



Spring School “Rethinking plant breeding for a zero-pesticide agriculture”



Bordeaux, 14-15 May 2024

Spring School COST TOP-AGRI-NETWORK “Rethinking plant breeding for a zero-pesticide agriculture” Bordeaux 13-15 May 2024

European Research Alliance Towards Chemical Pesticide-free Agriculture

- 3 preparatory workshops (Paris, Oct 2018; Berlin, May 2019; Helsinki, Oct 2019)
- Signature of the MoU (Paris, Feb 2020)
- Annual General Assembly
 - Next: 22 May 2024, Zagreb

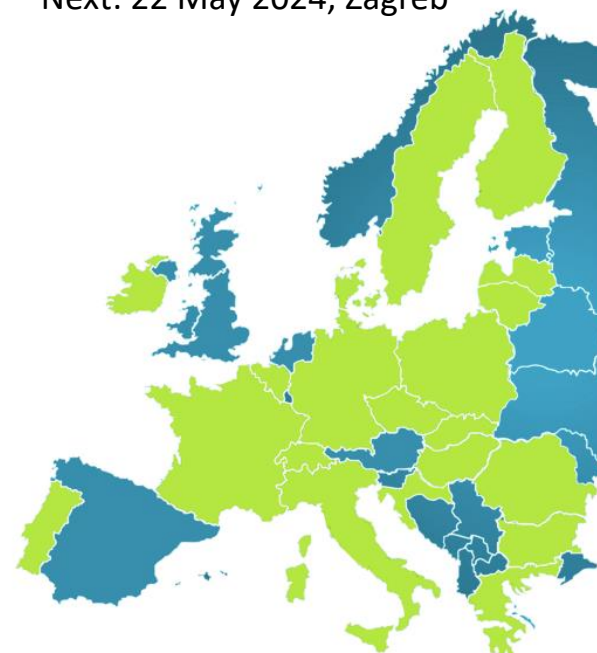
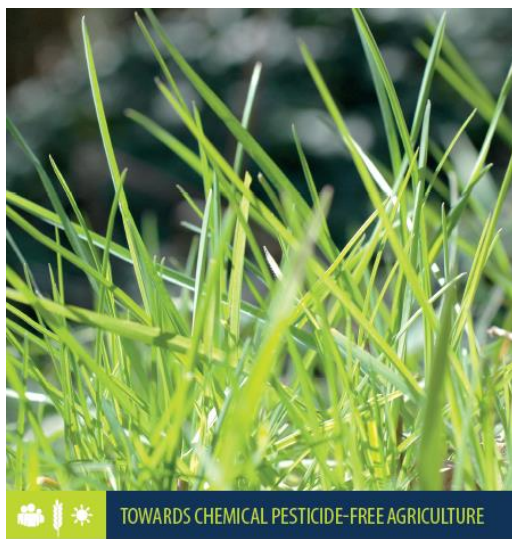


Today

- 37 organisations
- 21 countries

Achievements

- An increasing scientific community
- Contribution to a foresight study published in March 2023
- A Cost project approved (CA 21134)
- A CSA approved (Fortuna)
- A Life-PLP approved (Agrowise)



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Towards zero Pesticide AGRiculture : European Network for sustainability (TOP-AGRI-Network)

COST ACTION 21134

Action Chair: Christian Huyghe (France)

Action Vice-Chair: Renata Bazok (Croatia)

WG1 leader: Mugur Jitea (Romania)

WG2 leader: Danilo Christen (Switzerland)/Christian Andreasen (Denmark)

WG3 leader: Dimitris Tsitsigiannis (Greece)/Sevgi Marakli (Turkey)

WG4 leaders: Riccardo Bommarco (Sweden)/Kathrin Grahmann (Germany)

WG5 leader: Silke Dachbrodt (Germany)/Federic Leoni (Italy)

Grant Awarding Coordinator: Elisabete Figueiredo (Portugal)

Starting 1st November 2022

Now: 316 participants



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Setting the scene: identifying research gaps and needs



Transformation and transition steps towards zero pesticide based value chains



Breakthroughs in biological research offering new prospects in zero pesticide agriculture



Redesigning cropping systems for zero chemical pesticide use based on functional biodiversity and agroecological principles



Community building, dissemination and communication

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WG3. Breakthroughs in research offering new prospects in zero pesticide agriculture

Let's assume that chemical pesticides are no longer an option
→ We'll be more creative!

Research & innovation on agroecological methods (agronomy, breeding, biocontrol & biostimulation, automatics & digital tools, policies, etc.) can be revisited in the light of the « zero-pesticide paradigm ».

What about breeding in zero-pesticide systems and area?

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Workgroup planned activities (& deliverables)

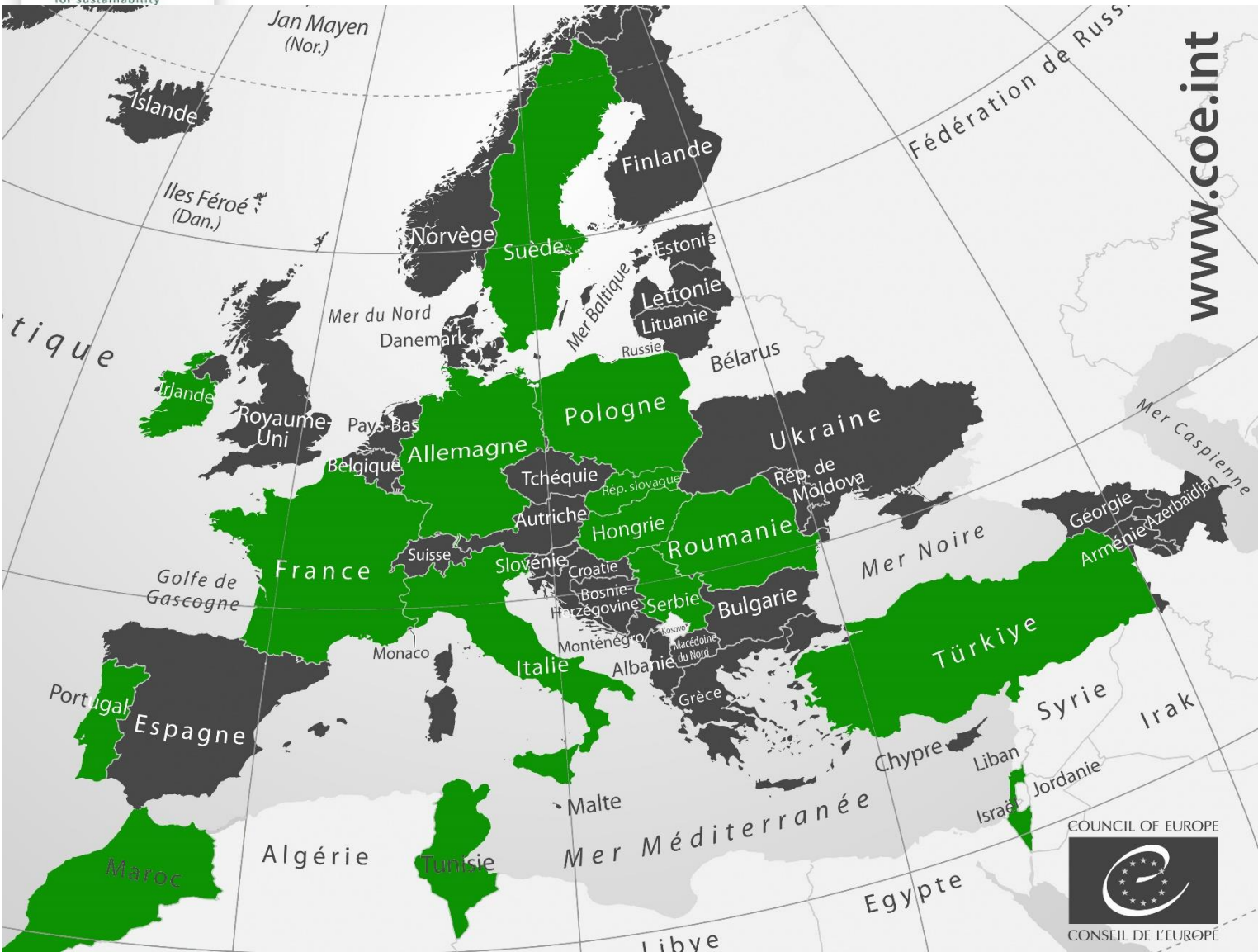
Monthly Webinar

Annual face-to-face event

Short-Term Scientific Missions (STSM)

Training schools

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www.coe.int



Welcome !
Where are you working ?

Country	Number of participants
France	7
Germany	5
Portugal	3
Romania	3
Serbia	3
Turkey	2
Hungary	1
Ireland	1
Israel	1
Italy	1
Morocco	1
Poland	1
Slovakia	1
Sweden	1
Tunisia	1

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Tuesday 14th May (location: Auditorium INRAE)

- **8:30 – 9:15**. Welcome of participants & introduction of the training school programme
- **9:15 – 10:00**. Flash talks presentation – Session 1
- **10:00 – 11:00**. Introduction by Christian Huyghe (INRAE)
- **11:00 – 11:30**. Break
- **11:30 – 13:00**. Breeding plant holobionts: how plant microbiomes could be integrated in breeding strategies (Patrice This and [Corinne Vacher](#), INRAE)
- **13:00 – 14:00**. Catered lunch



Christian Huyghe



Patrice This



Corinne Vacher

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Tuesday 14th May (location: Auditorium INRAE)

- **14:00 – 15:00.** "Exploiting of plant genetic resources for resource-efficient and environmentally friendly crop production" (Andreas Stahl, Julius Kuehn Institute)
- **15:00-15:30.** Flash talks presentation – Session 1
- **15:30 – 16:00.** Bus to Chateau Luchey-Halde
- **16:00 – 18:30.** Visit of [Chateau Luchey-Halde](#) and tasting (Guilherme Martins, Bordeaux Sciences Agro)
- **18:30.** Return (in Bordeaux downtown “Arts et Métiers” stop; or INRAE)
- **From 20:00.** Dinner in Bordeaux (optional). Meeting point at the urban ecosystem Darwin ([87 Quai des Queyries](#) **Canceled : we are looking for a new place. Stay tuned !** Bordeaux »]
meeting is booked, but the place is quite big



Andreas Stahl



Guilherme Martins





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Wednesday 15th May (**location: Auditorium ISPA**)

- **8:30 – 8:50**. Poster installation
- **9:00 – 10:00**. Breeding for within-field diversity to promote agroecological transition (Jérôme Enjalbert, INRAE)
- **10:00 – 10:30**. Break & Poster Session
- **10:30 – 12:30**. Workshop: Strategies for cultivar deployment in agricultural landscapes: confronting the points of view of breeders and farmers ([Marta Zaffaroni](#), [Frédéric Fabre](#), INRAE)



Jérôme Enjalbert



Marta Zaffaroni



Frédéric Fabre

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Wednesday 15th May (**location: Auditorium ISPA**)

- **12:30 – 13:30**. Catered lunch
- **13:30 – 14:30**. Poster Session
- **14:30 – 15:00**. Break
- **15:00 – 17:00**. Workshop: Design of international R&I projects integrating the genetic lever (Thibaut Malausa, INRAE)



Thibaut Malausa

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Organizing committee

Frédéric Fabre



Corinne Vacher



Anne-Sophie Miclot



Carole Couture



Laura Marolleau



Thibaut Malausa



Christian Huyghe



Clara Héligon

Local participants can also help you

Marie Foulogne Oriol



Marta Zaffaroni



Pierre Gastou



“Locals” have a blue point on their badges.



