

DISIT Seminar Series

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Room 204



Mycorrhiza Induced Resistance: Functioning and Applications in Agriculture

[Prof. Maria Jose Pozo Jimenez](#)

EEZ-CSIC, Granada



UNIVERSITÀ DEL PIEMONTE ORIENTALE



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Mycorrhiza Induced Resistance: Functioning and Applications in Agriculture

[Prof. Maria Jose Pozo Jimenez](#)

EEZ-CSIC, Granada

mjpozo@eez.csic.es

The mutualistic association between arbuscular mycorrhizal (AM) fungi and plants is widespread in nature and confers multiple benefits to hosts and ecosystems. Beyond improved nutrient acquisition, they enhance resistance/tolerance to biotic and abiotic stresses through greater metabolic and phenotypic plasticity, enabling more efficient activation of defenses. Numerous examples show AM plants exhibit increased resistance to pathogens and pests, a phenomenon known as Mycorrhiza-Induced Resistance (MIR). AM inoculation can affect not only the host plant but also the rhizosphere microbiota and, even the microbiomes of attacking herbivores.

Using tomato as a model, we show how MIR efficiently reduce damage by the destructive pest *Tuta absoluta*. We employ pharmacological and genetic approaches, omics technologies, and network analyses to understand the regulation and function of MIR and its effects across higher trophic levels, exploring its impact and potential synergy with other biocontrol agents. The strategy allowed the discovery of bioactive compounds mediating these effects with potential for biotechnological applications. Proof-of-concept field experiments under agronomic conditions show that MIR can reduce pest incidence without yield penalties, and modulate plant secondary metabolism improving fruit quality and antioxidant properties. We discuss the opportunities and challenges of integrating AM inoculants into integrated pest management programs for sustainable crop protection and fruit biofortification.

References

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