



LIFE CONOPS (LIFE12 ENV/GR/000466)

Development and demonstration of management plans against – the climate change enhanced - invasive mosquitoes in Southern Europe



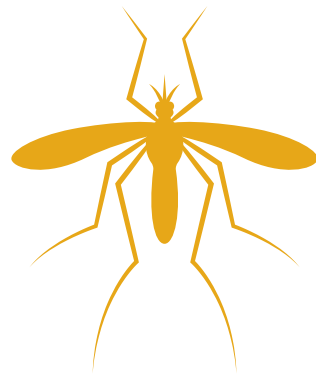
LIFE+ Environment Policy and Governance

LIFE CONOPS is co-financed by the LIFE+ programme (Environment Policy and Governance)



LAYMAN'S REPORT

"CONOPS" [Ko-no-ps] (Ancient Greek word for mosquito): Any of two-winged insects, the female of which has a long proboscis for sucking blood. Many mosquito species are vectors of diseases



life conops



01.07.2013
30.11.2018



Greece
Italy

life conops facts



Total budget
2.989.314 €



EC contribution
1.480.656€



PROJECT BENEFICIARIES



BENAKI
PHYTOPATHOLOGICAL
INSTITUTE



AGRICULTURAL
UNIVERSITY
OF ATHENS



Regione Emilia-Romagna



Institute of
Environment &
Human Resources



SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Azienda Unità Sanitaria Locale della Romagna



THE PROBLEM

Invasive species are the non-native species that invade in new biotopes and cause serious environmental, economic and human health impacts.

Several invasive mosquito species (IMS), including the Asian tiger mosquito (*Aedes albopictus*), have been inadvertently introduced in Europe, where they find favorable environmental and climatic conditions due to Climate Change established permanent populations. Consequently, new public health threats are emerging in different EU Member States, including Mosquito Borne Diseases such as Chikungunya, Dengue, Zika and West Nile that require the adoption of specific measures.





THE CHALLENGE

LIFE CONOPS project aimed at the development of Integrated Management Plans for the early detection and effective and environmentally friendly population control of the invasive mosquito species across Europe.

The project was implemented in Italy and Greece taking into consideration the climatic conditions as well as the parameters related to their (IMS) population monitoring and socioeconomic effects in both countries.





METHODOLOGY

A.

LIFE CONOPS project was implemented in three distinctive phases:

The preparatory phase that included the:

- Assessment of the current situation regarding the presence, distribution and population dynamics of invasive mosquitoes in Greece and Italy.
- Assessment and mapping of major climatic and environmental parameters affecting the spread and establishment of these invasive species.
- Assessment and analysis of the socio-economic impact of the spread and establishment of invasive mosquitoes.

B.

The implementation phase that included the core design, development and pilot activities of the project:

- Development of novel (prototype) invasive mosquitoes monitoring device and pilot implementation surveillance in high-risk areas in Greece and Italy
- Entomological surveillance at selected high-risk areas which are identified as IMS points of entry.
- Development and evaluation of biodegradable substances of natural origin as potential larvicidal and repellent agents.
- Assessment of the impact of climate change on the spread and establishment of invasive mosquitoes.
- Development of integrated management plans to control IMS.

C.

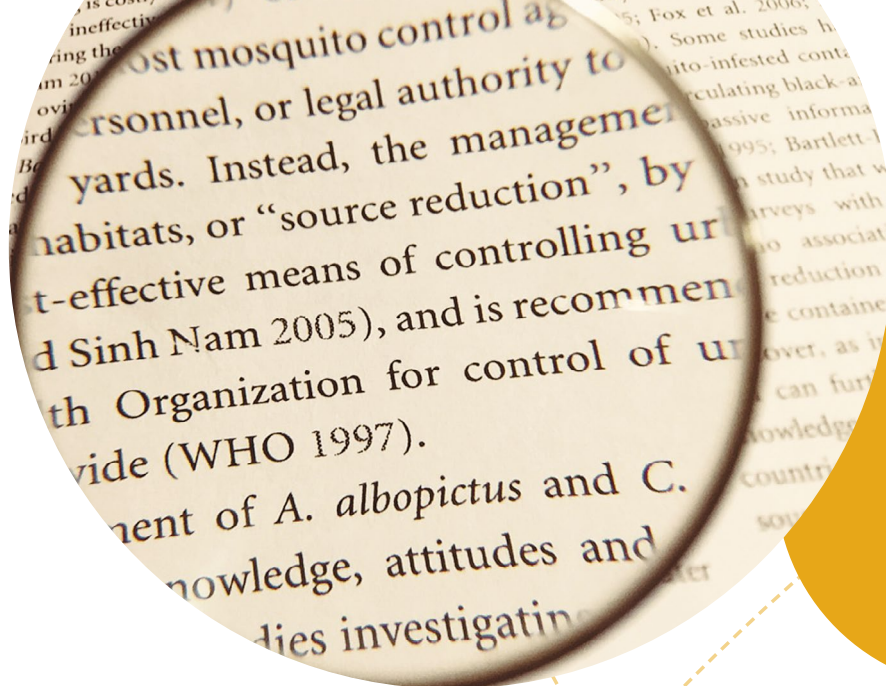
The monitoring phase that was necessary for the quality control/ assurance of the:

