



H.F.R.I.
Hellenic Foundation for
Research & Innovation

Description of the funded research project
2nd Call for H.F.R.I. Research Projects
to Support Post-Doctoral Researchers

Title of the research project: *Curculio elephas*: novel tools for Integrated Pest Management (IPM) on chestnut trees

Principal Investigator: Eirini Anastasaki

Reader-friendly title: CENOTOMA

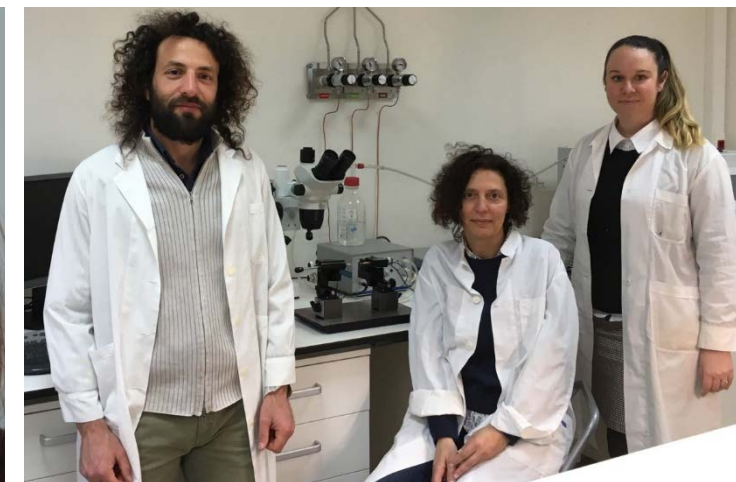
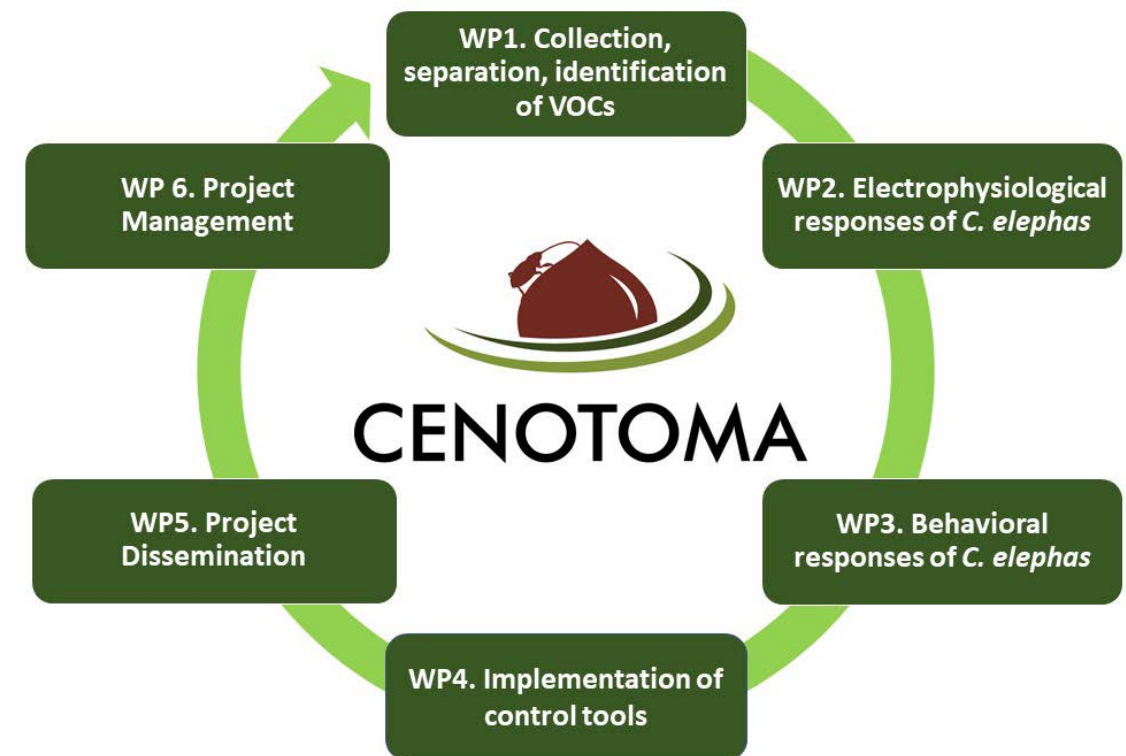
Scientific Area: Agricultural Sciences–Food Science & Technology

