FruitFly Net

Project funded by the EUROPEAN UNION

ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet project overview

4th (Final) Consortium Meeting

Open Day Workshop

December 7-10, 2015

Athens – Volos, Greece

Theodore Tsiligiridis (tsili@aua.gr)

Professor on Networking and ICT in Agriculture

Agricultural University of Athens

CRA
CONSIGLIO PER LA RICERCA E LA SPERIMENTAZIONE IN AGRICOLTURA

UIB Universitat de les Illes Balears

Project
funded by the
EUROPEAN UNION

ENPI
CBCMED
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN

This presentation has been produced with the financial assistance of the European Union under the ENPI CBC Mediterranean Sea Basin Programme. The contents of this presentation are the sole responsibility of AUA and can under no circumstances be regarded as reflecting the position of the European Union or of the Programme's management structures.

The 2007-2013 ENPI CBC Mediterranean Sea Basin Programme is a multilateral Cross-Border Cooperation initiative funded by the European Neighbourhood and Partnership Instrument (ENPI). The Programme objective is to promote the sustainable and harmonious cooperation process at the Mediterranean Basin level by dealing with the common challenges and enhancing its endogenous potential. It finances cooperation projects as a contribution to the economic, social, environmental and cultural development of the Mediterranean region. The following 14 countries participate in the Programme: Cyprus, Egypt, France, Greece, Israel, Italy, Jordan, Lebanon, Malta, Palestine, Portugal, Spain, Syria (participation currently suspended), Tunisia. The Joint Managing Authority (JMA) is the Autonomous Region of Sardinia (Italy). Official Programme languages are Arabic, English and French (www.enpicbcmed.eu).

The European Union is made up of 28 Member States who have decided to gradually link together their know-how, resources and destinies. Together, during a period of enlargement of 50 years, they have built a zone of stability, democracy and sustainable development whilst maintaining cultural diversity, tolerance and individual freedoms. The European Union is committed to sharing its achievements and its values with countries and peoples beyond its borders.

The project FruitFlyNet total budget is 1.662.872,32€ and it is financed, on an amount of 1.496.585,09€ (90 %), by the European Union (ENPI CBC Mediterranean Sea Basin Programme) through the European Neighbourhood and Partnership Instrument.

Editor(s): Theodore Tsiligiridis
tsili@aua.gr

FruitFlyNet project

- How sprayings will become easier, fewer, locally applied and more effective?
- How a less polluted and healthier environment will be created?

Compared to common spray tactics against for example some key fruit flies population how reliable is to expected to achieve:

1. An increase of the efficacy of the sprays from ground.
2. A reduction of the mean spray.
3. A reduction of the mean spray duration of the spray applications.
4. A reduction of the spraying volume.
5. A reduction in the number of insecticide applications.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Overall Information

Title: A Location–aware System for Fruit Fly Monitoring and Pest Management Control

Code: Standard II-B/2.1/0865/ENPI CBC MED/EU

Priority 2: Promotion of environmental sustainability at the basin level.

Measure 2.1: Prevention and reduction of risk factors for the environment and enhancement of natural common heritage.

Budget: € 1.662.872,32

Programme contribution (90%): € 1.496.585,09

Project co-financing (10%): € 166.287,23

Duration: 24 months

Start Day: 31.12.2013 End Day: 31.12.2015

Website: fruitflynet.aua.gr e-mail: fruitflynet@aua.gr

Project funded by the EUROPEAN UNION

ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Partners

1. **Beneficiary:**

   B/AUA: Agricultural University of Athens, Department of Agricultural Economy and Development, Informatics Laboratory, (Hellenic Republic, Attiki), EU.

2. **Partnership:**

   - PP1/ARO: Agricultural Research Organization (Israel: Arava, Negev), non-EU.
   - PP2/NCARE: National Center of Agricultural Research and Extension (Jordan: Al-Balqa), non-EU.
   - PP3/CRA-FRU: Agricultural Research Council, Fruit Tree Research Centre (Italy: Lazio), EU.
   - PP4/UIB: University of the Balearic Islands, Department of Biology (Spain: Baleares), EU.
   - PP5/UTH: University of Thessaly, Department of Entomology and Agricultural Zoology (Hellenic Republic: Thessaly), EU.

