



Università degli Studi di Napoli Federico II

PhD in Biotechnology - 35th cycle

Dr. Elia Russo

Bioinsecticides from Insect Parasitoids

Tutor: Prof. Francesco Pennacchio

Department: Department of Agricultural Science, Via Università, 100 – Portici (Naples)

Biological control strategies based on the use of natural antagonists are among the non-chemical alternative approaches to the most widely used pesticides.

The study of the antagonistic associations between parasitoid wasps and their insect hosts, and of the virulence factors triggering severe alterations of host physiology, development and reproduction, pave the way towards the identification of molecules with potential insecticidal activity, for which adequate delivery strategies have to be developed for an effective and safe application.

This PhD project will focus on the host-parasitoid system *Acyrtosiphon pisum/Aphidius ervi* (Homoptera, Aphididae/Hymenoptera, Braconidae), aiming to develop an in-depth functional analysis of the host regulation factor *Ae-γ-GT1*, which is the major component of the wasp venom. This will be performed by RNA interference (RNAi)-mediated silencing of the gene encoding *Ae-γ-GT1* in *A. ervi* females and assessing the phenotypic changes induced in host aphids parasitized by these silenced females. Concurrent studies on phenotypic alterations in host aphids receiving an injection of the purified recombinant *Ae-γ-GT1* protein will be performed.

The oral delivery of this virulence factor will be pursued by protein engineering, to generate fusion products bearing a domain facilitating the transepithelial transport of *Ae-γ-GT1* across the gut, so that it can reach the haemocoelic receptors in a bioactive undegraded form.