Layman's Report

0



Completion of LIFE-BIODELEAR

«Addressing Med fly with an innovative and environment friendly attractant through an Integrated Pest Management Strategy» LIFE BIODELEAR (LIFE13 ENV/GR/000414)









with the contribution of the LIFE+ financial instrument of the European Union









A R I S UNIVE THESS

Athens 2019

Life-Biodelear Layman's Report

Duration: 01/05/2014 - 25/10/2019 Budget: 2.205.454 euro



Goal:	The project aims to develop and implement he innovative attractant Biodelear for the control of the med fly in using the mass trapping technique.
Coordinator Hellenic: Type of organization:	Agricultural Organization DEMETER Description Research institution
Description:	The Hellenic Agricultural Organization (ELGO- DEMETER), which is funded by the Greek Ministry of Rural Development and Food, is the national body responsible for agricultural research and technology development. It carries out research in agricultural, forest and fish production, veterinary management, management of marine resources, soil science and land reclamation. The Institute of Soil and Water Resources is the coordinator beneficiary of the project.

Partners: Benaki Phytopathological Institute Aristotle University of Thessaloniki University of Thessaly



www.biodelear.gr

LIFE BIODELEAR (LIFE13 ENV/GR/000414)

What is Life-Biodelear project? What is the purpose?

Biodelear is an ambitious project which foresees the development of an integrated pest management strategy (IPMS) for the sustainable management for the control of Med fly (*Ceratitis capitata*) in the absence of insecticides using the mass trapping technique with a novel attractant which is no toxic to the people and to the environment, for the application in intensively cultivated Mediterranean areas.



Where?

The implementation of LIFE BIODELEAR is being performed in region of Kampos, in the island of Chios, Greece. This project will develop an integrated strategy through a series of actions and will use as pilot fruit crop the one of citrus trees, which are intensively cultivated in the island of Chios in Kampos for the last 500 years.

Who are we?

ELGO- DEMETER was the coordinator beneficiary of the project and the associated beneficiaries were Aristotle University of Thessaloniki, University of Thessaly and Benaki Phytopathological Institute. The project was co-funded by the European Union.



What is the attractant Biodelear?

Dr. V. Mavraganis developed and produced the innovative attractant Biodelear. Biodelear is produced during the known Maillard reaction between urea and reducing sugars such as fructose, under specific conditions.





UNIVERSITY OF THESSALY



ARISTOTELE UNIVERSITY of THESSALONIKI





Aristotle University of Thessaloniki Short name: AUTH Group Leader: Pr. nikolaos Koulousis Department of Crop Production, School of Agriculture Laboratory of Applied Zoology and Parasitology Faculty of Agriculture Forestry and Natural Environment nikoul@agro.auth.gr



University of Thessaly Short name: UTH Group Leader: Pr. Nikoloas Papadopoulos Department of Agricultural Crop Production & Rural Environment Laboratory of Entomology and Agricultural Zoology nikopap@uth.gr



Hellenic Agricultural Organization DEMETER / Short name: SSIA Researcher - Coordinator: Dr. Vassilis G. Mavraganis Department: Soil Institute of Athens Institute of Soil and Water Resources Mavrag1a@otenet.gr



Benaki Phytopathological Institute Short name: BPI Group Leader: Dr. Eleftheria Bempelou Department of Pesticides Control and Phytopharmacy Laboratory of Pesticide Residues National Reference Laboratory e.bempelou@bpi.gr



Kampos of Chios

0

"Kampos" is a unique, virtual citrus garden, centrally situated on the island of Chios and has been characterized by the Ministry of Culture as an "historic site". Fragrant citrus groves, with their characteristic high walls of Thimianan stone and rare mansions of aesthetic architectural grace, make up an incomparable residential complex. The region had developed as an urban area around the Castle of Chios by the Genoese during the 14th century, a date also signifying the introduction of citrus trees to the island.

Our program...





The phases of the Life Biodelear program



Background or Info for Ceratitis Capitata

The medfly, Ceratitis capitata is one of the most important part of the pest of the world fruit production. The Mediterranean fly Ceratitis capitata (Wiedemann) is one of the main entomological pest of fruit trees. It belongs to the Diptera class and is a member of the Tephritidae family. It is a polyphagous species with a very wide geographical spread. It therefore has a significant impact on world fruit trade, with a range of hosts that exceeds 300 plant species and includes mainly trees.