- Performance of the pilot implementations
- Environmental impacts of the management plans
- Socio-economic impacts of the management plans



LIFE CONOPS ACTIONS





INNOVATION

Prototype Monitoring Device (MD)

A prototype Monitoring Device (MD) was designed and 12 MDs were manufactured and tested so as to play an important role in assisting efficiently and cost effectively the surveillance of IMS in high risk areas. Its main innovation aspects are:

- continuous operation for a period of at least 1 month (one sample/day) or 95 sampling periods (on-demand)
- assisted collection of mosquitoes through a continuous air-flow
- equipped with the option of carrying appropriate attractants (lactic acid, CO₂)
- light weight sampling pot manufactured by a recyclable material
- highly durable in extreme climatic conditions
- remote monitoring, control and programming of its operation
- preservation of the collected mosquitoes in temperature ranging from 0°C to 4°C
- equipped with a meteorological station for the simultaneous monitoring of the existing climatic conditions.



Management Plans

Invasive mosquito species cause high concern in public health because they are vectors of pathogens. LIFE CONOPS management plans offer a comprehensive practical technical guideline to assist local authorities in organizing their vector control activities. LIFE CONOPS management plans are currently legally operating in Greece since August 2016, when a ministerial circular was produced by the Hellenic Ministry of Health and was distributed to all public health units in Greece. Local authorities, that are responsible for organizing the vector control activities, implement LIFE CONOPS management plans (via the ministerial circular) for all imported cases (Vector-borne-Diseases from IMS).

In Italy improvements of the previously adopted mosquito control measures have been obtained throughout the LIFE CONOPS project such as the implementation of the door-to-door strategy, the quality control on the mosquito control treatment following imported cases of Vector-borne-diseases and the evaluation of environmental impact of Diflubenzuron (most commonly used insecticide).


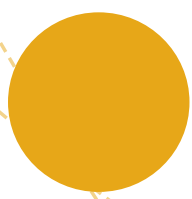
Sterile Insect technique*

The innovation and demonstration value of the project is also amplified by the implementation of Sterile Insect technique (SIT) against the Asian tiger mosquito (*Aedes albopictus*). In autumn 2018, for the first time in Greece, the SIT pilot trial was launched in the area of Vravrona (Municipality of Markopoulo). The whole philosophy of SIT is based on the release of sterile male insects in order to halt the reproduction process of the targeted mosquito species. The method of releasing sterile insects was combined with the mosquito management methods developed within LIFE CONOPS**. In the case of Vravrona, the continued release of such sterile males in combination with other management methods eventually led to a reduction of *Aedes albopictus* population.

* What is SIT?

The sterile insect technique is an environmentally-friendly insect pest control method involving the mass-rearing and sterilization, using radiation, of a target pest, followed by the systematic area-wide release of the sterile males in defined areas, where they mate with wild females resulting in no offspring and a declining pest population. (IAEA website, <https://www.iaea.org/topics/sterile-insect-technique>)

*** The release of sterile male insects was carried out in collaboration with the project "TC Project Developing Genetic Control Programs on Aedes Invasive Mosquitoes in the European Region (TC7-RER-5.022-001)" funded by the International Atomic Energy Commission. The implementation of this project in Greece is coordinated by the Benaki Phytopathological Institute (Dr. Antonios Michaelakis), in collaboration with the Hellenic Atomic Energy Commission and the University of Thessaly (Laboratory of Entomology and Applied Zoology).*





RESULTS

With the completion of the project the following results have been achieved:

- Risk analysis on the current and future climatological conditions is delivered and presented in appropriate maps for the most important Invasive Mosquito Species in Greece and Italy.
- Integrated Management Plans for the population surveillance and control of invasive mosquitoes as well as their potential application in high risk areas are available to the competent authorities.
- Socioeconomic evaluation of the IMS problem and the management plans provides useful data to national authorities in order to acquire the required resources in case of emergency.
- An extensive entomological surveillance with established oviraps' network gathering useful data regarding the presence, seasonal abundance and population density of Invasive mosquito species was installed providing an early warning system regarding IMS and Vector Borne Diseases.



Entomological surveillance with 12 Monitoring Devices:

Athens International Airport, Piraeus, BPI, Patra, Orestiada, Chania, Mytilene, Thessaloniki airport, Ravenna, CAA, Rovereto, Ancona.

- Several Mediterranean culinary plants were selected as subject of a bio-prospecting* endeavour aiming the development and of novel biodegradable mosquitoes repellants and larvicidals of natural origin. Their activity was evaluated in large scale field tests -performed for the first time in the terms of LIFE CONOPS project implementation- highlighting their potentials for replacing the corresponding synthetic chemicals. The lessons learned and the acquired knowledge are valuable for the development of novel natural agents.

