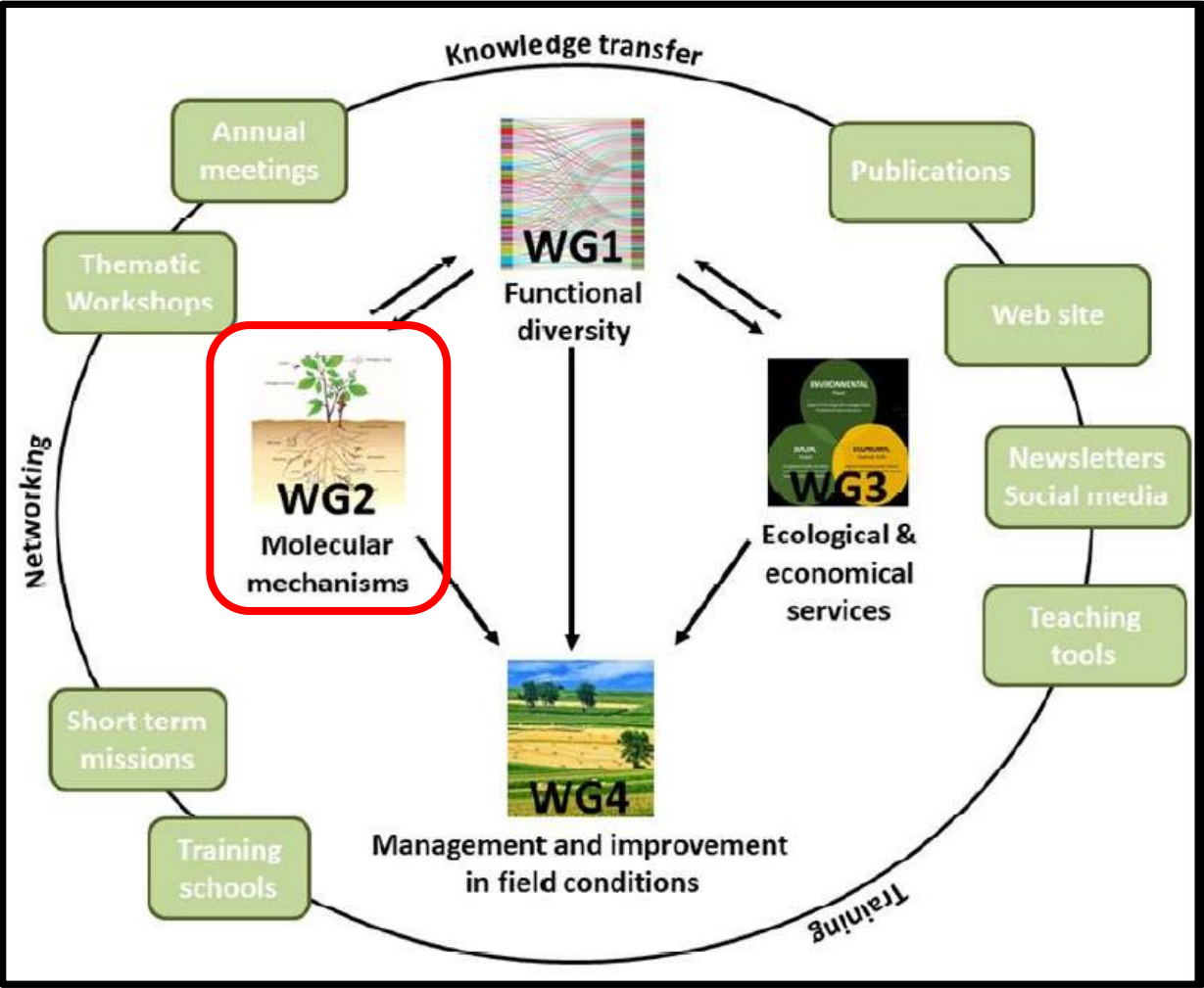




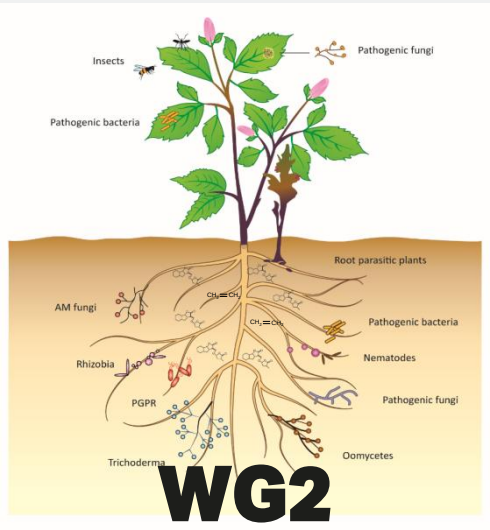
Beneficial root-associated microorganisms for sustainable agriculture (ROOT-BENEFIT)





Molecular mechanisms associated with beneficial interaction networks

WG2



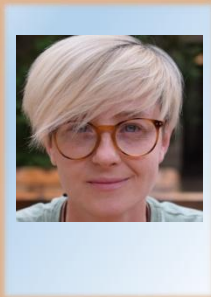
Molecular mechanisms



Juan A. López-Ráez
Estación Experimental Zaidín
(CSIC)
(Spain)



Florian Frugier
Institute of Plant Science
(University Paris-Saclay)
(France)

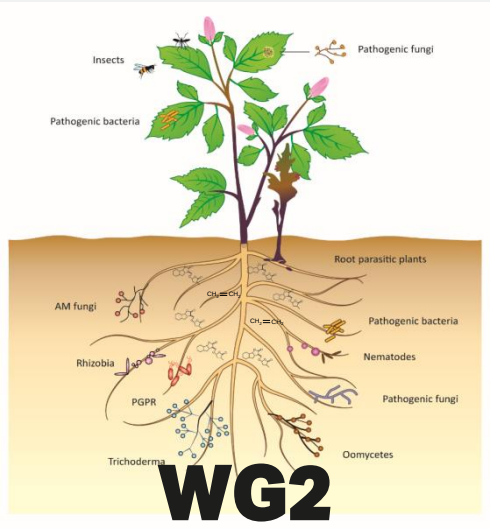


Joanna Banasiak
Institute of Bioorganic Chemistry
(Polish Academy of Science)
(Poland)



