, P, Cu, and S, while Zn increased across all treatments. Spatial ionomic analyses using micro-X-ray fluorescence at the PETRA III P06 beamline (DESY, Hamburg) revealed tissue-specific distribution patterns, including distinct Mn localization, suggesting that nutrient homeostasis depends not only on total concentration but also on precise spatial arrangement within tissues. To better characterize the molecular components underlying elemental distribution in roots, we are developing a spatial transcriptomics protocol to map transcript localization across the root epidermis, cortex, and vascular tissues.

Overall, this study highlights the importance of spatial localization in understanding plant nutrient interactions. The integration of spatially resolved approaches offers a valuable framework to link elemental distribution (Fe, K, Mg, Mn, P, Cu, S, Zn) with underlying biological processes, providing new perspectives on Fe deficiency tolerance in grapevine.

Poster #14

Environmental toxicity of tramadol and paracetamol mixture in aquatic model organisms

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The increasing presence of pharmaceuticals in aquatic environments raises concerns about their ecological impact. Analgesics such as tramadol and paracetamol are widely used and frequently detected in surface waters. While their individual effects have been partially described, the toxicity of their mixtures and underlying mechanisms in aquatic organisms remain insufficiently understood. This study evaluates the toxicity of tramadol and paracetamol, applied as pure compounds and in mixture (0; 0,1; 1, 10; 100; 1000 µg/L), using three model organisms representing different trophic levels: *Danio rerio* (OECD 236 FET test), *Lemna minor*, and *Aurelia aurita*. A 96-hour (*D. rerio*), 14 (*L. minor*) and 90 days (*A. aurita*) exposure will be conducted to assess survival, growth, behaviour, and morphological changes. Gene expression and histopathological analyses will be conducted on zebrafish embryos. Following genes are planned to be analyzed: *CYP1A*, *SOD*, *GPX*, *GR*, *CAT*. Photosynthetic efficiency will be assessed in *L. minor*. Statistical analysis will be conducted using ANOVA with Tukey's post-hoc test ($p < 0.05$).

The study provides a comprehensive assessment of mixture toxicity of commonly detected analgesics under environmentally relevant conditions. Results are expected to improve understanding of synergistic or additive effects of pharmaceuticals in aquatic systems and highlight risks not evident from single-compound studies. The findings contribute to environmental risk assessment frameworks and may support the development of improved monitoring strategies and more sustainable pharmaceutical management.

Poster #15

Effects of thermal stress and nutrition on the healthh of *Apis mellifera* under laboratory conditions

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The honey bee (*Apis mellifera* L.) plays a fundamental role in favour of plant biodiversity and crop production. Rising temperatures associated with climate change pose a significant threat to the survival of honey bees, since extreme environmental heat can hamper the capacity of bees to maintain the optimal nest temperature of 34.5 °C. Understanding these effects is crucial for predicting climate change consequences and adopting effective mitigation strategies.
Caged adult bees (hybrids of *A. m. ligustica* and *A. m. carnica*), provided with water and sugar candy, were exposed to three different temperatures: 34.5 °C (control), 37.0 °C (supra-optimal temperature 1), and 39.5 °C (supra-optimal temperature 2). Survival as well as water and food consumption were monitored daily. The relative abundance of Deformed Wing Virus (DWV) and the expression of two key molecular markers (i.e. HSP90 for thermal stress and ILP1 for nutritional status) were also assessed.
Median survival decreases as temperature increases, likely due to dehydration and oxidative stress. High temperatures significantly increased water consumption while reducing sugar intake. The reduced food consumption and differential ILP1 expression may be linked to the reduction of metabolism in order to limit heat production, whereas increased water intake likely compensates for higher transpiration. Elevated HSP90 expression contributed to reducing DWV infection, but did not mitigate the higher mortality caused by thermal stress. Future studies will be carried out to gather data about the response to stressing temperatures and to assess the role of pollen in the modulation of such response.

