



Università degli Studi di Napoli Federico II

PhD in Biotechnology - 37th cycle

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The role of symbiotic microorganisms in the modulation of plant-insect interactions

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The reduction of pesticide use for plant protection is essential to enhance ecological and economic sustainability of agriculture and for reducing its impact on human health. Microorganisms can establish mutualistic symbiotic associations with plants, promoting their growth and conferring protection against different biotic stress agents [1]. The aim of this PhD project is to study the functional and molecular bases of these multitrophic interactions focusing on fungal endophytes (*Beauveria bassiana* and *Trichoderma sp*) colonizing tomato plants, and two tomato insect pests: the noctuid moth *Spodoptera littoralis* and the aphid *Macrosiphum euphorbiae*. The impact of plant defense barriers triggered by fungal colonization on these pests and their natural antagonists will be studied and the underlying mechanisms analysed at holobiont level, considering the role played by the insect associated microbiota. This background information will allow the development of bioinspired pest control technologies based on the manipulation of immune interactions among different trophic levels, using synergistic combinations of biocontrol agents and RNAi-mediated silencing of immune genes. The enhanced impact of pest natural antagonists will be pursued, while minimizing the negative effects on non-target organisms, towards a more sustainable management of agricultural systems.

References

- [1] Sugio, A., Dubreuil, G., Giron, D., Simon, J.C., 2015. Plant-insect interactions under bacterial influence: Ecological implications and underlying mechanisms. *J. Exp. Bot.* 66, 467–478.