Molecular mechanisms associated with beneficial interaction networks

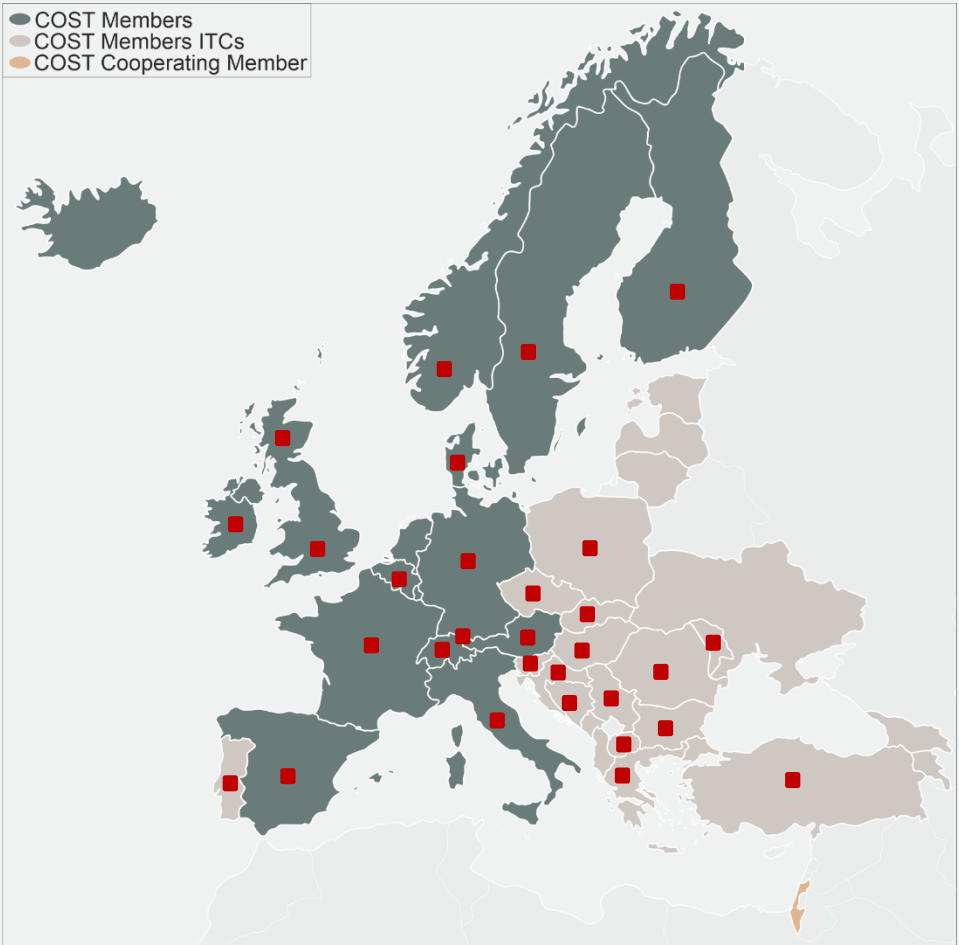
WG2



Molecular mechanisms

PARTICIPANTS (WG2)

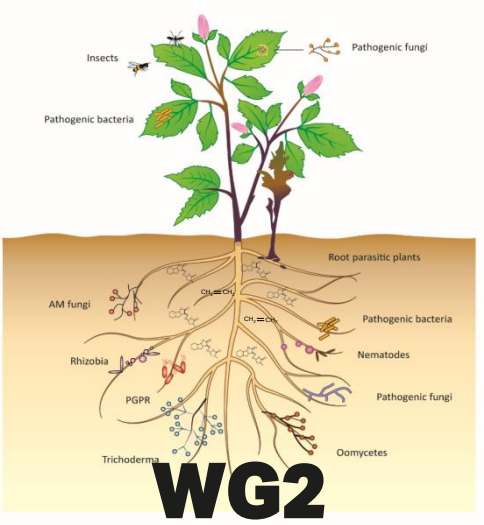
- **Number of participants:**
367 participants (≈ 60%)
- **Number of countries:**
46 countries
(Spain, Turkey, Italy and Poland)
 - 16 ITC
 - Israel (Cooperating member)
 - Tunisia
 - Azerbaijan
 - Kosovo