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Flash talks :

- Breeding (pear, apple, grapevine, solanum, cereal, potato, sunflower, oilseed rape) [13 talks]

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Martin Maag (Germany)

University/Structure : Martin-Luther-University/Julius Kühn-Institute

Research topic: Breeding pear cultivars resistant to fire blight

Five key-words :

- 1- Pear breeding
- 2- Genetic resources
- 3- Fire blight
- 4- Phenotyping and genotyping
- 5- Genetic mapping



Pear accessions infected with fire blight

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Julie Ferreira de Carvalho (INRAE, France)

Durable resistance of apple against multiple pathogens

CONTEXT

Varieties overall susceptible to many pathogens



Need to rationalized use of pesticide
Perennial plants
Resistance genes quickly eroded

⇒ Enhance apple immunity by combining complementary levers (genetic, PRI,...)
⇒ Elucidating molecular mechanisms implicating in plant-pathogen interactions

Objective : Unravel genetic architecture and molecular regulations of apple resistance

Hypothesis: Durable resistance may be achieved by (i) combining complementary molecular mechanisms and metabolic pathways and by (ii) prioritizing quantitative resistance with broad spectrum

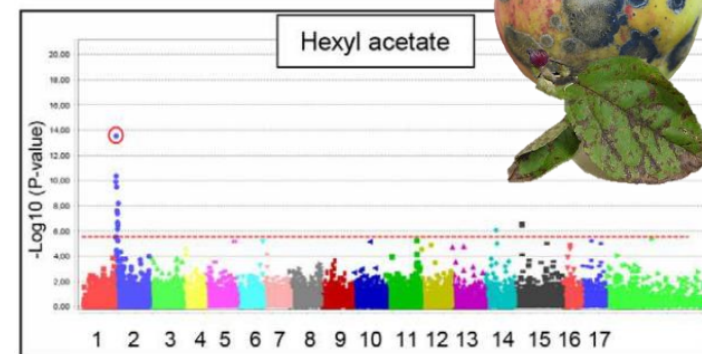
- Q1. Diversity and genetic architecture of specialized metabolites with a role in plant-pathogen interaction ?
- Q2. Regulatory mechanisms behind quantitative resistance ?
- Q3. Trade-off between resistance and growth to build ideotypes ?

APPROACHES

Quantitative genetics : QTL mapping and GWAS
Structural Genomics
Population Genetics
Functional analyses : Targeted and untargeted metabolomics, Transcriptomics, Genetic mutants

IMPACT

Resistance QTL and metabolite QTL, Candidate genes and metabolites
Progenitors and ideotypes for breeding



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Matthias Pfeifer (Italy)

University/structure: Leibniz University Hannover/Julius Kühn Institute - Institute for Breeding Research on Fruit Crops

Research topic: Mapping, isolation, and characterisation of resistance to early leaf drop disease (*Diplocarpon coronariae*) in the wild apple species *Malus baccata*

Five key-words:

- 1- Resistance breeding (apples)
- 2- *Malus* wild species
- 3- Inoculation + phenotyping
- 4- Genotyping-by-sequencing (GBS)
- 5- Whole-genome-sequencing (WGS)



Premature defoliation on apple



Leaves of 'Idared' and *Malus baccata* 'Jackii' 14 dpi



'Idared'

×



M. baccata 'Jackii'



F1-population: 130 offspring

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Buist Muçaj (Germany, Albania)

University/Structure : Julius Kühn-Institut

Research topic: Breeding apple cultivars resistant to scab and powdery mildew.

Five key-words :

- 1- Apple breeding
- 2- Genetic resources
- 3- Scab and powdery mildew resistance
- 4- Phenotyping and genotyping
- 5- Genetic mapping



Scab infection on fruit (Muçaj 2023)



P. mildew infection on leaf (Muçaj 2023)



BioRender.com

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Pierre Gastou (France)



University/Structure : University of Bordeaux - INRAE / UMR SAVE

Grapevine susceptibility to esca: exploring underlying mechanisms in 46 cultivars through an approach of physiopathology

Five key-words :

- 1- Phenotypic diversity
- 2- Vascular disease
- 3- Multi-trait phenotyping
- 4- Pathogenesis
- 5- *Vitis vinifera*

Esca foliar symptoms

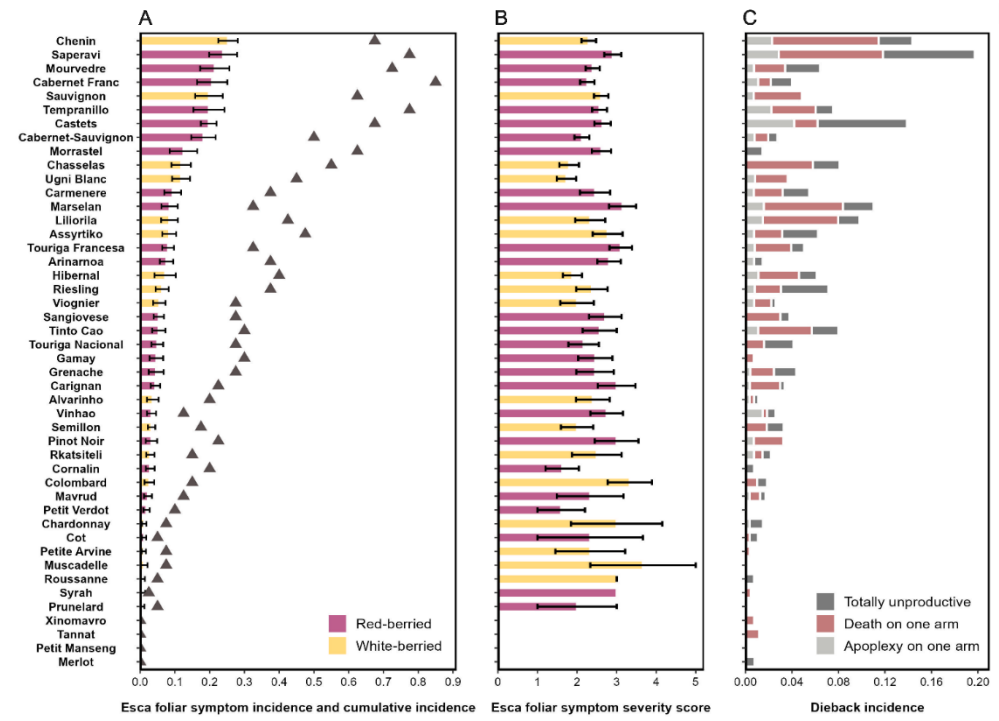


Declining phenotypes



Monitoring a common garden experimental vineyard for seven years

Clear and consistent intervarietal gradient of esca and dieback incidences



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Ambar Carvalho Lopez

University/Structure : University of Wisconsin-Madison / INRAE-GAFL

Tomato breeding for improved yields, disease resistance, and fruit quality, adapted to organic farming systems in the Upper Midwest, US.

Key-words :

- 1- Participatory breeding
- 2- Septoria leaf spot resistance
- 3- Marker-assisted selection
- 4- Fruit quality
- 5- Organic farming

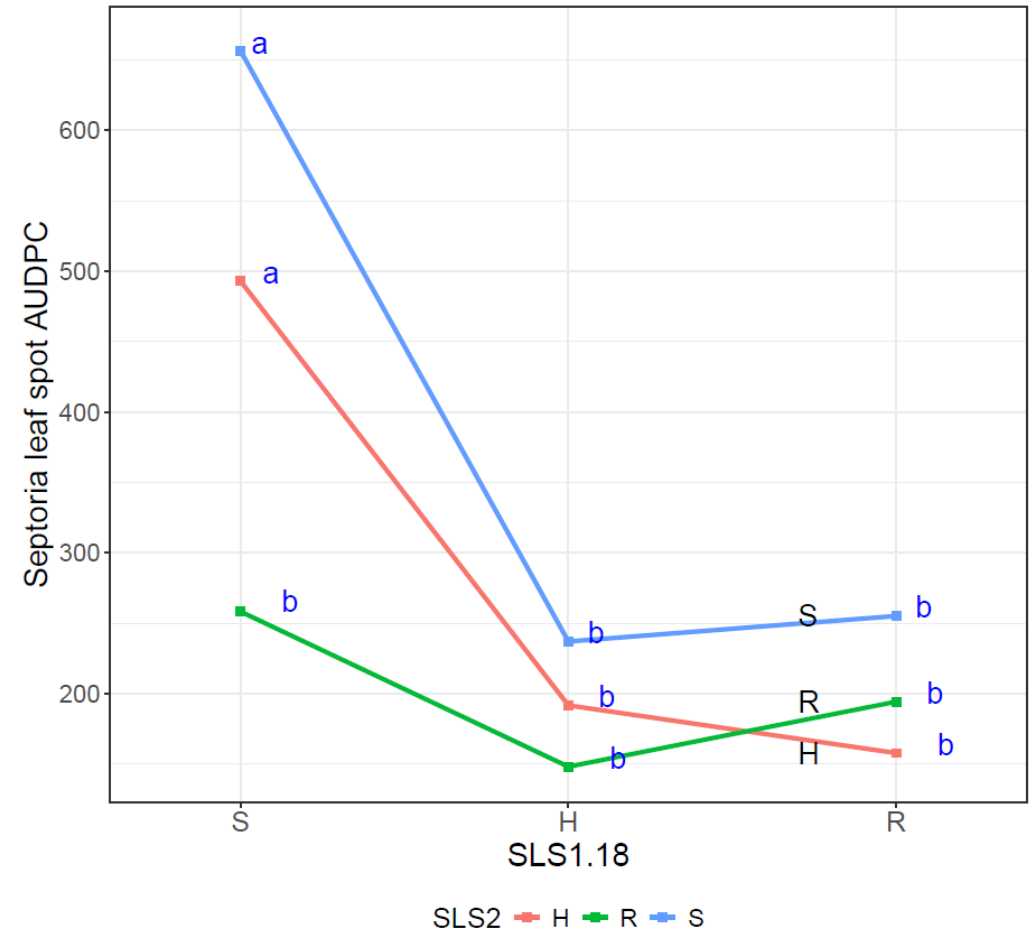


Figure 1. SLS1 and SLS2 markers interaction on the overall Septoria leaf spot resistance in tomato.

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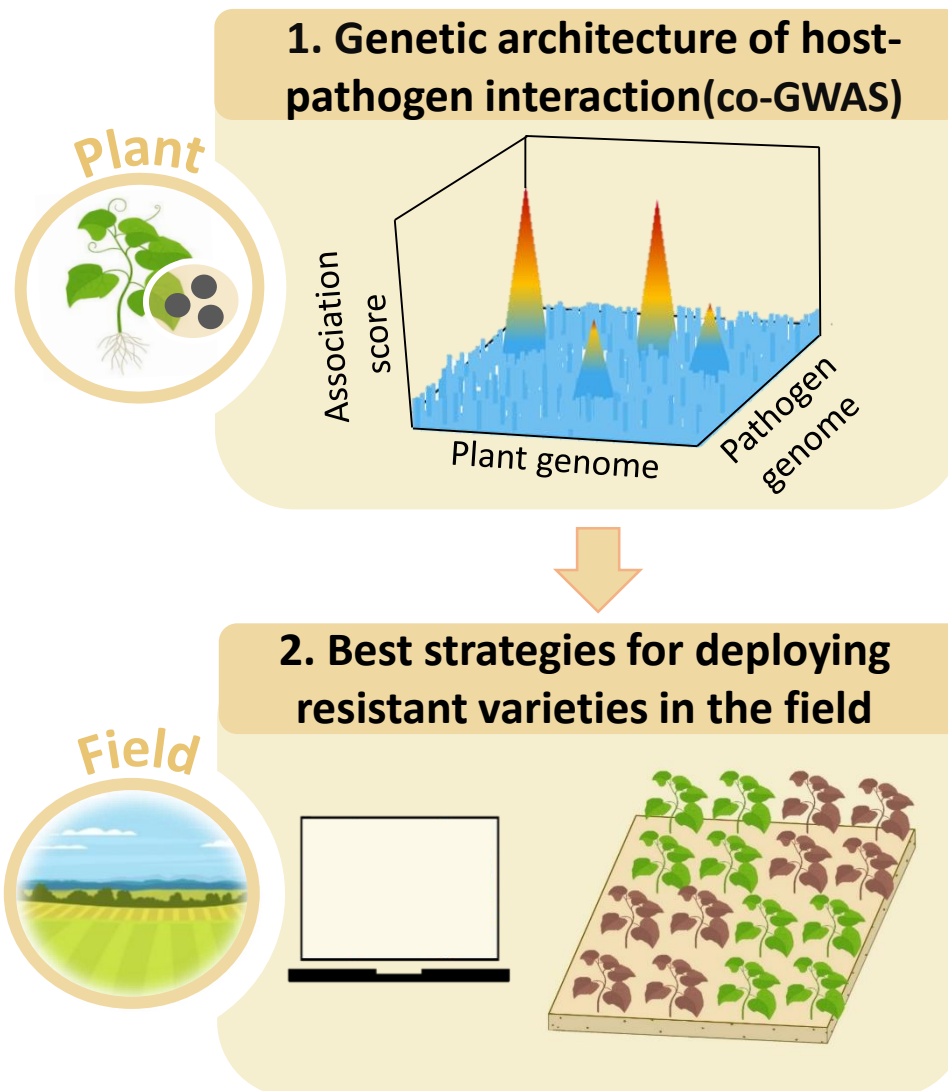
Lucie Tamisier (France)