Contact person:
Mr. Theodore Tsiligiridis
Professor on Networking and ICT in Agriculture
Informatics Laboratory,
Agricultural University of Athens
e-mail: tsili[at]aua[dot]gr
tel: +30 (210) 529.4176, fax: +30 (210) 529.4176
skype: tsiligiridis.theodore

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Main Goal

General Objective: To contribute to the development and implementation of environmentally effective e-monitoring and ground spraying control solutions based on prototypes, technological innovations, and knowledge transfer for specific key-pests in the Mediterranean, in order to increase the quality and quantity of available fruit to local consumers at lower prices.

Indicators:

1. One prototype developed per case to increase efficacy of sprays per pilot area by the end of the project.
2. Knowledge transfer to the final beneficiaries/target groups of good practices (reduce sprayings, better applications, etc.) developed by the outputs of the project activities.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Specific goals

- **Goal 1:** Create a control system that will harmonize management strategies for specific key-pests (*B.Oleae*, *C.Capitata*, *R.Cerasi* & *B.Zonata*, *D.Cilliatus* - invasive species).
- **Goal 2:** Contribute to the development and implementation of environmentally effective e-monitoring & ground spraying control solutions, so as to increase the quality & quantity of available fruit to local consumers at lower prices.
- **Innovation:** Development, implementation, test and demonstration of an innovative, integrated, Location Aware System (LAS) for fruit fly e-monitoring and ground spraying control based on a Real –time Trapping & Insect Counting (ReTIC) system that can rationalize the use of insecticides.
- **Geospatial data delivery:** Implementation of four fruit fly operational pilots (*OliveFlyNet*, *MedFlyNet*, *CherryFlyNet*, *InvasiveFlyNet*) in five Med countries to demonstrate the advantages of LAS compared with conventional methods.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Interesting Parties

- **Target Groups**
  - Farmers, growers, landowners.
  - SMEs, Cooperative Unions.
  - Citizens.
  - Local communities living near spraying areas.
  - Phytosanitary inspectors.
  - Spraying operators.
- **Final Beneficiaries**
  - Pest-control operational industry.
  - National and/or International organizations dealing with the supervision of Tephritid control and their geographic expansion.
  - Agricultural, Environmental Protection, UN Food, UN FAO, IAEA Institutes and/or Organizations.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Objectives

Specific Objective: To develop, implement, test, and demonstrate an innovative, integrated, Location Aware System (LAS) for fruit fly ground spraying control, by means of four (4) pilot prototypes in five (5) Med-countries aimed at developing prototypes, technological innovations and knowledge transfer.

Pilot Prototype	Fruit fly key insect	Country - Region	Partner
OliveFlyNet	*Bactrocera oleae*	Spain (Balearic Islands)	PP4 (BIU)
		Jordan (Al-Balqa)	PP2 (NCARE)
CherryFlyNet	*Rhagoletis cerasi*	Hellenic Republic (Thessaly - Agia)	PP5 (UTH)
MedFlyNet	*C. capitata*	Italy (Lazio)	PP3 (CRA–FRU)
InvasiveFlyNet	*Bactrocera zonata* *Dacus cilliatus*	Israel (Arava, Nagev)	PP1 (ARO)
Test site	*Bactrocera oleae*	Hellenic Republic (Attiki)	B (AUA)

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Background info

- Experimental design per pilot site.

***MedFly* Pilot Site (PP3, Italy)**	***CherryFly* Pilot Site (PP5, Hellenic Republic)**	***InvasiveFly* Pilot Site (PP1, Israel)**	
# of Blocks: 3 # Plots/Block: 3 (LAS, No LAS, Control) Plot size: 3 ha Orchard: Peaches trees Area: Rome, Lazio, IT *Ceratitis Capitata*	# Blocks: 4 # Plots/Block: 3 (LAS, No LAS, Control) Plot size: 0,5 - 1 ha Orchard: Cherry trees Περιοχή: Agia, Thessaly, Hellenic Republic *Rhagoletis Cerasi*	# Blocks: # Plots/Block: Plot size: 0.75 ha Home gardens. Region: Nagev , IL *Bactrocera zonata*	# Blocks: # Plots/Block: Plot size: 0.75 ha Tunnel: Melons, peppers, cucumbers, etc. Region: Avara, IL *Dacus cilliatus*