 - Australia
 - US
 - ...





Molecular mechanisms associated with beneficial interaction networks

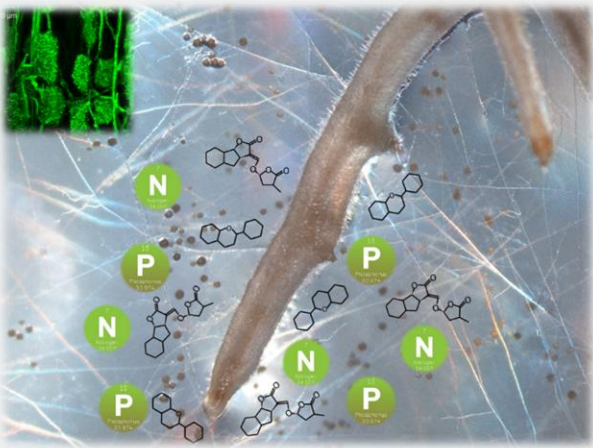
WG2



**Molecular
mechanisms**

MAIN OBJECTIVE

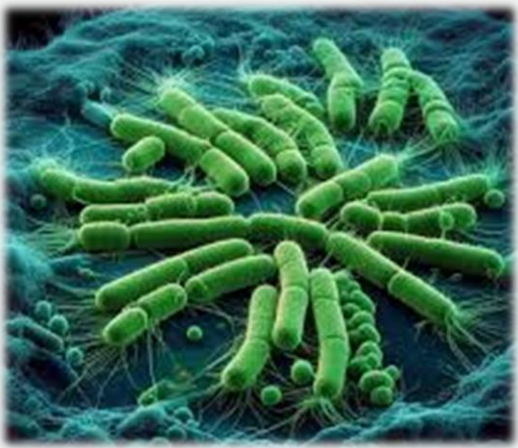
**TO DEFINE SIMILARITIES AND DIFFERENCES OF MOLECULAR MECHANISMS REGULATING
THE ESTABLISHMENT AND FUNCTIONING OF BENEFICIAL ROOT-ASSOCIATED
MICROORGANISM INTERACTIONS**