University/Structure : INRAE (Avignon)

Research topic : Characterizing the genetic architecture of host-pathogen interaction to enhance resistance durability

Five key-words :

- 1- Quantitative genetics
- 2- co-GWAS
- 3- Resistance durability
- 4- Virus
- 5- Melon



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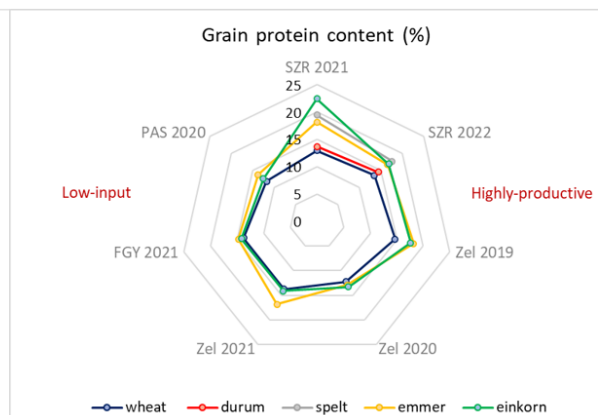
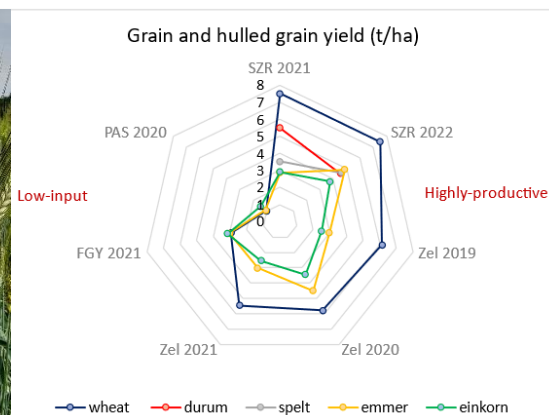
Szilvia Bencze (Hungary)

Average hulled grain and grain yields, and grain protein content of modern and ancient wheats in the ÖMKi on-farm and small-plot trials (2019-2022)

University/Structure : ÖMKi Hungarian Research Institute of Organic Agriculture

Research topic:

- Participatory research and breeding (durum, emmer, einkorn - and wheat from 2024),
- ancient wheat landraces (emmer and einkorn)



Five key-words :

- 1-organic breeding
- 2- organic heterogenous materials
- 3- on-farm research
- 4- grain yield and quality
- 5- resistance to stresses and diseases



Value chain building

- Emmer and einkorn product development
- Emmer and einkorn bread baking and pasta tests
- Emmer beer??
- Testing of einkorn and emmer drinks as milk-substitutes and as fermented products

Hungarian Research Institute of Organic Agriculture

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Inès Durand (Ireland)



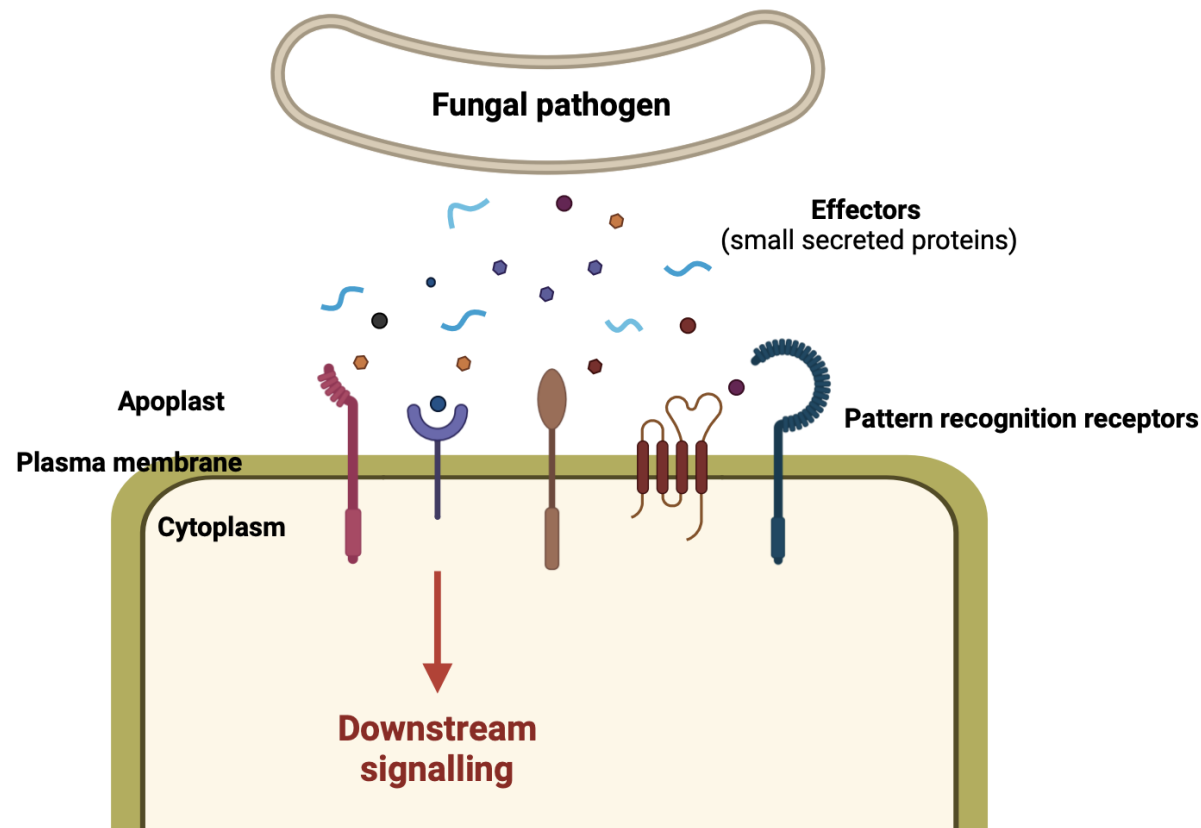
University/Structure : University College Dublin
School of Agriculture and Food Science



Research topic: Identification of conserved immune receptors in cereals targeted by cereal leaf blight fungal pathogens.

Five key-words :

- 1- Plant immunity
- 2- Fungal effectors
- 3- Septoria tritici blotch
- 4- Ramularia leaf spot
- 5- Transcriptomics



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Maria João Camacho (Portugal)

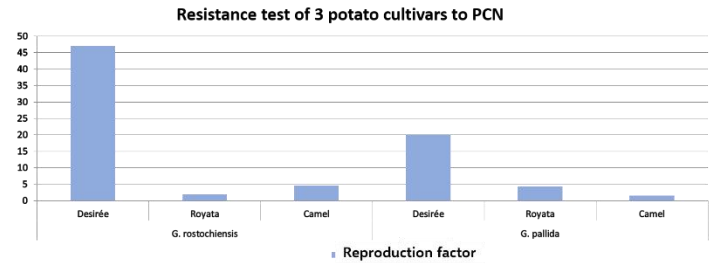
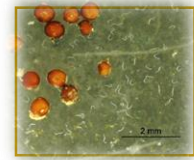
University/Structure : INIAV

Research topic : Identify potato protein-coding genes and protein non-coding genes involved in *Globodera* spp. infestation response (tolerance/susceptibility) and their correlation with known secreted effectors proteins-mediating plant susceptibility through the suppression of its defences and to obtain gene edited potato for its own genes and/or expressing RNA complementary to one relevant effector. At the end, I would like to get resistant commercial potato varieties while keeping their agronomic features, avoiding the use of nematicides.

Five key-words :

- 1- Cyst nematodes, 2- *Globodera pallida*, 3- Potato crop,
- 4- Resistant cultivar, 5- Susceptible cultivar

Variedade	n.amostra	Ro1	Ro2/3	Ro4	Pa1	Pa2	Pa2/3	Pa3
Agria	2841	9		R	2		2	
Agria	2867	9		R	2		2	
Alouette	2837	9			1		1	
Asterix	2875	9	3		2	2	2	1
Babylon	2844							
Bintje	2865	Low	Low		Low	Low		
Camel	2872	9			9		9	
Cara	2843	9, Low		Ro5 (High)	2		2	
Carnaval	2871	R			S	S	S	S
Desiree	2910	1, 2	1		2	2	2	1
Eldorado	2869							
Hermes	2899	2			2		2	
Hermes	2868	2			2		2	
Kennebec	2866	2			2		2	
Kondor	2908	2			2		2	
Lady Amarilla	2873	1	1			1		1
Lady Roseta	2840	9			2		2	
Lady Roseta	2842	9			2		2	
Lady Roseta	2874	9			2		2	
Lady Roseta	2839	9			2		2	
Lady Roseta	2835	9			2		2	
Manitou	2907	9	R	R	1		1	
Merlin	2864	Low		R	low	Low		
Red Scarlet	2838	9	3					
Royata	2846	R	R			R		R



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Milan Jocković (Serbia)

University/Structure : Institute of Field and Vegetable Crops (NSSEME) / Research Institute and Breeding company – Government organization

Research topic : Sunflower breeding

Five key-words :

- 1- High seed and oil yield
- 2- Herbicide tolerance (imi, express, air)
- 3- drought tolerance, disease resistance/tolerance
- 4- Broomrape resistance (*Orobanche cumana*)
- 5- High oleic sunflower



Currently active projects:



Member: Centre of Excellence - Centre of Excellence for Innovations in Breeding of Climate-Resilient Crops



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Nemanja Ćuk (Serbia)

University/Structure : Scientific institute

Research topic : My research topic is sunflower breeding, mostly relied on disease resistance breeding.

Five key-words :

- 1- sunflower breeding
- 2- disease resistance
- 3- *Macrophomina phaseolina*
- 4- biotic stress
- 5- abiotic stress



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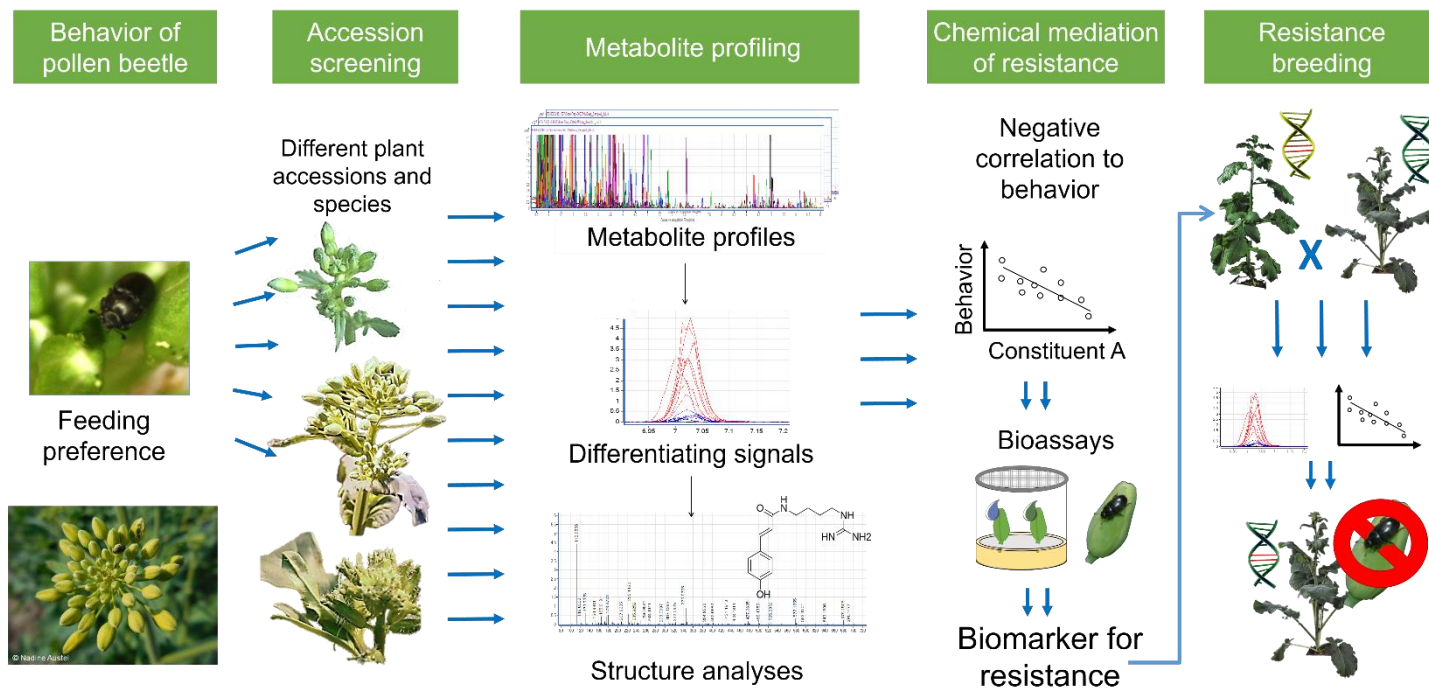
Sarah Awater-Salendo (Germany)