Poster #16

From waste to resource: integrated production of antimicrobials and biomaterials from Apulian Kombucha fermentation

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Kombucha is a functional beverage fermented by a Symbiotic Culture of Bacteria and Yeast (SCOBY). This PhD project investigates the replacement of traditional kombucha substrates (tea and sugar) with agro-industrial by-products as a bio-based strategy to enhance sustainability. We aim to map the consortium's adaptability and metabolic profiles across different by-products, evaluating the potential for producing the beverage and bacterial cellulose (BC) within a circular economy.
Characterization will integrate culture-dependent techniques with molecular tools, such as qPCR and NGS, to monitor microbial community dynamics throughout the process. The antimicrobial activity of the SCOBY and isolated strains will be screened against human pathogens, food-spoilage agents, and phytopathogens. Finally, the BC, a fermentation by-product, will be tested for non-food applications, such as compostable tableware, biomedical materials and bioactive compound carriers.
This multidisciplinary approach valorizes regional waste streams as high-value biotechnological resources.

We aim to characterize microbial interactions that optimize bioactive metabolite production and to isolate novel biocontrol agents as sustainable alternatives to synthetic ones. Upcycling BC into biodegradable prototypes aligns with the ecological transition, transforming kombucha-based fermentation into a versatile, zero-waste biotechnological platform.

Poster #17

Impact of NDF and lipid dietary contents on enteric methane emissions of dairy cows measured in a multi-herd study

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Livestock systems are considered one of the responsible of the GHG emissions and consequent global warming. Several potential dietary actions have been proposed to reduce emissions and those based on low forage and high lipid dietary contents (e.g. low NDF–high EE) do not use additives and can be realized by modulating traditional feed source. This study compared productive diets with different NDF and EE contents on methane emissions of lactating cows at farm level. Our experiment is a multi-herd study involving 14 commercial dairy farms located in the plane area of the Friuli Venezia Giulia Region (Italy). The herds were divided into two groups based on dietary NDF and EE content of lactating cows' diets: high NDF–low EE (42.5 and 2.7% DM) and low NDF–high EE (34.6 and 3.6% DM). Diets for dry cows and pregnant heifers were forage-based and did not differ in chemical composition. The individual methane emission was measured by a portable laser detector on a representative sample of lactating cows, dry cows and pregnant heifers in each herd (in total 342, 134 and 230 females, respectively). The herds with low NDF–high EE diets had a higher DMI (24.9 vs 22.4, kg) and were more productive (35.4 vs 26.3 kg ECM/d). Methane emissions were about 100 g/d higher in high NDF– low EE herds (426 vs 320 g/d) and larger differences were calculated per unit of intake or milk produced. No differences were observed in methane emissions of dry cows and pregnant heifers. Our on-farm study shows that dietary NDF and EE influence methane emissions in lactating cows, and that simple assessments can detect farm-level differences. Similar results in non-productive groups support these findings. Overall, this study indicates a practical perspective to rank commercial dairies for their potential emission of methane using an easy-to-use and affordable technology.

Poster #18

Effects of *Hericium erinaceus* Supplementation on Neurocognitive Functions in the Context of Healthhy Aging

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Age-related cognitive decline is a major public healthh concern, increasing interest in safe strategies for healthhy aging. *Hericium erinaceus* (Lion's Mane) is a medicinal mushroom with neuroprotective potential. Its bioactive compounds stimulate nerve growth factor (NGF) and may influence brain-derived neurotrophic factor (BDNF), supporting neuronal growth and reducing neuroinflammation. This study evaluated its effects on cognitive function in healthhy adults aged 50 and older.

A literature review was conducted using PubMed, MDPI, Frontiers, Scopus and Google Scholar, including English-language studies (2020–2026). Keywords included "cognitive function," "healthhy aging," "*Hericium erinaceus*" and "neuroprotection." Findings suggest moderate cognitive benefits, particularly in memory and executive functions, while effects on attention and processing speed are less consistent. Doses ranged from 1,000 to 3,200 mg per day over 6 to 24 weeks, with good tolerability.