MYCORRHIZA



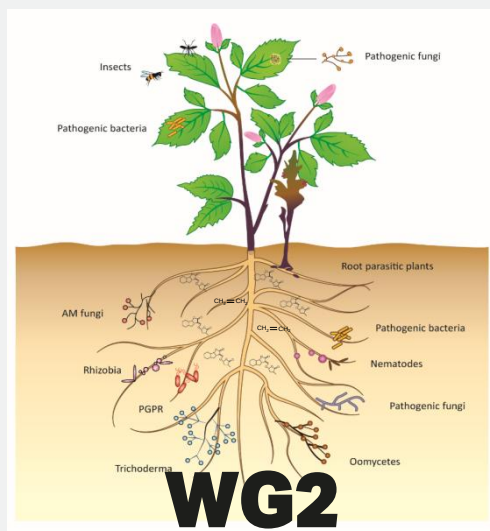
NODULATION



PGPR/F



WG2



Molecular mechanisms

Molecular mechanisms associated with beneficial interaction networks

MAIN OBJECTIVE

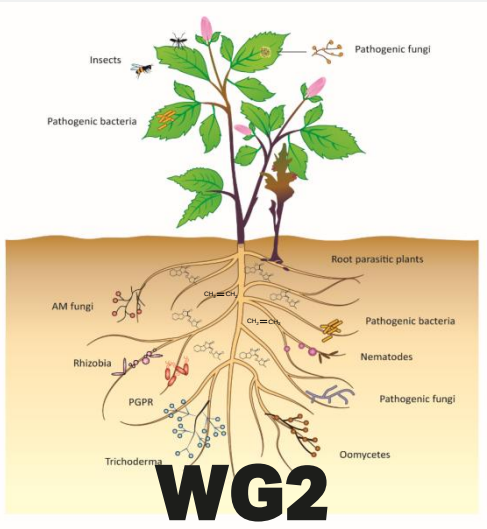
TO DEFINE SIMILARITIES AND DIFFERENCES OF MOLECULAR MECHANISMS REGULATING THE ESTABLISHMENT AND FUNCTIONING OF BENEFICIAL ROOT-ASSOCIATED MICROORGANISM INTERACTIONS

- **Objective 2.1.** To summarize knowledge on specific and common molecular and cellular mechanisms controlling beneficial root-associated microorganism interactions (AMF, Rhizobia, PGPR, ...)
- **Objective 2.2.** To provide a comprehensive analysis of the molecular mechanisms that govern and/or are modulated during multiple beneficial root-associated microorganism interactions
- **Objective 2.3.** To evaluate how these molecular mechanisms are regulated by environmental factors in the frame of agricultural practices and climate changes contexts



Molecular mechanisms associated with beneficial interaction networks

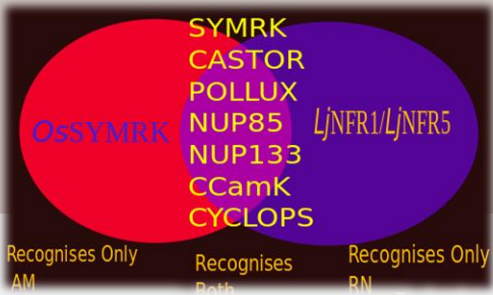
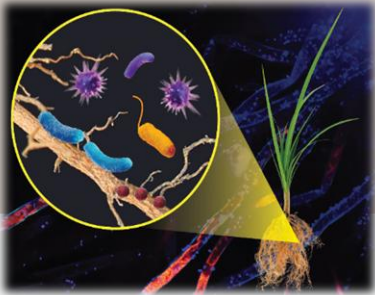
WG2