University/Structure : Julius Kühn-Institute (JKI – Berlin)

Research topic : Evaluation of resistant intergenic hybrid lines of oilseed rape with either *Sinapis alba* or *Eruca sativa* against adult pollen beetle and its mediation by secondary plant metabolites

Five key-words :

- 1- Pest insects
- 2- Plant – herbivore interactions
- 3- Secondary plant metabolites
- 4- Bioassays
- 5- Field studies



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Flash talks :

- **Breeding (pear, apple, grapevine, solanum, cereal, potato, sunflower, oilseed rape) [13 talks]**
- **Plant-pathogen interactions [3 talks]**

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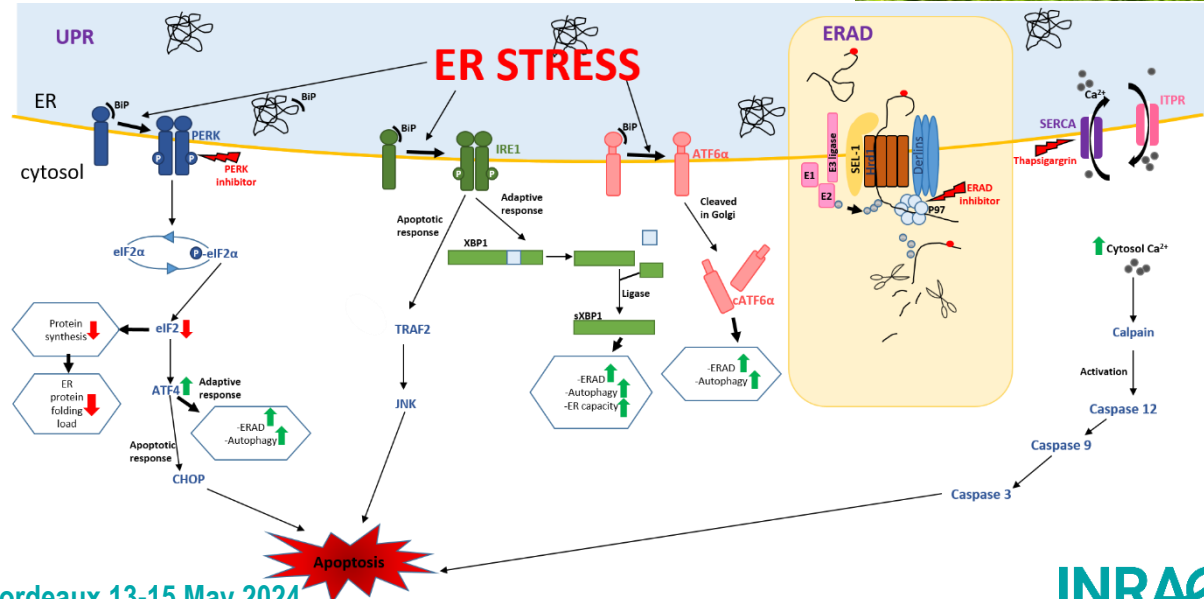
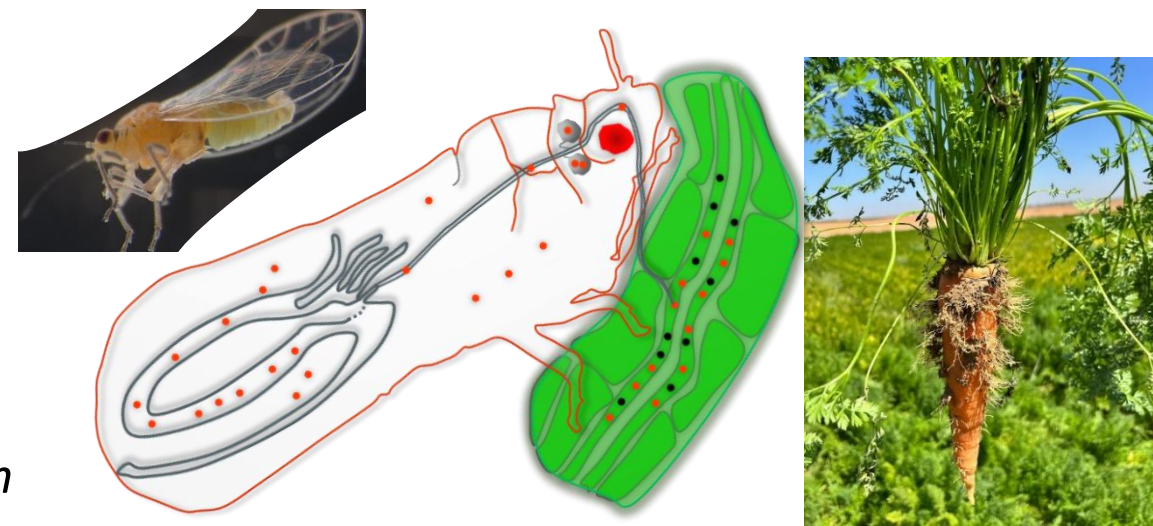
Ola Jassar (Israel)

University/Structure : The Hebrew University of Jerusalem & Volcani Institute.

Research topic: Endoplasmic reticulum (ER) associated cellular and molecular responses underlying *Liberibacter solanacearum* interactions with the carrot psyllid *Bactericera trigonica*

Five key-words :

- 1- Bacterial plant pathogen
- 2- Liberibacter
- 3- Vector-pathogen interactions
- 4- ER stress
- 5- Apoptosis



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Alum Sheryl Dinymoi

University : Université Côte d’Azur

Internship: Institut Sophia Agrobiotech (Plant-Nematode Interaction team)

Research topic: Characterizing the plant target of putative root knot nematode effectors

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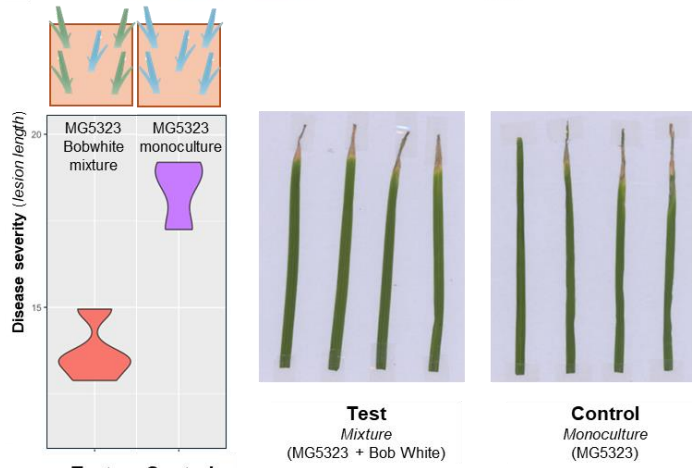
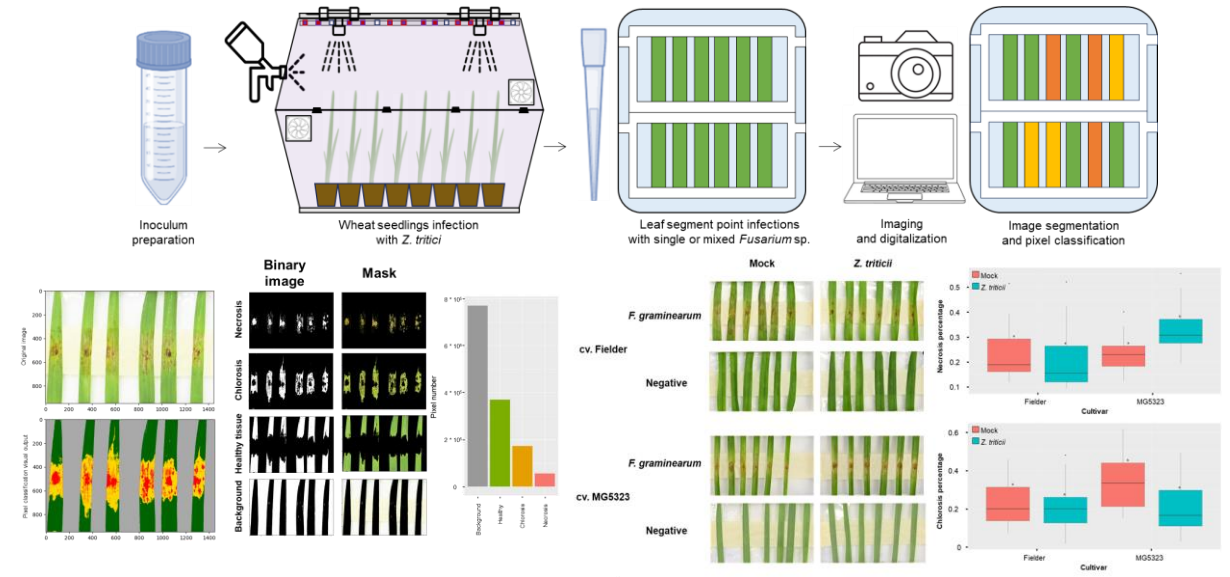
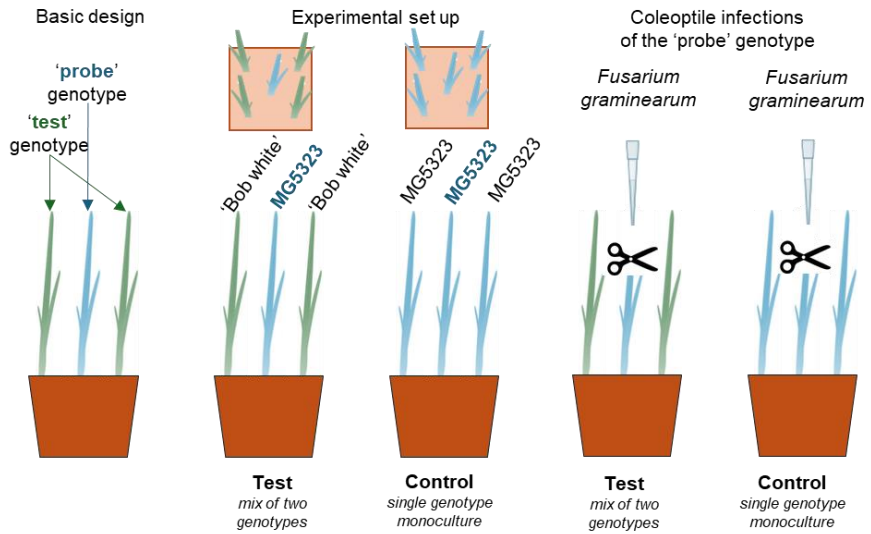
Miguel Ángel Corrales Gutiérrez (Sweden)

University/Structure : Swedish University of Agricultural Sciences (SLU)