Kingdom:	Animalia
Phylum:	Arthropoda
Class:	Insecta
Order:	Diptera
Family:	Tephritidae
Genus:	Ceratitis
Species:	Ceratitis capitata

C. capitata originates from Africa with a possible origin point in the southeast of the Sahara Desert. The first recording of the insect in Mediterranean countries such as Spain and Italy took place in the middle of the 18th century. At the beginning of last century, the the Mediterranean fly was first recorded in California in 1975. The colonization of the Mediterranean took place either through the Nile Valley initially in Egypt and then on the coasts of the Middle East and the other Mediterranean countries or through the western coasts of the African

continent initially in Spain and from there to the rest of the countries. Today the development of human activities is followed by global concern about the economic impact of the spread of the Mediterranean fly and other species of the Tephritidae family.



Why is it difficult to deal with the **Mediterranean fly**?

- Number of hosts
- Procyclicality and difficulties in predicting population's phenology
- Oviposition close to host maturation
- Residues of insecticides in fresh fruit
- Few authorized active substances
- Implementation of integrated strategies requires high levels of organization



Our story

Mass trapping of Ceratitis capitata using the new attractant Biodelear

The efficacy of mass trapping was evaluated by comparing:

- a. Level of Ceratitis capitata population
- **b.** Fruit infestation rates
- c. Ground biodiversity of arthropods using pitfall traps.

Why?

In several places around the world, farmers fight against the Mediterranean fruit fly, which damages citrus and other fruit crops causing high losses in their production.

To minimize food losses and protect agricultural trade, beneficial organisms and the environment, the novel attractant **BIODELEAR** has been developed and used to mass-trap the insect.

Hundreds of plastic McPhail traps were placed on citrus orchards over an area of 10 ha.

BIODELEAR captures mainly the female Med flies, which are those that causes damage, and the past population could thus be controlled

and the pest population could thus be controlled.

Soil samplings took place in the experimental orchards in the area of Kampos, during the whole duration of the project. Soil samples were collected at depth increments of 0-30 cm and 30-60 cm.

Samples were subjected to main physicochemical analysis. The results showed Chios showed high values of the nutrients Cu, Zn, Mg and of the sulphate ions (SO4).

More than 2000 citrus fruit samples were sampled in accordance with Directive 91972/2003/EC. All samples were analyzed with two multiresidue analytical methods capable of analyzing 334 pesticides and 18 plant growth regulators. During the implementation of the project in the pilot area, the main insecticides determined in citrus fruits were chlorpyrifos, deltamethrin e.t.c. After the real scale application of **BIODELEAR**, no detectable residues were observed in the total of the samples analysed.











According to the obtained results

• The mass trapping technique with the innovative attractant **Biodelear** is a reliable solution for the control of medfly in citrus orchards.

• The application of **Biodelear** in citrus orchards had no negative effect in the environment and resulted in the elimination of insecticide residues in citrus fruits.

• **Biodelear**, due to its low cost and non-toxicity can become a significant tool for the Mediterranean fruit fly management in organic and low input orchards.

Moreover,

Biodelear has reduced infestation levels both in mandarin and orange crops.

Biodelear has selectively attracted the Mediterranean fruit fly and did not disturb non-target insect populations in areas where the mass trapping method was used.

The application of the attractant Biodelear in real scale resulted in non-detectable residues in the total of the citrus fruits examined.

The soil analysis of all citrus orchards in **Kampos Chios** showed high values of the nutrients Cu, Zn, Mg and of the sulphate ions (SO4).

Under the frame of **LIFE BIODELEAR**, the development of a sustainable IPMS foresees the decrease of pesticide residues, and in combination with soil quality indicators will contribute to the control of medfly due to the use of **Biodelear** attractant and finally to the recovery of citrus ecosystem.



Experimental orchards







Information sings were placed in all the citrus orchards involved in the project and they provided full information regarding beneficiaries, funding, duration and a short description of the project.



HOAHEAN

AAAHAAA

Under the framework of the dissemination plan of LIFE-BIODELEAR, the research team proceeded to the creation of promotional/ advertising material (hat, sack, notepad, pen, etc.).

KAAHE

XOAKIS









Journals and magazines

The attractant **BIODELEAR** and its promising results in the control of Medfly were presented in newspapers and magazines of rural interest.

Networking and dissemination activities

Participation in conferences



Project website

By typing https://www.biodelear.gr/index.php/en/, you will be visit the project's official webpage. Information about the progress and the implementation of project, its results and organized events are all available.

Biodelear network

If you want more information on Biodelear, just contact us (info@biodelear.gr) and join the Biodelear network.

Social media

The project Life-Biodelear developed social media (Facebook page), for broader spreading of information on, its activities and its results. If you want to enter the world of Biodelear, follow us: https://www.facebook.com/Biodelear

Workshops

Numerous workshops were organized aiming to inform farmers, agronomists, students and stakeholders in general.

Film

The Life-Biodelear research team in the framework of the promotion and communication of the program designed and created a film.



Networking and dissemination activities