Molecular mechanisms

SPECIFIC OBJECTIVES

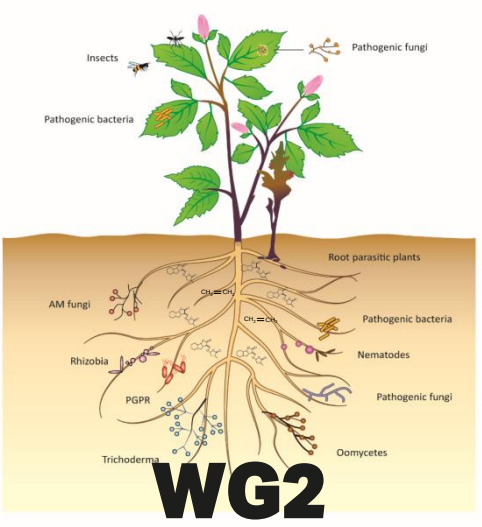
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Molecular mechanisms associated with beneficial interaction networks

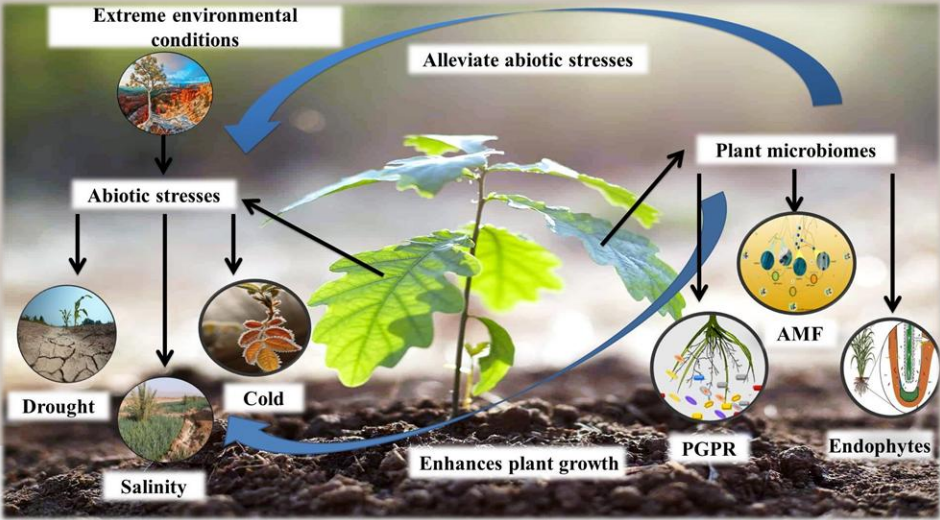
WG2



Molecular mechanisms

SPECIFIC OBJECTIVES

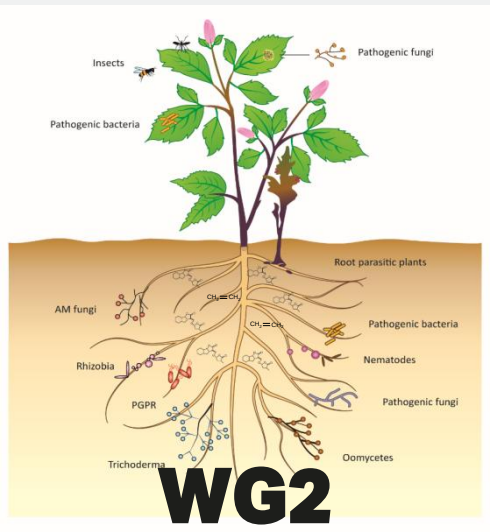
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Molecular mechanisms associated with beneficial interaction networks