Research topic: Plant-Pathogen Interactions through Advanced Phenotyping Techniques

Five key-words :

- 1- Plant diseases
- 2- Plant-Pathogen interactions
- 3- Neighbor Modulated Immunity (NMI)
- 4- Quantitative resistance
- 5- Image analysis



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Flash talks :


- **Breeding (pear, apple, grapevine, solanum, cereal, potato, sunflower, oilseed rape) [13 talks]**
- **Plant-pathogen interactions [3 talks]**
- **Biocontrol and biostimulation [7 talks]**

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BOIU-SICUIA Oana-Alina
from **ROMANIA**



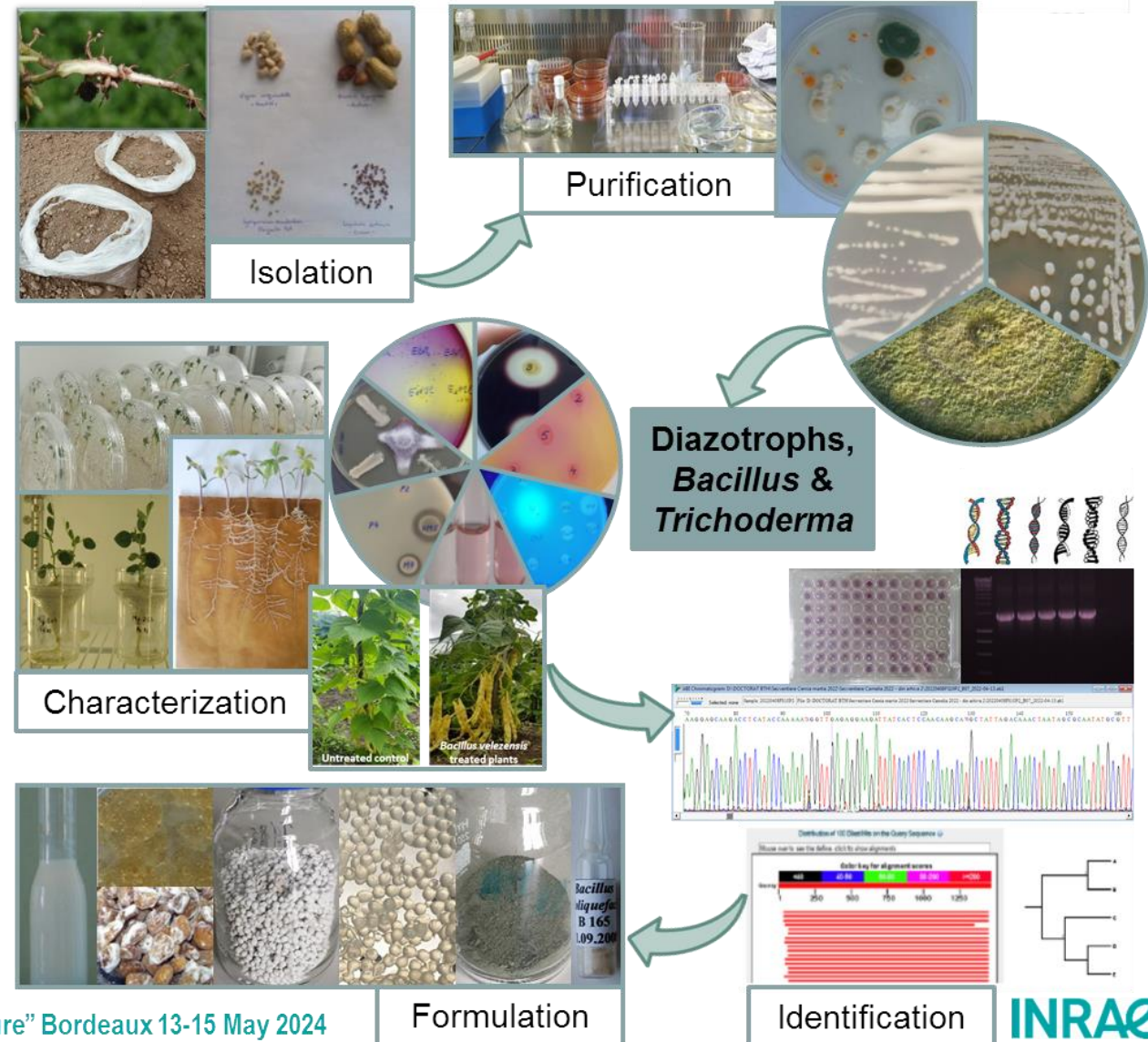
 1. University of Agronomic Sciences and Veterinary Medicine of Bucharest / Faculty of Biotechnologies

 2. Research and Development Institute for Plant Protection, Bucharest

Research topic : Bioinoculant preparation. Isolation, selection, identification and formulation of microbial inoculants for plant protection and growth promotion.

Five key-words :

- 1- Beneficial microorganisms isolation
- 2- Polyphasic microbial characterization
- 3- Functional gene detection in microorganisms
- 4- Microscale bioinoculant production
- 5- Biologic compatibility with PPP



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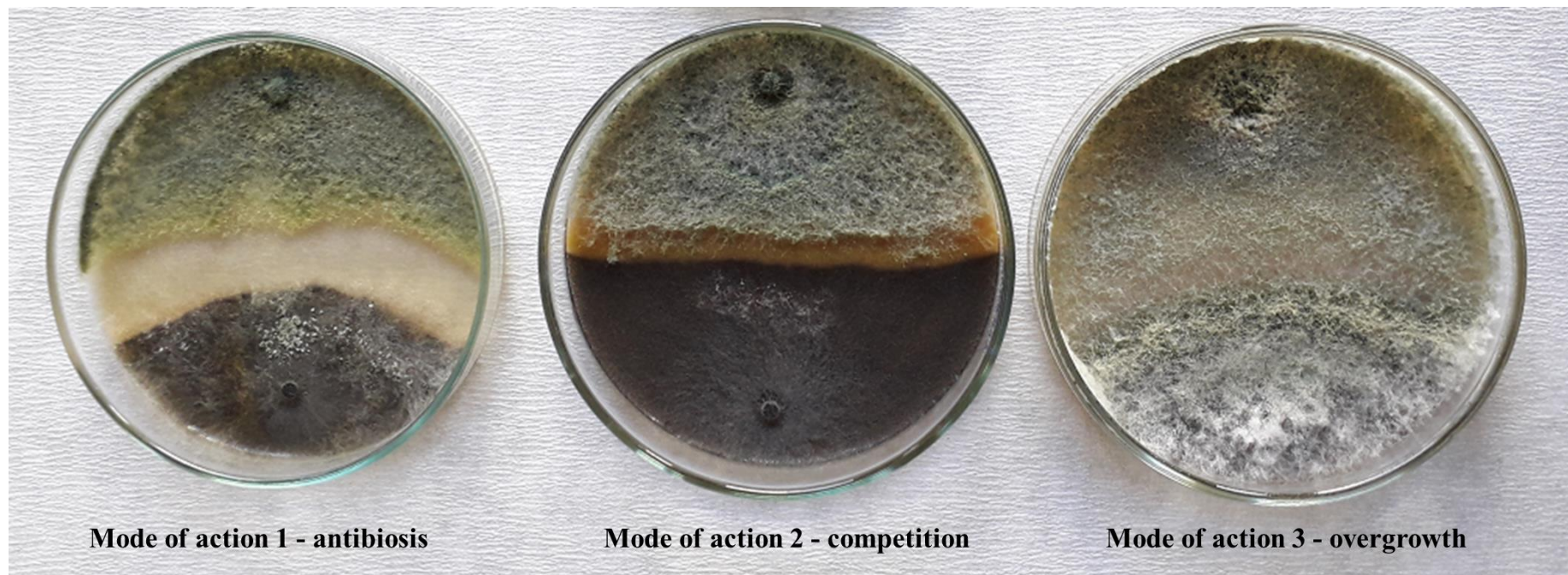
Aleksandra Stankov Petres (Serbia)

University/Structure : Institute of field and vegetable crops

Research topic : Biological control of plant pathogens.

Five key-words :

- 1- Pathogen
- 2- Antagonist
- 3- Metabolites
- 4- Molecular characterization
- 5- Interactions



Different modes of antagonistic action of *Trichoderma harzianum* isolates

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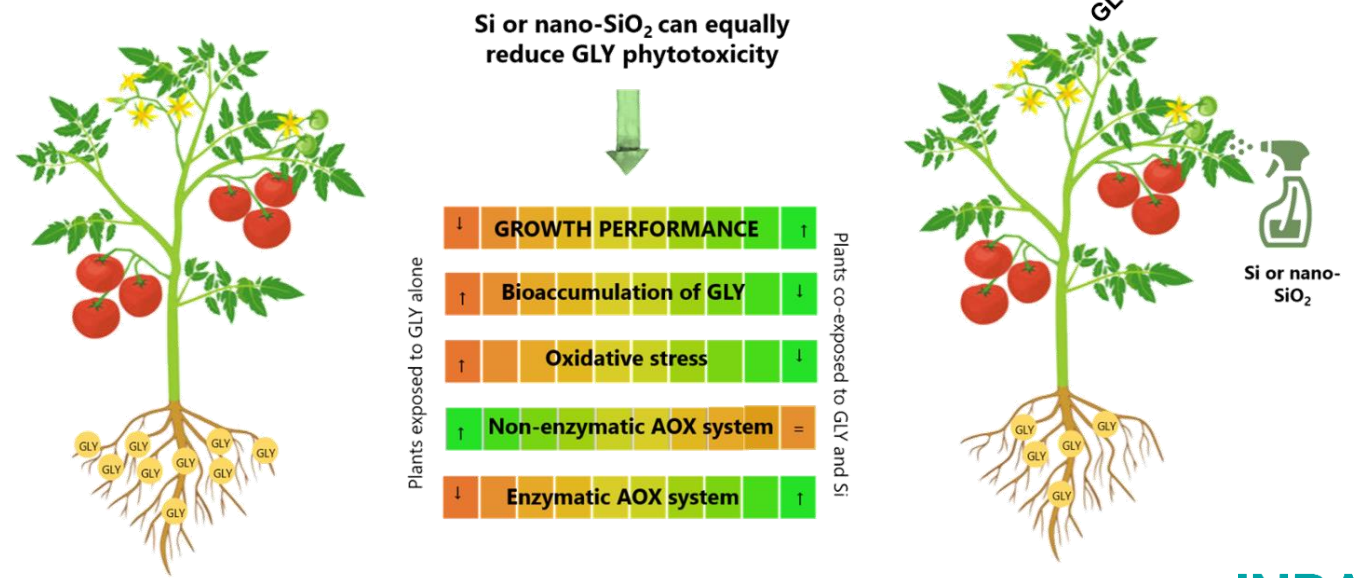
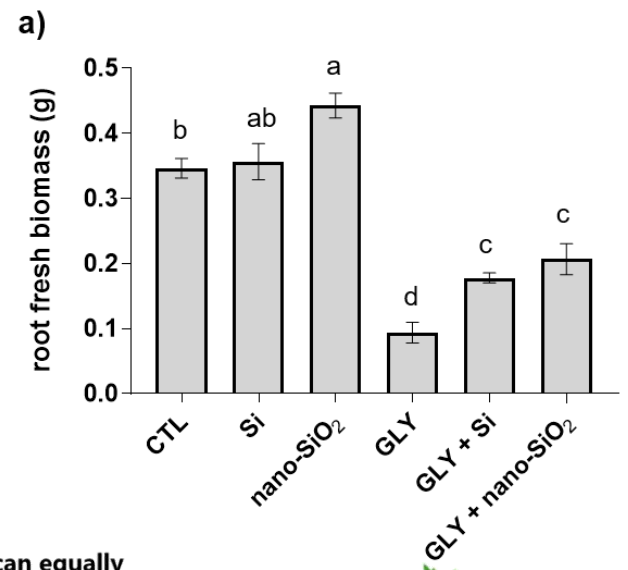
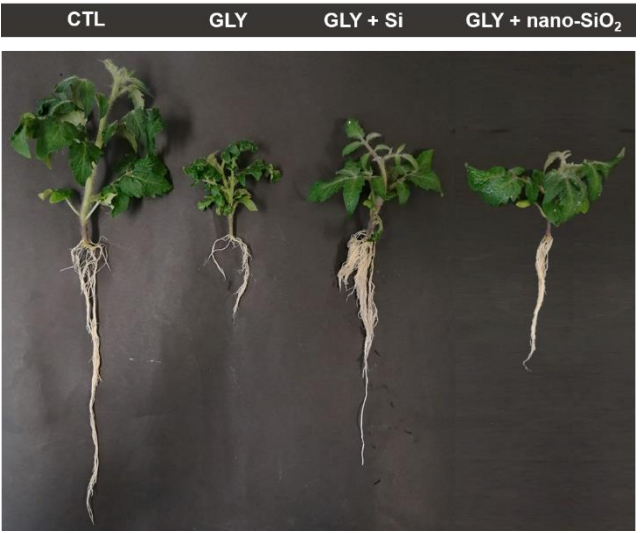
Cristiano Soares (Porto, Portugal)

University/Structure : GreenUPorto/FCUP

Research topic : Explore how pesticide contamination impacts the physiology performance of non-target plants, and development of stress-ameliorative strategies

Five key-words :

- 1- plant stress tolerance
- 2- redox homeostasis
- 3- abiotic stress
- 4- pesticide contamination
- 5- biostimulants



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Marko Bajus (Slovakia)

University/Structure : Institute of Chemistry, Slovak Academy of Sciences

Research topic : The effect of biostimulants on plants exposed to environmental stress.