***OliveFly* Test Site (B, Hellenic Republic)**	***OliveFly* Pilot Site**	
	(PP4, Spain)	**(PP2, Jordan)**
# Blocks: 1 # Plots/Block: 3 (LAS, No LAS, Control) Plot size: 1 ha Orchard: Olive trees Region: Koropi, Attiki, Hellenic Republic *Bactrocera Oleae*	# Blocks: 3 # Plots/Block: 3 (LAS, No LAS, 1 Control) Plot size: 1 ha Orchard: Olive trees Περιοχή: Palma, Mallorca, SP *Bactrocera Oleae*	# Blocks: 2 # Plots/Block: 2 (LAS, No LAS, Control) Plot size: 2 ha Orchard: Olive trees Area: Amman, Jordan *Bactrocera Oleae*

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements

1. ***Achievement:***

   An operational pilot in each one of the five (5) Med-countries.
   Prototyping *FruitFlyNet* solutions in representative application scenarios applied for four key-pests (21-month).

   Indicator:

   - Four fruit fly operational pilots:
     - *OliveFlyNet*,
     - *MedFlyNet*,
     - *CherryFlyNet*,
     - *InvasiveFlyNet*

     in five Med countries and one test site.
   - Five (5) WMSNs deployed in five (5) pilot regions plus a reference model.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements

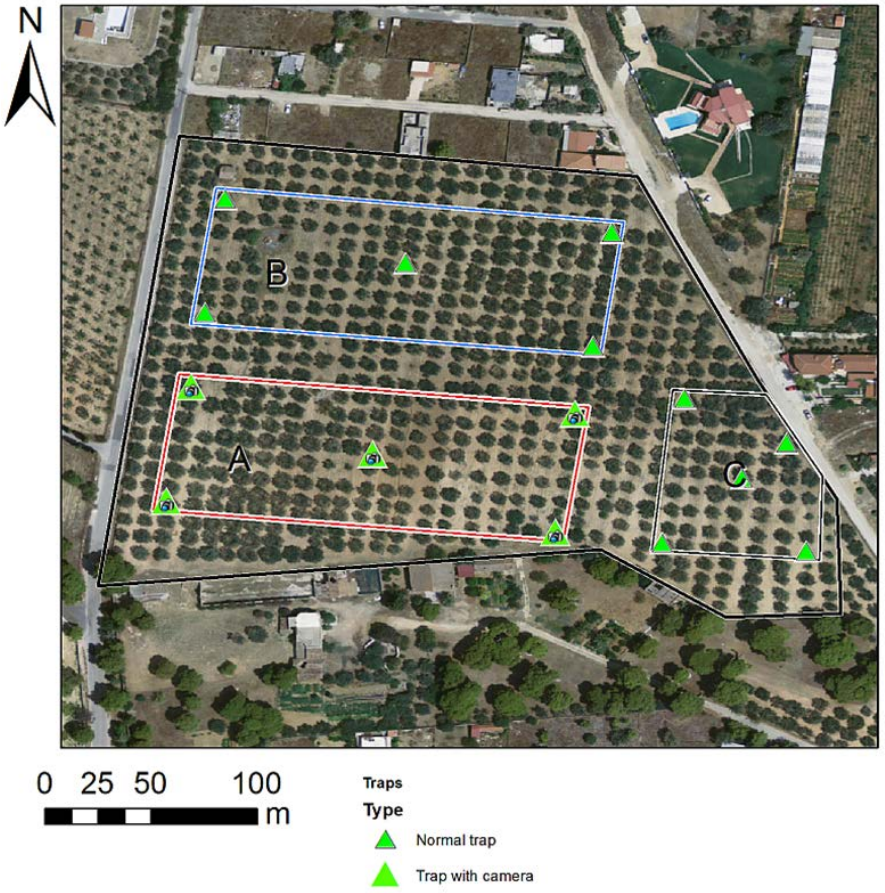
Comparison between standard (NO LAS) and the new (LAS: Location Aware System) method

Traditional Method (NO LAS)		New Method (LAS)
Trapping Sampling	Monitoring fruit fly species	Trapping + Sampling + use of e-traps, Fast recording.
Meteorological measurements	Meteorological data	Sensors Network, Interpolation for large regions
Traditional, operations	Decision	Assisted by computer, Risk assessment in the field, Real-time warning
Experience	Spraying application	Location aware, variety, fruit loan, interpolation of the population of the fruit flies and meteorological data, spraying volume control, tracing.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements

- Experimental Design: Reference model.