** Bio-prospecting is the process of discovery and commercialization of new products based on biological resources*



LIFE CONOPS BENEFITS

Environmental benefits

- Increased capacity for early detection of new IMS in points of entry allowing the adoption of more cost-effective measures.
- Reduction in the use of toxic insecticides through a better understanding of the IMS phenomenon and improved capacity to prevent the problem from becoming an area-wide issue.
- Improved capacity for detecting insecticide resistance at the initial phase and to adopt managing strategies allowing the rational use of mosquito control products.
- Energy savings and reduction of emissions by using the prototype MD that does not entail the increased transportation requirements as the commonly used surveillance methods do.

Long-term benefits

- More convenient cost-benefit approach by implementing IMS surveillance activities allowing early detection of IMS and rapid adoption of suppression measures.
- Positive effects on public health by the use of IMS management plans. Improved wellness of people in areas where the management plans are implemented.
- Minimized public and private costs for confronting IMS.
- Raising awareness in public health authorities and general public about mosquito related problems.





PUBLICITY/ COMMUNICATION & DISSEMINATION

An extensive information campaign was implemented during the LIFE CONOPS project. It is noteworthy to mention that these activities in most cases surpassed the targets set, at the start of the project.

5 Stakeholders workshops

were organized (3 in Greece, 2 in Italy) with a total number of



970 participants which were mainly agricultural, environmental and veterinary scientists, public health decision makers and pest control professionals. The Mid-term workshop in Athens, during which the management plans were presented, received more than **60 references** from newspapers and electronic media in Greece (CNN Greece, in.gr, SKAI, Imerisia, Athens Voice, Agrotypos, Agronews, Newsbomb, etc).

>20 TV and Radio interviews of LIFE CONOPS team members

(ERT TV, ANT1, ALPHA TV, STAR TV, SKAI TV, RealFM, CNN Greece, Thessaloniki FM, Crete TV, NEA TV, Corfu TV, Speciale Salute TV, etc)

Video with information

about mosquitoes and protection measures which counts > **44,000 views** (www.conops.gr/videos). This video was also approved and broadcasted as a social message by all Greek TV stations

> **99,100** Website visitors
> **248,000** page views



>100 general public articles

in national and/or local press and press releases for LIFE CONOPS activities

>10 scientific journal articles

in peer review journals (Parasitology Research, Ecological Economics, Pathogens and Global Health, PLOS ONE, Vector Biology Journal, Acta Tropica, Bulletin of Insectology, etc).



LIFE CONOPS leaflets **>20,000** were distributed:



- To citizens of several Municipalities (Kifissia, Palaio Faliro, Neo Irakleio, Psychikou, Fylis)
- To the Region of Western Greece
- To several pest control companies

>75 presentations

of LIFE CONOPS at conferences, workshops, meetings and other events

2 MD Presentation/
demonstration events

- during the Mid-term workshop that was held in AUA premises on 10.12.2015 (350 participants)
- at a LIFE event that was held in the Airport of Thessaloniki "Makedonia" on 21.4.2016 (60 representatives of DG Environment, LIFE unit and NEEMO)



Educational project



about mosquitoes was implemented in Cesena (Italy). The project involved

11 classes and **273 students** from two different high schools

Mosquito weather forecast*

was included in the forecasts presented by www.meteo.gr. The application calculates and presents the index of mosquito activity which is an indication of the activity of mosquitoes in an area related to the forecasted weather conditions.



*Developed in cooperation with the Institute of Environmental research and Sustainable development of the National Observatory of Athens



NETWORKING

An extensive network with other projects, public organizations, as well as private companies and individual scientists has been established during the LIFE CONOPS implementation. This network was established in order to facilitate the LIFE CONOPS successful implementation, to exchange information regarding IMS and to communicate similar efforts regarding the confrontation of IMS problem.

Indicative External collaborations:

- 7 LIFE, FP7 and other EU projects
- European Centre for Disease Prevention and Control (ECDC)
- International Atomic Energy Agency
- Hellenic Center for Disease Control & Prevention
- National School of Public Health
- Italian National Health Institute
- Associazione Nazionale delle Imprese di Disinfestazione (ANID)
- Greek Pest Control Association (GPCA)
- National Observatory of Athens
- Region of Crete
- Region of Western Greece
- Municipalities of Chania, Palaio Faliro, Kifissia, Neo Irakleio, Psichiko, Fyli, Mytilini
- Athens International Airport
- Patra's port
- Fraport Greece SA
- Attiki Odos SA
- Ravenna port authority
- Ancona port authority
- Istituto Zooprofilattico Umbria Marche
- Istituto Zooprofilattico Lombardia Emilia-Romagna
- Piraeus Container Terminal SA





Invasive
Mosquito Species
management

Contact

Project Coordinator: Dr Antonios Michaelakis



Stefanou Delta 8, 14561, Kifissia, Greece



+30 210 8180215



+30 210 8077506



lifeconops@conops.gr, a.michaelakis@bpi.gr



For more information
scan the QR Code



@life_conops