Illustrative picture of maize plants under different environmental conditions.

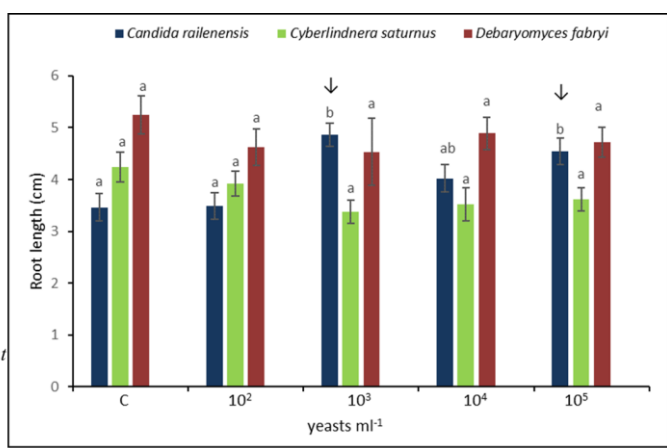


Figure 1: Length of roots (cm) of white mustard treated with suspensions of *Candida railenensis* CCY-29-175-7, *Cyberlindnera saturnus* CCY-38-4-9, and *Debaryomyces fabryi* CCY-41-6-26 in concentrations of 10², 10³, 10⁴, 10⁵ yeasts per ml. Different letters denote statistically significant differences between the treatments of the particular yeast strain at $p < 0.05$.

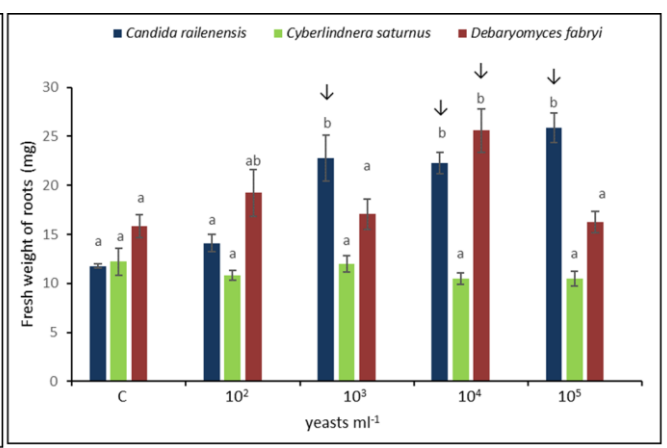


Figure 2: Fresh weight of roots (mg) of white mustard treated with suspensions of *Candida railenensis* CCY-29-175-7, *Cyberlindnera saturnus* CCY-38-4-9, and *Debaryomyces fabryi* CCY-41-6-26 in concentrations of 10², 10³, 10⁴, 10⁵ yeasts per ml. Different letters denote statistically significant differences between the treatments of the particular yeast strain at $p < 0.05$.

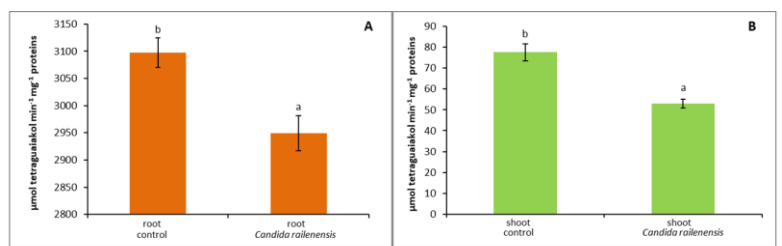


Figure 3: GPOX activity of white mustard in A: roots, B: shoots ($\mu\text{mol tetraguaiacol min}^{-1} \text{mg}^{-1} \text{proteins}$) treated with *Candida railenensis* (10⁵ cells per ml). Different letters denote statistically significant differences between the treatments at $p < 0.05$.

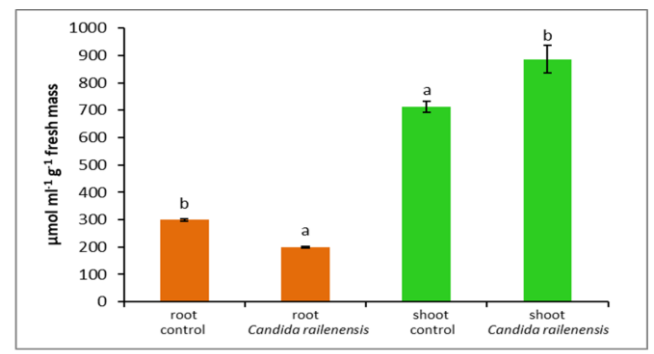


Figure 4: Concentration of H₂O₂ in roots and shoots of white mustard ($\mu\text{mol ml}^{-1} \text{g}^{-1} \text{fresh mass}$) treated with *Candida railenensis* (10⁵ cells per ml). Different letters denote statistically significant differences between the treatments in the plant organ at $p < 0.05$.

Five key-words :

- 1- Drought
- 2- Biostimulants
- 3- Yeasts
- 4- Plant stress response
- 5- Maize



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Mafalda Pinto (Portugal)

University/Structure : Faculty of Sciences of the University of Porto

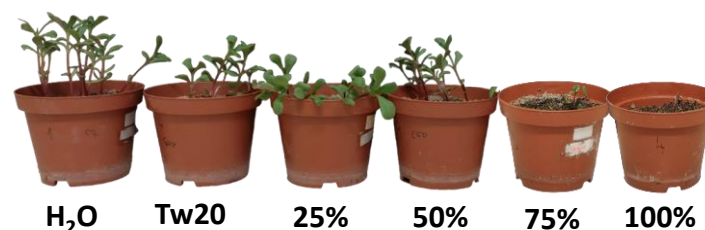
Research topic : To explore the potential of eucalyptus-based products to be used in the control of weeds and crop-related bacterial diseases to reduce the application of synthetic pesticides

Five key-words :

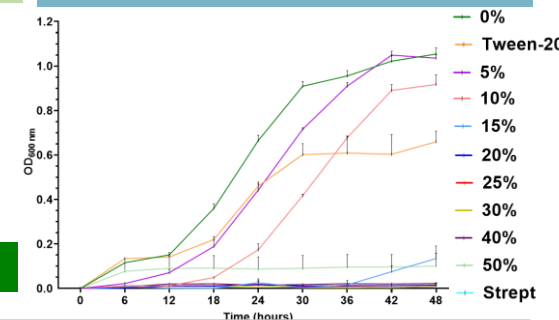
- 1- Eucalyptus-based products
- 2- Nanobiopesticides
- 3- Weed management
- 4- Crop-related disease management
- 5- Sustainable agriculture

Eucalyptus globulus essential oil

Herbicidal activity against *P. oleracea*



Antibacterial activity against *Xanthomonas euvesicatoria*



Encapsulation of eucalyptus essential oils into eco-friendly nanoparticulate systems – **lipid** and **keratin-based nanoparticles (NP)**

Physico-chemical characterization (size; PDI)

Lipid-based NP with EO

Keratin-based NP with EO

	Lipid-based NP with EO	Keratin-based NP with EO
7 days	144.1 ± 2.5 nm; 0.278 ± 0.007	587 ± 14 nm; 0.165 ± 0.023
14 days	136.5 ± 2.5 nm; 0.257 ± 0.003	549.8 ± 8.4 nm; 0.244 ± 0.007
1 month	134.6 ± 1.0 nm; 0.258 ± 0.011	480.1 ± 1.9 nm; 0.221 ± 0.021
2 months	136.8 ± 0.4 nm; 0.264 ± 0.005	418.3 ± 8.6 nm; 0.272 ± 0.010

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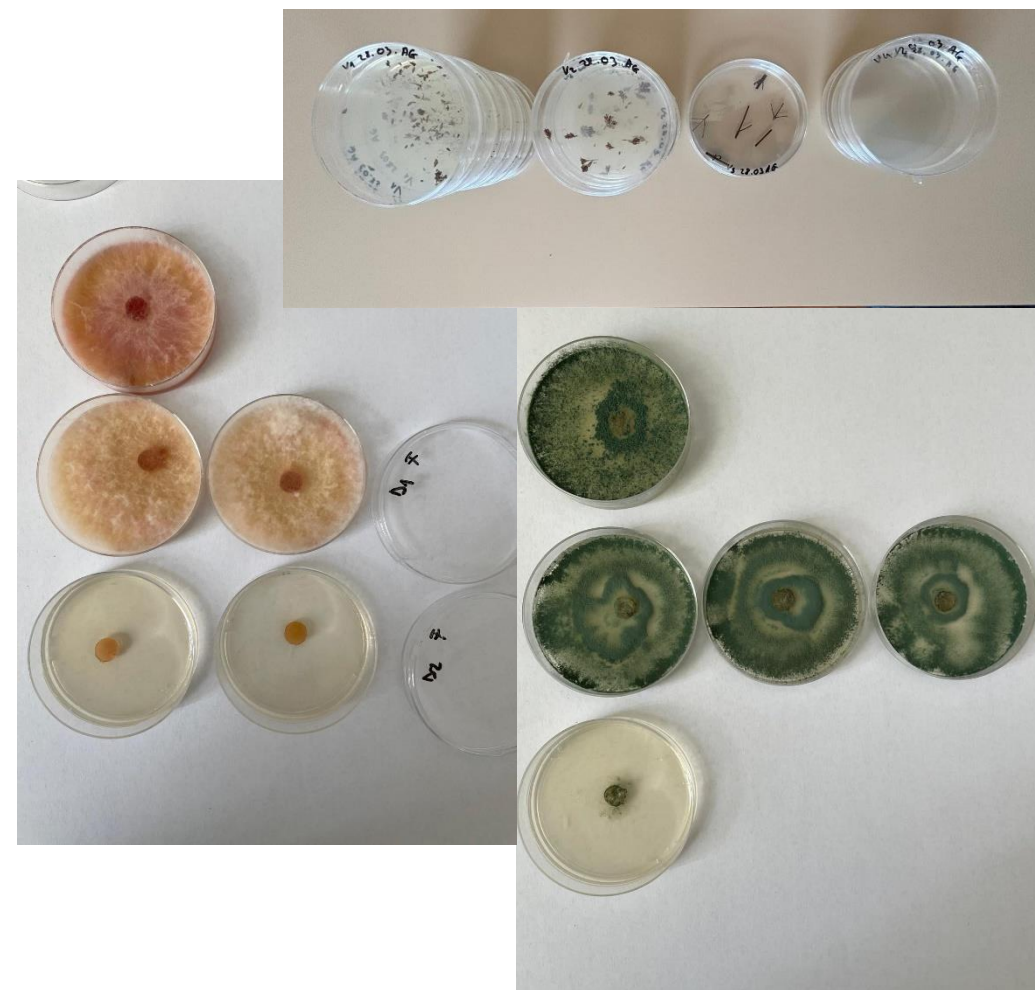
Alexandra Maria Georgescu (Romania)

University/Structure : University Of Agronomic Sciences and Veterinary Medicine

Research topic : My research is based on antifungal activity of origanum plant derived essential oil on different pathogens of aromatic plants.