Test site: AUA

- Same plot size/shape
- Same number of trees
- Buffer zone determination
- Plot Orientation
- Single Variety (Manaki)
- Uniformity Cultivation (age, height, fertilization, irrigation, etc.)
- Interpolation requirements
- Same number per plot.
- In LAS plot:
  - McPhail with direct recording.
  - Validate ReTIC.
- Sensors: T: Temperature, RH: Relative Humidity, W: Wind speed, P: Precipitation, F: Fluid level.
- Data for decisions “when” and “how” to spray.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements

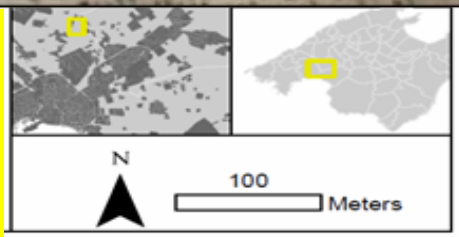
- Experimental Design – *OliveFlyNet*: Olive Trees - *Bactrocera Oleae*

Son Llompart Nou

Block 1
Plot 1: LAS 194 trees
Plot 4: No LAS 198 trees
Block 2
Plot 2: LAS 196 trees
Plot 5: No LAS 197 trees
Block 3
Plot 3: LAS 192 trees
Plot 4: No LAS 162 trees
Control
Plot 7: 24 trees

N
150
Meters

Experimental Design: *OliveFlyNet*
Pilot site: Mallorca, SPAIN
Blocks: 3 (17,8 ha, 3304 trees),
Plots/Block (LAS, NO LAS): 1 ha + CONTROL
Production: Olive trees
Fruit Fly Species: *Bactrocera Oleae*