Institution and Country: Benaki Phytopathological Institute, Greece

Host Institution: Benaki Phytopathological Institute

Collaborating Institution(s):-

Project webpage (if applicable): www.cenotoma.gr (under construction)



Budget: 170.000 €

Duration: 36 months

Research Project Synopsis

Understanding mechanisms underlying insects' host choice is important to the study of plant-insect interactions. Plants emit a variety of volatile organic compounds (VOCs) that play multiple roles in plant-insect interactions; they are important cues for insects to locate an appropriate host plant or mating and oviposition sites. Insects of Curculionidae family, because of their almost exclusive preference for specific plant host genera, offer an ideal candidate for studying these plant-insect interactions.

*The chestnut weevil, *Curculio elephas*, is a weevil native to Southern and Central Europe, which feeds on the nuts of chestnuts and oaks.*

The objectives of CENOTOMA are:

- to identify VOCs from chestnut plant tissues applying static and dynamic headspace techniques combined with gas chromatography-mass spectrometry (GC-MS)*
- to assess electrophysiological responses of this insect pest to the plant material using Gas-Chromatography and Electro-Antennographical Detection (GC-EAD)*
- to examine electrophysiological behavioral responses to mixtures and individual VOCs from the host plant using the electroantennographic (EAG) technique and Y-tube olfactometer*
- to evaluate the active compounds in fields*

Project originality

*While, many aspects of the biology and ecology of the chestnut weevil have been studied, scarce research has been conducted to examine the important ecological chemistry behind this highly host-specific plant-insect system. No studies have been reported so far for *C. elephas* regarding its response towards VOCs emitted by its host plant.*

CENOTOMA targets an interesting system that has not been explored in depth. It will further contribute to scientific progress by extending our knowledge on this highly host-specific plant-insect system and to the elucidation of the chemical ecology that underpins insect plant interactions.

*The identification of potential compounds from chestnut trees that act as attractants for *C. elephas* females will enhance the development of novel integrated pest management tools such as the 'attract and kill' method.*

CENOTOMA will provide new tools for pest control that will lead to the limitation of pesticide use and plant protection products and the application of more environment-friendly tools.

Expected results & Research Project Impact

Elucidating the chemical ecology behind this highly host-specific plant-insect system, results from CENOTOMA will generate multidisciplinary scientifically-based knowledge. Results will shed light on C.elephas- chestnut interactions.

The identification of behaviorally relevant odorants will bring novel insect control methods that contribute increasingly to food and environmental security. CENOTOMA will set up and promote new guidelines to researchers, growers, stakeholders, commercial diagnostic laboratories, government staff and the general community to insect control.

The overall impacts of the scientific research will enhance:

- the environmental sustainability through the limitation of pesticides and plant protection products and the application of more environment-friendly products. The chestnut cultivation will reinforce the conservation and the preservation of natural resources.***
- the economic sustainability. Application of the project's results will improve product quality, yield and commercialization for a higher added value. The results will offer to the developers of the trap technology, the major tools for foresight, clever marketing, and an understanding of the needs of growers.***
- the social sustainability, by securing available marketable nuts, will increase employment and people involvement in the development and application of the processes of integrated pest management.***
- the reinforcement of the Greek research community. It will strength the collaboration among researchers and give research incentives for the new scientists, by enhancing interaction, knowledge transfer and research.***

The importance of this funding

H.F.R.I. funding is a great motive for academic progress. It provides the necessary tools to support research, which will greatly enhance my scientific training. Funding gives the opportunity, both on a personal level and to young scientists, who will be part of the research team, to expand knowledge on chemical ecology, an interdisciplinary approach that combines tasks of analytical chemistry and insect behavior. Being scientifically responsible gives the opportunity to gain experience in coordinating and managing research projects. The experience, that will be acquired, will be employed for future collaborations and research projects.



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