Five key-words :

- 1- aromatic plants (AP)
- 2- production of AP
- 3- diseases and pests
- 4- ecological culture
- 5- optimising practices



Spring School COST T0P-AGRI-NETWORK “Rethinking plant breeding for a zero-pesticide agriculture” Bordeaux 13-15 May 2024

Lavinia Diana Nicoleta Buturugă-Barbu (Romania)

University/Structure :

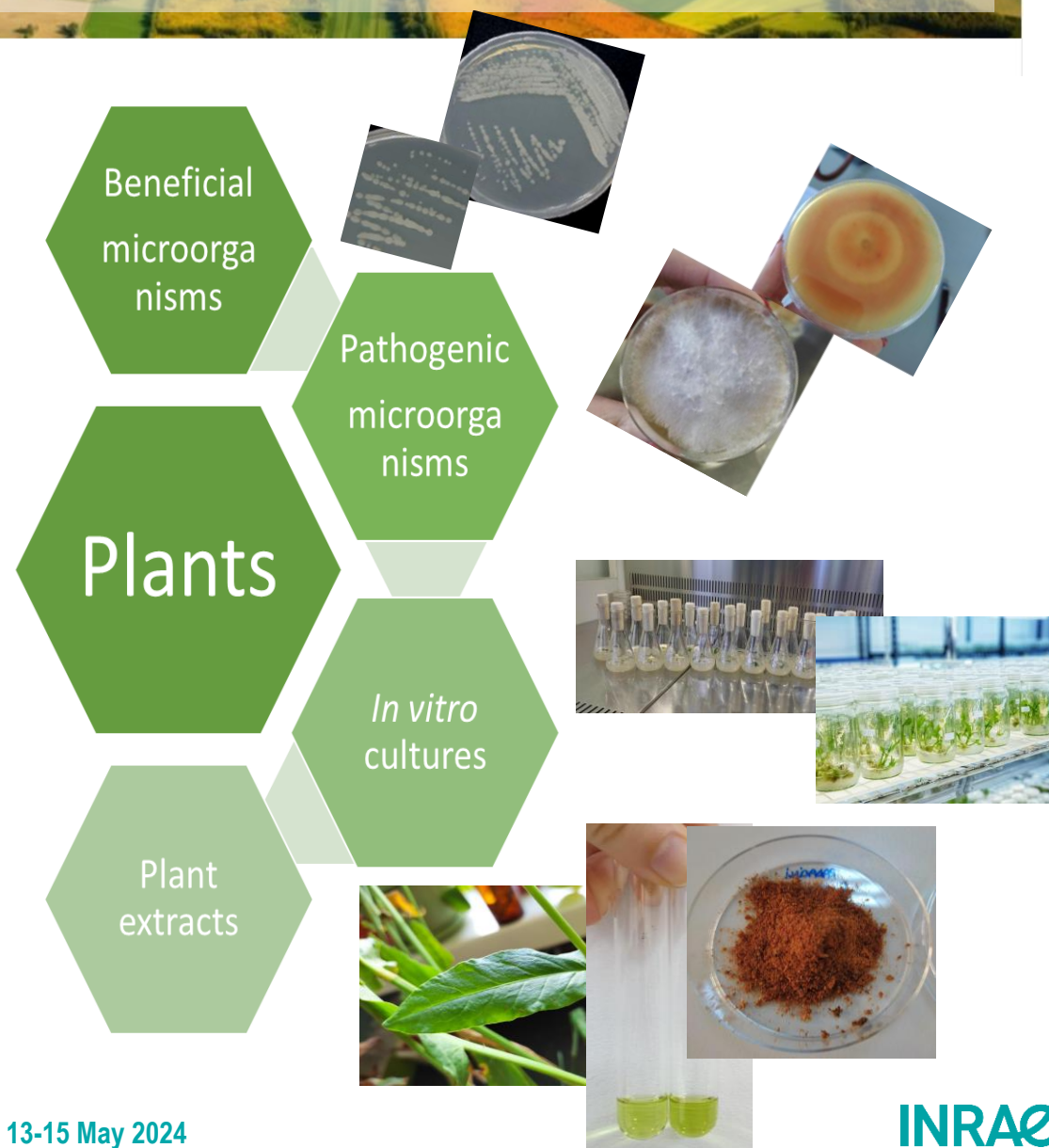
- University of Agronomic Sciences and Veterinary Medicine of Bucharest;
- Research and Development Institute for Plant Protection Bucharest.

Research topic:

- biotechnologies for sustainable agriculture;
- bacteria with properties of biological control agents;
- production and application of bacterial biopreparations.

Five key-words :

- 1-Agricultural Innovation
- 2-Biotechnological Advancements
- 3-PhD Research
- 4- Sustainable Crop Protection
- 5-Plant extracts



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Flash talks :

- **Breeding (pear, apple, grapevine, solanum, cereal, potato, sunflower, oilseed rape) [13 talks]**
- **Plant-pathogen interactions [3 talks]**
- **Biocontrol and biostimulation [7 talks]**
- **Microbiota [2 talks]**

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Inorganic or organic soil management system



Herbicide strip

Mechanical cultivation

Synthetic mulch

Miscanthus mulch

Mushroom compost

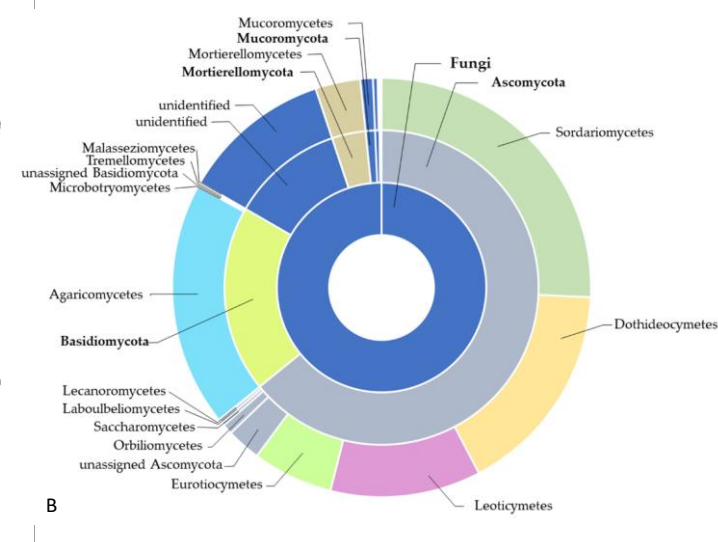
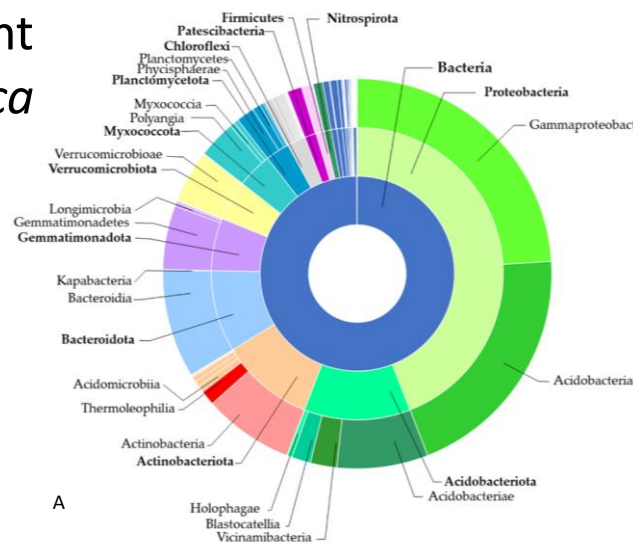
Kamila Bokszczanin (Poland)

University/Structure : Warsaw University of Life Sciences/Department of Pomology and Horticultural Economics

Research topic: Tree Root-Associated Microbial Communities Depend on Various Floor Management Systems in an Intensive Apple (*Malus × domestica* Borkh.) Orchard.

Five key-words :

- 1- rhizosphere
- 2- microbiome
- 3- organic floor management system
- 4- soil organic matter
- 5- NGS



Overview of bacteria (A) and fungal (B) phyla and classes of apple rhizosphere microbiomes originated from organic and inorganic soil management systems.

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Benoît Alunni (France)

University/Structure : INRAE, BAP, IJPB Versailles

Research topic : Exploiting the root microbiota (AMF + bacteria) to improve Maize (*Zea mays*) nutrition under low input agriculture

Five key-words :

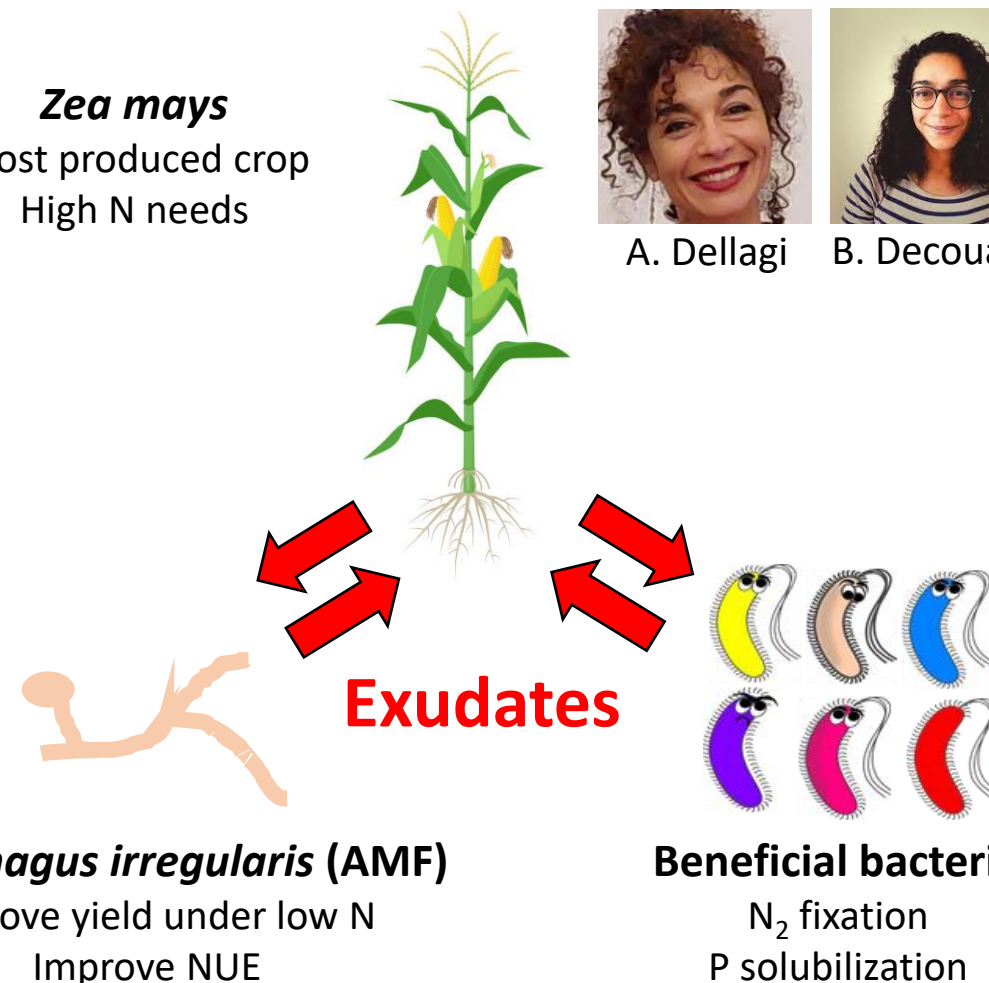
- 1- Nitrogen (and P) nutrition
- 2- Maize (intercropping with Soybean – K. Magne)
- 3- SynCom (Arbuscular Mycorrhizal Fungi + Plant Growth Promoting Bacteria)
- 4- Root exudates (composition, microbiota)
- 5- Agroecology (fertilizer use reduction, improved NUE)