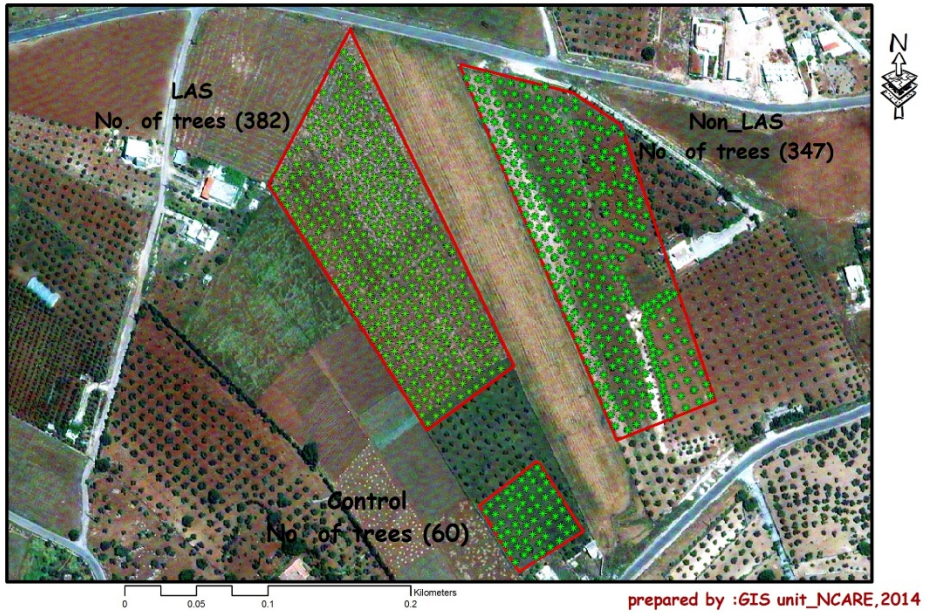


Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

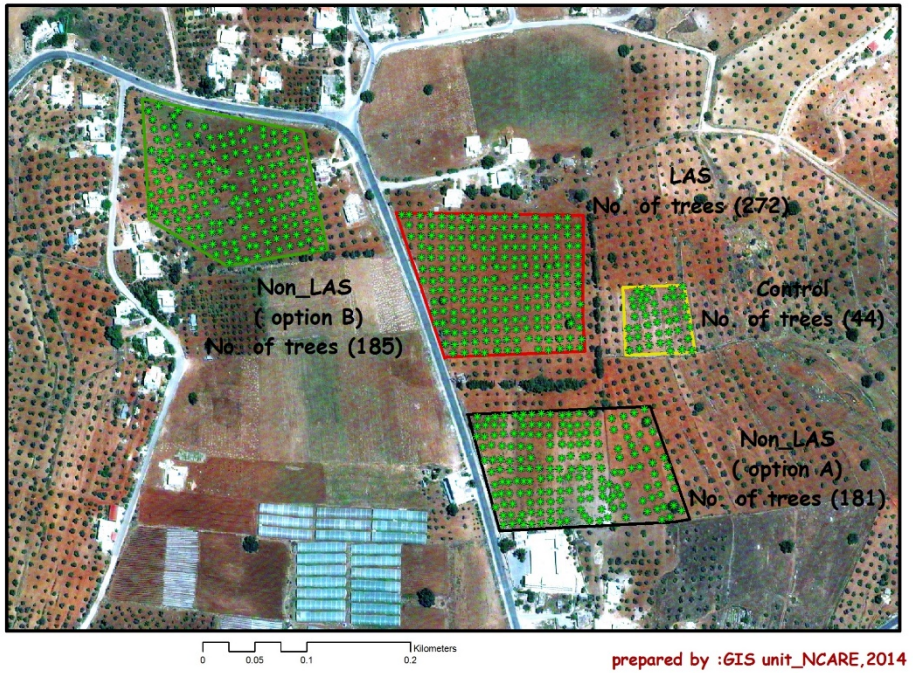
FruitFlyNet: Achievements

- Experimental Design – *OliveFlyNet*: Olive Trees - *Bactrocera Oleae*

Block 1



Block 2

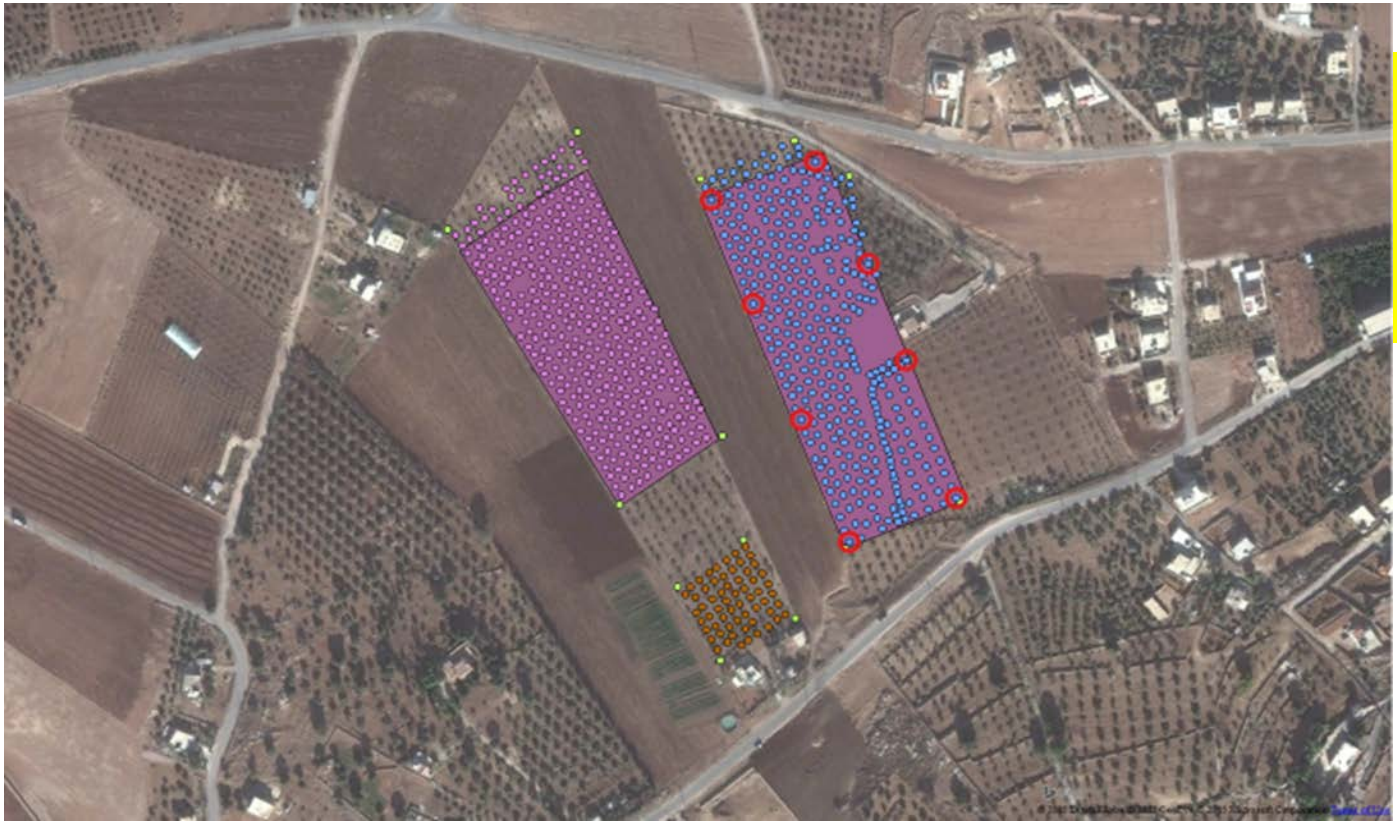


Experimental Design: *OliveFlyNet*
Pilot site: Al-Balqa, Jordan
Blocks: 2 (ha, 940 trees),
Plots/Block (LAS, NO LAS): 2 ha + Control
Production: Olive trees
Fruit Fly Species: *Bactrocera Oleae*