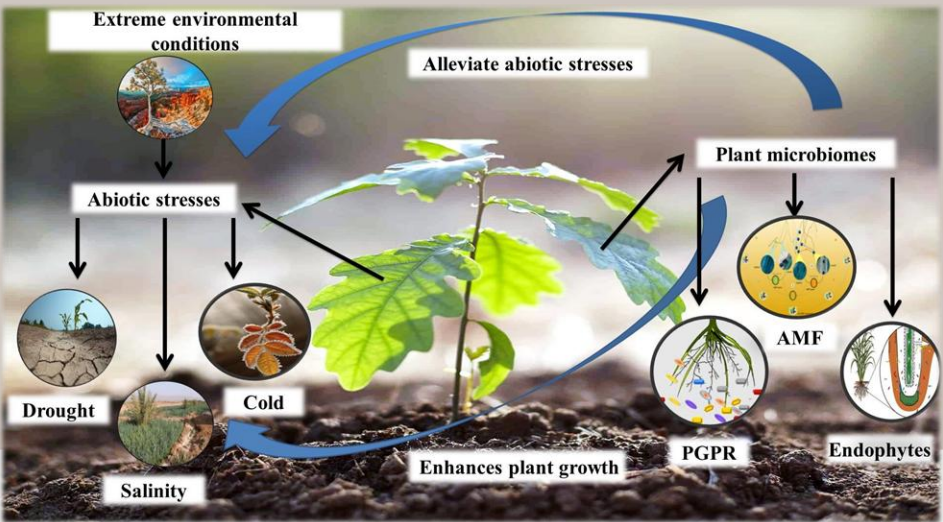
WG2



Molecular mechanisms

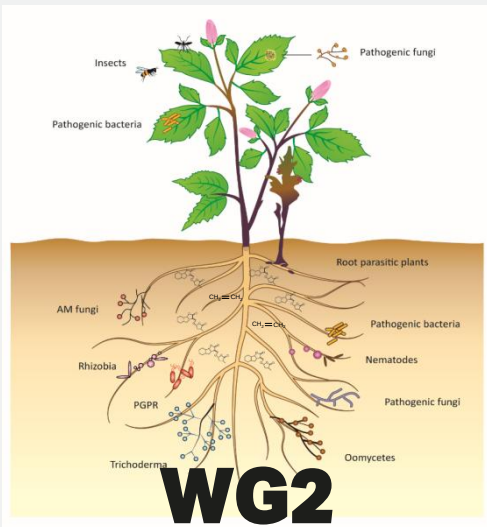
SPECIFIC OBJECTIVES

- **Meta-analysis** studies will focus on the effect of different **agricultural factors** (fertilization, cropping systems, soil type), and **environmental stress factors** (high CO₂, drought, temperature, light, radiation, ...) on formation and functioning of beneficial associations





WG2



Molecular mechanisms

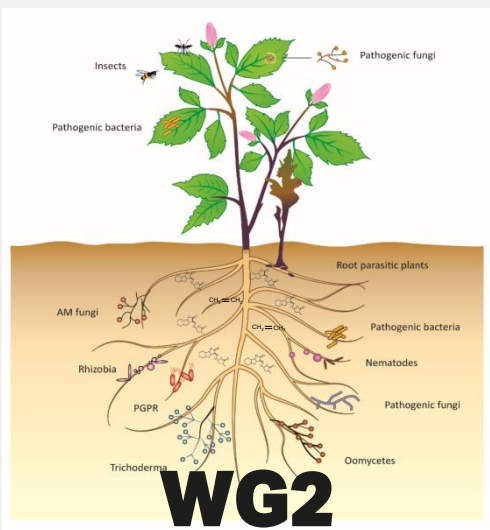
Molecular mechanisms associated with beneficial interaction networks

DELIVERABLES

- **D2.1.** A comprehensive analysis of the specific and shared molecular mechanisms governing the different beneficial root-associated microorganisms (**Year 2, semester 1; publication**)
- **D2.2.** A comprehensive analysis of the molecular mechanisms that control complex multiple beneficial root-associated microorganism interactions (**Year 3, semester 1; publication**)
- **D2.3.** An evaluation of the impact of agronomical practices and climate change-related environmental conditions on the molecular mechanisms previously identified (**Year 4, semester 1; publication**)