Zea mays
Most produced crop
High N needs



A. Dellagi

B. Decouard



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Yavuz Delen (Turkey)

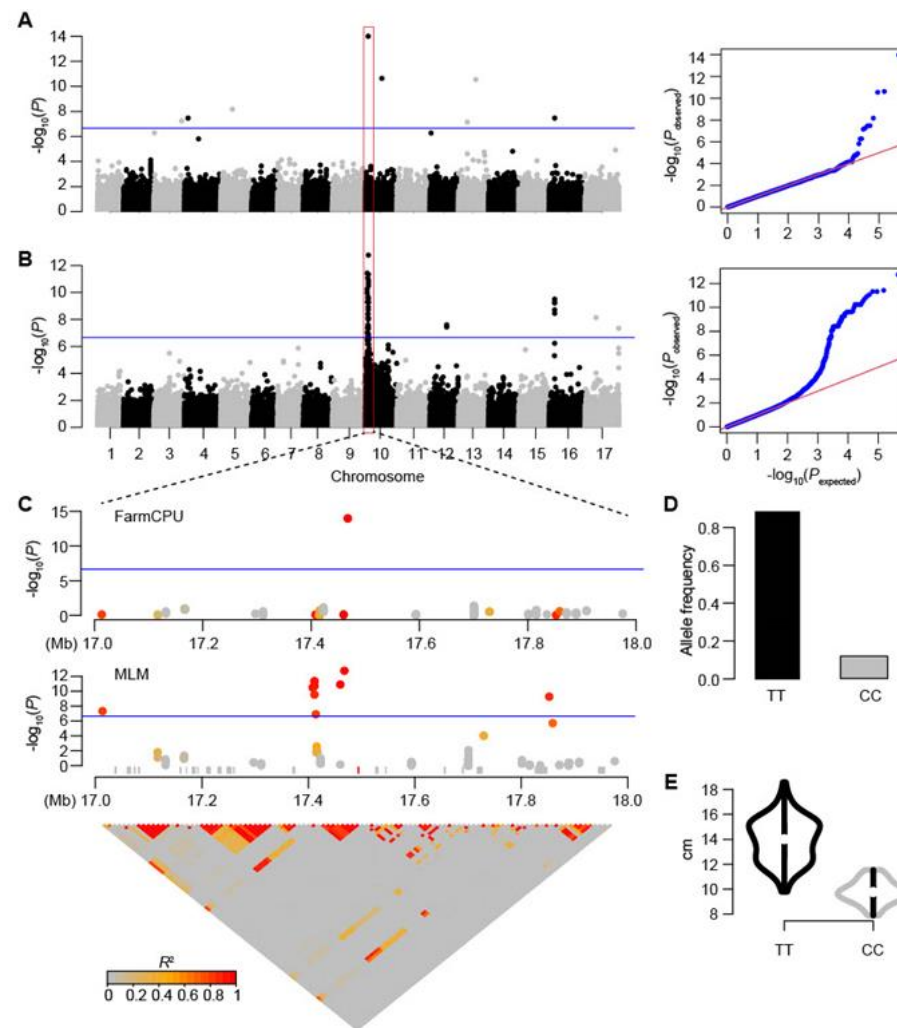
University/Structure : Field Crops Central Research Institute, Ankara

Research topic :

- Identification of some *Yr* Genes Providing Resistance to Yellow Rust Disease in Wheat (*Triticum aestivum* L.) Population by Molecular Markers and Development of Doubled Haploid Pure Lines with Multiple Resistance Genes.
- KASP analysis for soil borne pathogens in wheat (*Triticum aestivum* L.).
- Dissecting the Genetic Architecture of Morphological Traits in Sunflower (*Helianthus Annuus* L.).

Five key-words :

- 1- Field crops
- 2- Yellow rust
- 3- Soil borne pathogens
- 4- Molecular markers
- 5- Genome-wide association study



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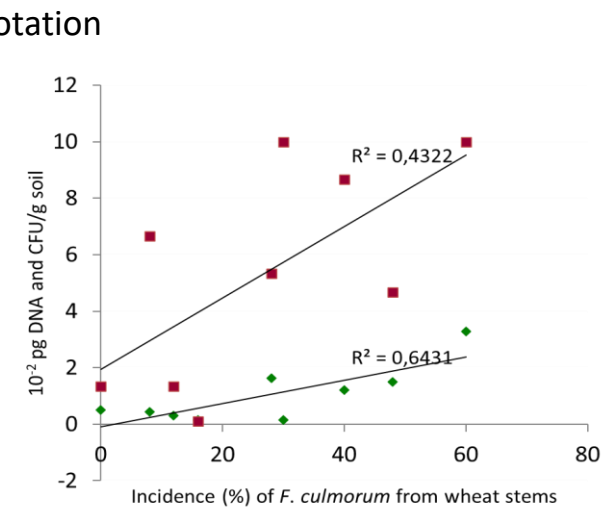
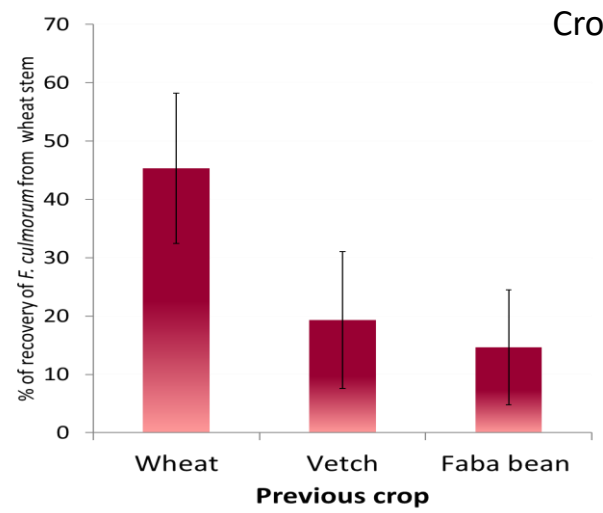
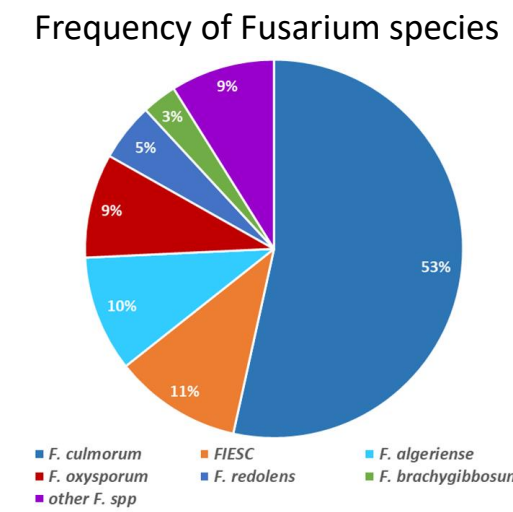
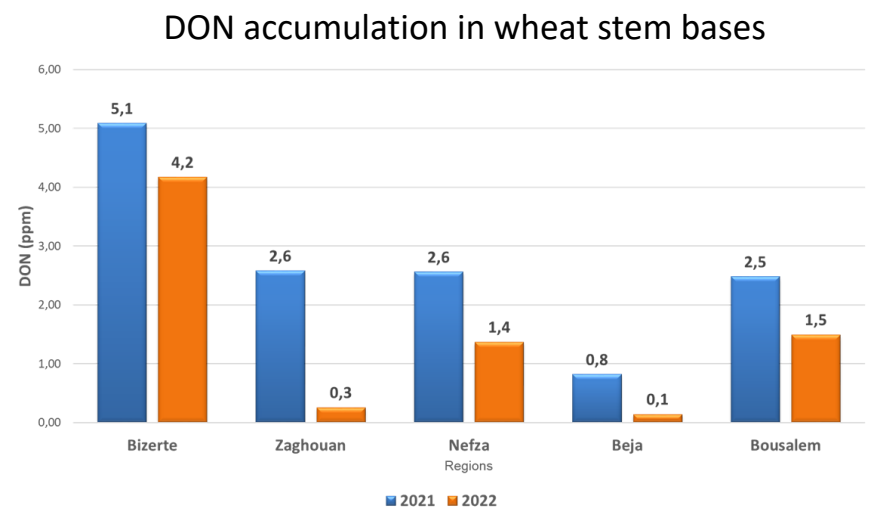
Samia Gargouri (Tunisia)

University/Structure : National Institute of Agronomic Research of Tunisia

Research topic : Monitoring and management of soil-borne diseases in field crops

Five key-words :

- 1-Soil-borne diseases
- 2-Cereals
- 3-Fusarium
- 4-Mycotoxin
- 5-IPM

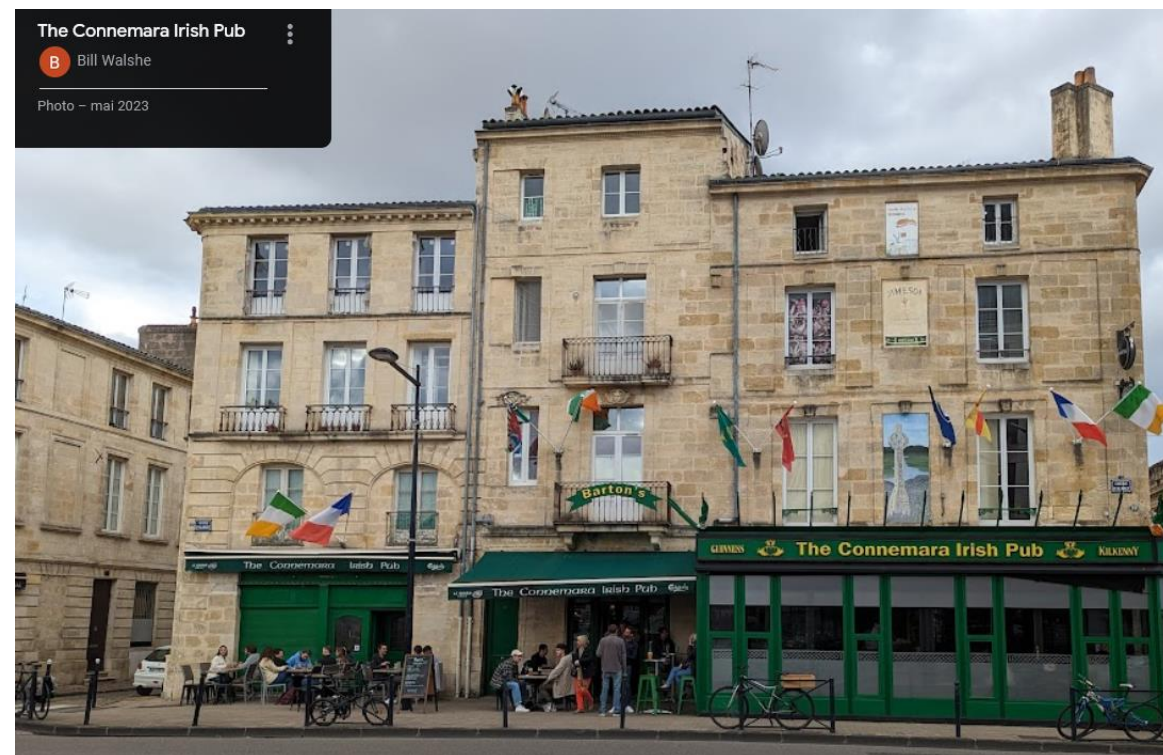


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19:30 – 20:30. Meet up for a drink at
The Connemara Irish Pub
18 Cours d'Albret, 33000 Bordeaux

Bordeaux's historic city center (ok, one of them !)

Take Tram B (possibly from Arts & Métiers) until stop « Hotel de Ville »



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20:30 – Free time for dinner down town by groups (or alone, but then what about networking !!).

Many possibilities within a buffer of 5/10 min walks. Have a look to : Mama Shelter, Le Clemenceau, Bistro Régent Clemenceau, Le Café Rohan, Big Fernand, Un soir à Shibuya, Le Scopitone, Le Bistro du Musée, Les vins urbains, Les drôles, le petit commerce, Ishikawa, Elio's Ristorante...and even Burger King (!)