These results indicate potential as a supportive approach to maintaining cognitive healthh. However, small sample sizes and methodological variability limit the conclusions. *Hericium erinaceus* shows promise for supporting cognitive function in healthhy aging, but further high-quality studies are needed.

Poster #19

Introduction of non-thermal technology into the nuts supply chain: use of pulsed light to improve the stability of almonds and pistachios

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Nuts have gained an important place in the diet over the last twenty years. In general, raw nuts are consumed whole, fresh or roasted, or used in spread or paste, or as ingredients in other food products. Thermal treatments, such as drying or roasting, cause water vaporization, changes in the chemical and physical properties of kernels, and enhance the sensory attributes. But heat treatments also lead to the loss of bioactive compounds and the formation of unpleasant and toxic products from the Maillard reaction. Innovative technologies are developed to replace conventional roasting with an environmentally friendly on, such as microwave or infrared; the last one is the only that showed an alternative. Pulsed light (PL) technology is considered a non-thermal treatment that uses short-duration and high-power light pulses and is commonly used to decontaminate food surface by DNA damaging and heating.
The project aims to use a non-thermal treatment for both drying and roasting nuts to stabilize the products, preserve nutritional and enhance sensorial properties, limiting the degradation of bioactive compounds. PL treatment will be applied to almonds and pistachio seeds, and the effect of treatment will be evaluated on microbial load, qualitative and sensory parameters and lipid stability. Afterwards, PL treated nuts will be used to produce a paste and spreadable, and shelf-life study will be carried on.
Thanks to the use of an innovative, non-thermal technology to replace heat treatments, the project's implementation promises to yield a stable product, whose nutritional and sensory properties remain intact.

Poster #20

The Role of Land Consolidation Associations in Enhancing Mountain Attractiveness

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Mountain areas across Europe face structural challenges such as depopulation, land abandonment, and the decline of agro-silvo-pastoral activities. Land Consolidation Associations (ASFO) have recently emerged in Italy as governance tools aimed at restoring land management and supporting the regeneration of marginal territories. This study investigates the role of ASFO in enhancing the attractiveness and resilience of mountain areas, focusing on ASFO Erbezzo in Stregna (FVG).
The research adopts a mixed-methods approach combining a quantitative survey with qualitative interviews conducted among local stakeholders and residents. The analysis explores perceptions of ASFO's territorial, economic, and social impacts, with particular attention to landscape restoration, land management practices, and community participation. Results highlight appreciation for ASFO's contribution to landscape recovery, improved land management, and renewed engagement in agro-silvo-pastoral activities. Respondents reported increased safety, higher property values, and revitalization of territory.

The initiative also strengthened social cohesion and collective participation, although challenges remain, including uneven involvement, limited local services, and reliance on a small group of active members. While ASFO contributes to territorial attractiveness and may support the arrival of new residents, structural constraints such as housing shortages and weak local economic opportunities remain significant barriers. Overall, collective land management initiatives such as ASFO support the sustainable regeneration of mountain areas and the objectives of the 2030 Agenda.

Poster #21

Effects of insect mass-rearing by-products on tomato herbivorous pests

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Global food security depends on effective pest management. Herbivorous insects cause significant yield losses, while synthetic pesticides remain the main control strategy despite their negative environmental and healthh impacts. Future agriculture requires increased productivity with reduced pesticide inputs. Insects are a sustainable protein source, but their farming produces by-products such as insect frass. Frass contains microorganisms and bioactive compounds with potential plant-protective properties; yet, research has mainly focused on its fertilizing role.

This study investigates the effects of by-products from the mass rearing of *Tenebrio molitor* and *Hermetia illucens* on tomato pests and their natural enemies. We focus on the identification and characterization of different frass types and their associated microbiomes, their role in inducing direct and indirect plant defenses against pests, the understanding of the underlying molecular and chemical mechanisms, and the evaluation of their plant-protection potential under greenhouse conditions.

The research will expand sustainable pest management tools and reduce reliance on pesticides. It will enhance our understanding of plant-herbivore interactions and support the development of environmentally friendly strategies based on microorganisms and bioactive compounds.