WG2



Molecular mechanisms

DELIVERABLES

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Plant Communications

Review article

CellPress
Partner Journal

January 2026

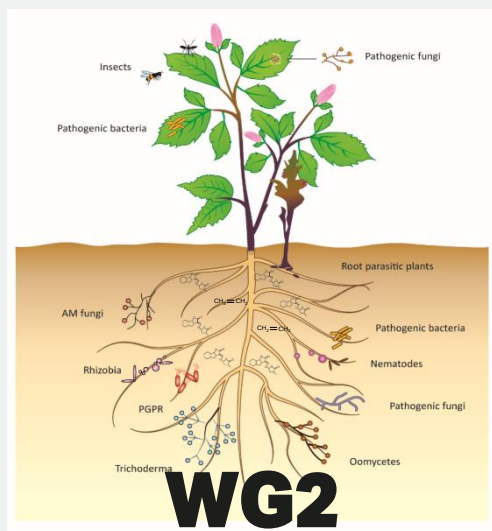
Cites = 5

Molecular mechanisms modulating beneficial plant root-microbe interactions: What's common?

Juan Antonio López-Ráez^{1,*}, Joanna Banasiak², Manuel Becana³, Sofie Goormachtig^{4,5}, Luisa Lanfranco⁶, Estibaliz Larrainzar⁷, Benoit Lefebvre⁸, Claire Veneault-Fourrey⁹ and Florian Frugier^{10,*}



WG2



Molecular mechanisms

Molecular mechanisms associated with beneficial interaction networks

DELIVERABLES

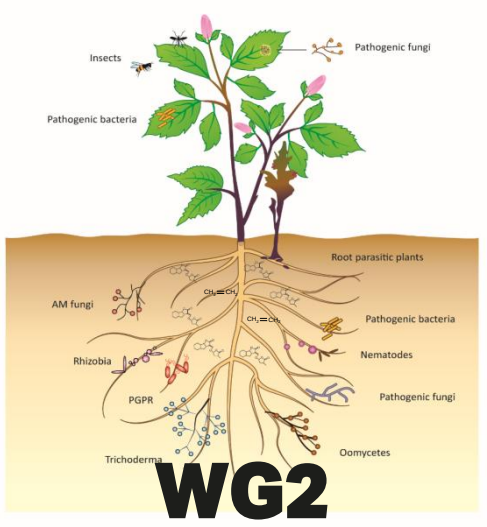
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- **D2.3.** An evaluation of the impact of agronomical practices and climate change-related environmental conditions on the molecular mechanisms previously identified (**Year 4, semester 1; publication**)

Meta-analysis





WG2



Molecular mechanisms

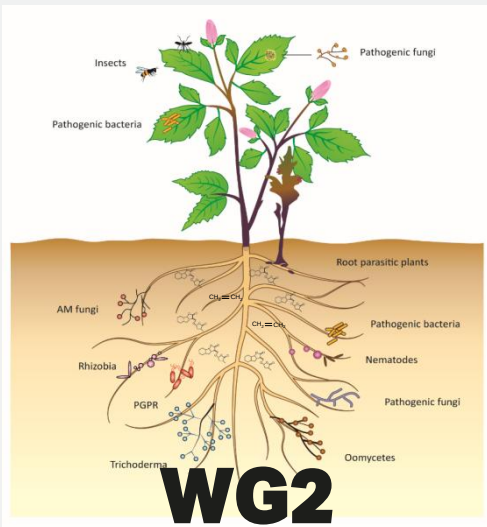
STSMs (5 calls)

45 STSMs granted

50% related to WG2



WG2



Molecular mechanisms

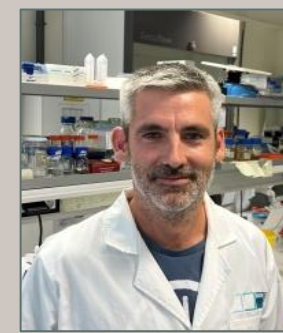
Molecular mechanisms associated with beneficial interaction networks

WG2 webinars

Organizers



Naomi STUER
(VIB; Ghent University)
(Belgium)



Rafa MORCILLO
IHSM-CSIC
(Spain)

Schedule: Bimonthly

<https://conectaha.csic.es/b/raf-k1s-mpl-lea>