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements

- Experimental Design – *OliveFlyNet*: Olive Trees - *Bactrocera Oleae*



Experimental Design: *OliveFlyNet*
Pilot site: Al-Balqa, Jordan
Plots/Block (LAS, NO LAS): 2 ha
Plot 1: LAS 382 trees
Plot 2: No LAS 347 trees
Control: 60 trees
Production: Olive trees
Fruit Fly Species: *Bactrocera oleae*

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements

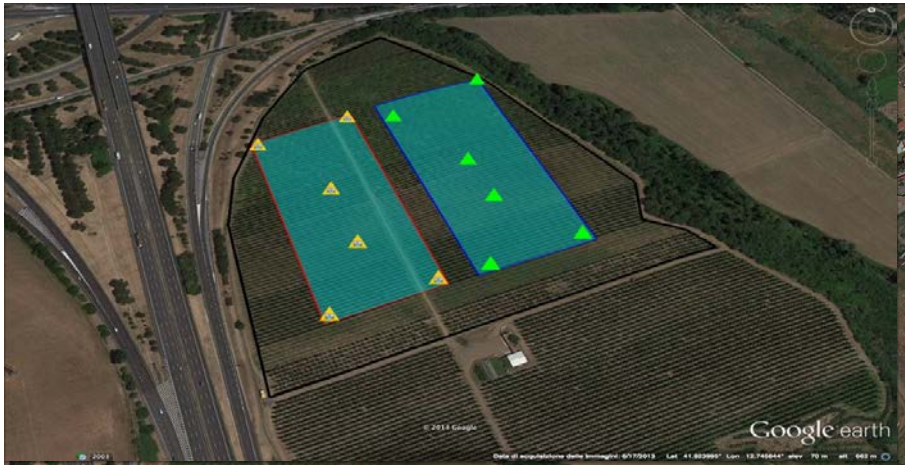
- Experimental Design – *OliveFlyNet*: Olive Trees - *Bactrocera Oleae*