Poster #22

Biology and ecology of *Culex pipiens* biotypes in Greece

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The *Culex pipiens* complex is one of the most widespread and epidemiologically important mosquito groups in Greece, acting as a major vector of pathogens such as West Nile virus (WNV). In Europe, *Cx. pipiens* occurs in two biotypes—*pipiens* and *molestus*—which are morphologically identical but differ markedly in ecology, physiology, and behavior. The *pipiens* form is eurygamous, anautogenous, ornithophilic, and enters reproductive diapause during winter, while the *molestus* form is stenogamous, autogenous, mammalophilic, and remains active year-round. The two forms frequently coexist and hybridize, producing individuals with mixed traits that may act as efficient bridge vectors, facilitating WNV spillover from birds to humans.

This PhD project investigates the biology and ecology of *Cx. pipiens* biotypes and hybrids in Greece. Laboratory experiments will examine how abiotic and biotic factors—such as temperature, photoperiod, and nutrition—shape key traits including autogeny, diapause induction, lipid reserves, reproductive output, and host-seeking behavior. In parallel, extensive field sampling combined with molecular identification will map the geographical distribution of biotypes and hybrids across different regions of Greece and explore associations with environmental variables. By integrating physiological, ecological, and molecular data, the

study aims to clarify the mechanisms underlying biotype differentiation and hybridization, improve understanding of seasonal population dynamics, and assess their implications for WNV transmission risk. The findings will support more effective vector surveillance and targeted mosquito control strategies.

Poster #23

Exploring the grapevine microbial endosphere to identify potential biocontrol agents against Flavescence dorée

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Flavescence dorée (FD) is one of the most concerning grapevine diseases in Europe. The microbiota of the grapevine endosphere includes prokaryotic and eukaryotic endophytes, which may establish different relationships with the host plant, i.e. symbiotic or pathogenic. A sustainable strategy as a promising tool against FD could be the use of grapevine endophytic microorganisms with known biocontrol or inducing resistance properties. To isolate putative biocompetitors, three diverse groups of grapevines have been investigated based on different FD-phytosanitary status: healthhy, symptomatic and recovered. In October 2025, wood chips have been collected from trunks and processed in order to isolate both gram-positive and negative bacteria. In total, nearly 250 bacteria have been isolated from the wood samples and their molecular identification is ongoing. After identification, bacteria will be selected for *in vivo* tests, to evaluate their potential as biocontrol agents against FD.
Moreover, on the same wood samples the interaction between grapevine endophytic bacteria and fungi with FD phytoplasma will be explored using next-generation Illumina sequencing. In particular, the endomicrobiota associated with grapevine wood will be characterized with a meta-barcoding approach to investigate and compare the structure and composition of bacterial and fungal community of the three identified groups.

Poster #24

Proposed Research Framework for the Integration of Flow Cytometry and Bioinformatics

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This research is part of a broader scientific project in biotechnology. Flow cytometry is a widely used tool as it enables rapid and precise analysis of phenotypic and functional characteristics of cells. When combined with bioinformatics approaches, it allows analysis of complex datasets and identification of patterns, difficult to detect, using classical methods. Despite significant progress in this field, many aspects of cell populations and their roles in various biological processes remain insufficiently explored. The aim of this research is to investigate the potential applications of flow cytometry in combination with bioinformatics analysis.
This study will be conducted as an observational or experimental study, depending on the availability of samples within the project. The analysis will include samples of biological material or suitable cell lines. Flow cytometry will be used, applying fluorescently labelled antibodies to detect specific cellular markers. The data will be analysed using bioinformatics tools, including methods for data processing, visualisation, and interpretation of multidimensional datasets. Statistical analysis will involve descriptive methods and appropriate tests for comparing different groups. As this is an early-stage doctoral research, this work is expected to provide a foundation for further improvement of the methodology and a more precise definition of the experimental design. It is assumed that integrating flow cytometry and bioinformatics approaches will offer deeper insight into the structure and function of the analysed cell populations.
This research represents a step towards the development of integrated approaches in modern biotechnology.