



**UNIVERSITY OF CYPRUS**  
**DEPARTMENT OF BIOLOGICAL SCIENCES**

The Department of Biological Sciences cordially invites you to the thesis defense  
of the PhD candidate

**Georgios S. Michaelides**  
(Dr. Spyros Sfenthourakis Research Laboratory)

entitled

**“SUSCEPTIBILITY OF TUTA ABSOLUTA TO INSECTICIDES, IDENTIFICATION OF RESISTANCE  
MUTATIONS AND BIOLOGICAL CONTROL WITH TWO GENERALIST PREDATORS”**

Abstract

*Tuta absoluta*, known as the South American tomato pinworm, is one of the most disastrous pests of tomato cultivations, presently menacing tomato cultivations worldwide. In 2006, *T. absoluta* invaded Spain from South America. Since then, it spread rapidly to most European, African and Asian countries. Such alien invasive species can minimize crop production, whereas the increasing use of insecticides raises various environmental concerns, as well as worries on control costs, control failure and the toxicity to non-target organisms. The S. American tomato pinworm is mostly controlled by chemical insecticides, and failure to control it is not a rare phenomenon. The tomato pinworm can infest also other cultivated and native wild Solanaceae plants.

Despite the availability of a variety of preventive and biological control measures for this pest, farmers rely mostly on insecticides. Several examples of insecticide resistance have been reported from different countries where the tomato pinworm is present. In order to develop a successful Insecticide Resistance Management (IRM) strategy for any major pest, one needs to identify the baseline toxicity to insecticides and then monitor susceptibility levels. It is worth noting that in Cyprus, the current status of susceptibility levels to the main insecticides used to control *T. absoluta* has never been studied before.

Our first aim was to investigate the susceptibility levels of Cypriot *T. absoluta* populations against the four main insecticides (chlorantraniliprole, indoxacarb, emamectin benzoate, spinosad) that are mostly applied against it. More precisely, we found that the insecticides chlorantraniliprole and indoxacarb could not control the Cypriot *T. absoluta* populations anymore. However, the insecticides emamectin benzoate and spinosad are very effective against it.

Moreover, it was of interest to identify the mechanisms that drive the development of resistance to indoxacarb and chlorantraniliprole. Thus, we conducted molecular analyses to find out if there were any mutations at the transmembrane proteins where these two insecticides act. Two point mutations for each one were detected. The F1845Y and V1848I target-site mutations for indoxacarb; the G4903V and I4746M mutations for chlorantraniliprole.

A hot topic in modern agriculture is the introduction of natural enemies of pest species in the frames of Integrated Pest Management (IPM) programs aiming to control them in an environmentally friendly manner. Therefore, in the last part of this thesis we conducted research on two generalist predators, *Nesidiocoris tenuis* and *Macrolophus pygmaeus* (Hemiptera: Miridae), to find out if they are effective in controlling *T. absoluta* eggs. We tested specifically their functional response and their intra- and interspecific interactions when preying on *T. absoluta* eggs. We concluded that these two predators could not only control this pest, but also suppressed effectively *T. absoluta* eggs when present in high densities.

**Tuesday, May 7, 2019 at 10:00**  
**Building ΘΕΕ02, Room B230 (Panepistimioupoli Campus)**

**The presentation is open to the public.**