Experimental Design: *OliveFlyNet*
Pilot site: Al-Balqa, Jordan
Plots/Block (LAS, NO LAS): 2 ha
Plot 1: LAS 162 trees
Plot 2: No LAS 161 trees
Control: 44 trees
Production: Olive trees
Fruit Fly Species: *Bactrocera oleae*

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements

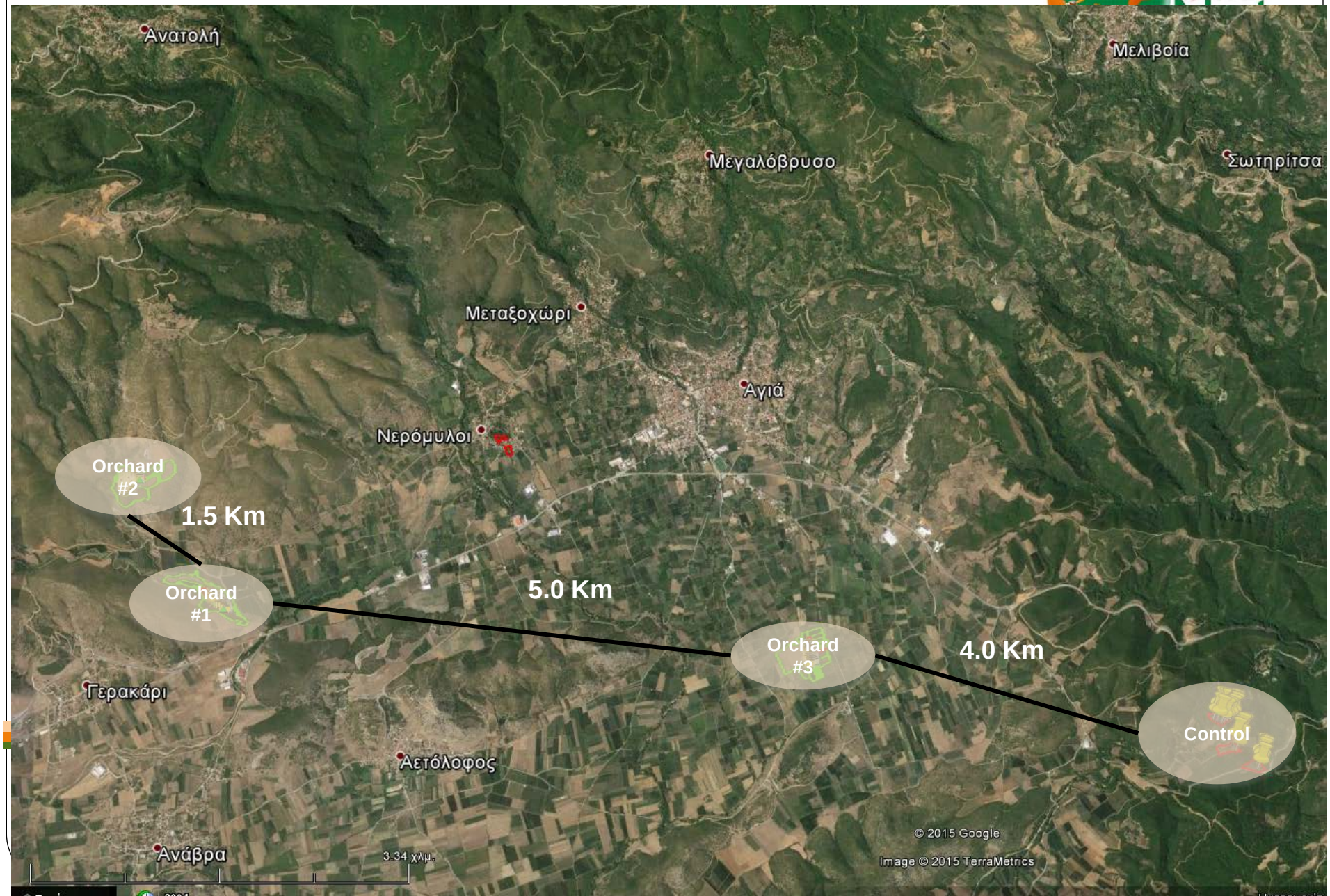
- Experimental Design – *MedFlyNet*: Peaches Trees – *Med fly*



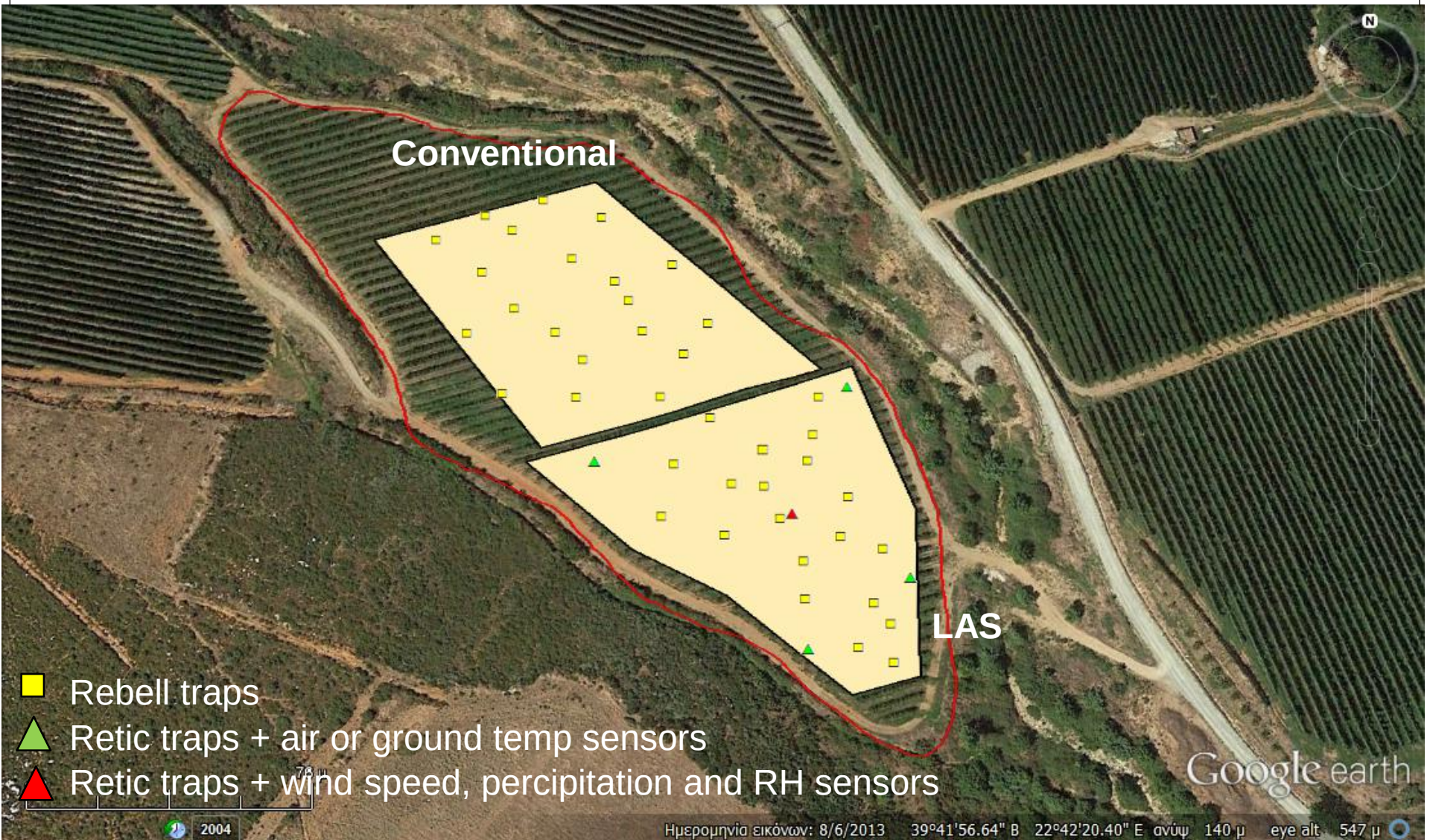
Experimental Design: *MedFlyNet*
Pilot site: Lazio, Rome, ITALY
Blocks: 3, Plots/Block (LAS, NO LAS): 3 ha + Control
Production: Peaches
Fruit Fly Species: *Ceratitis Capitata*

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

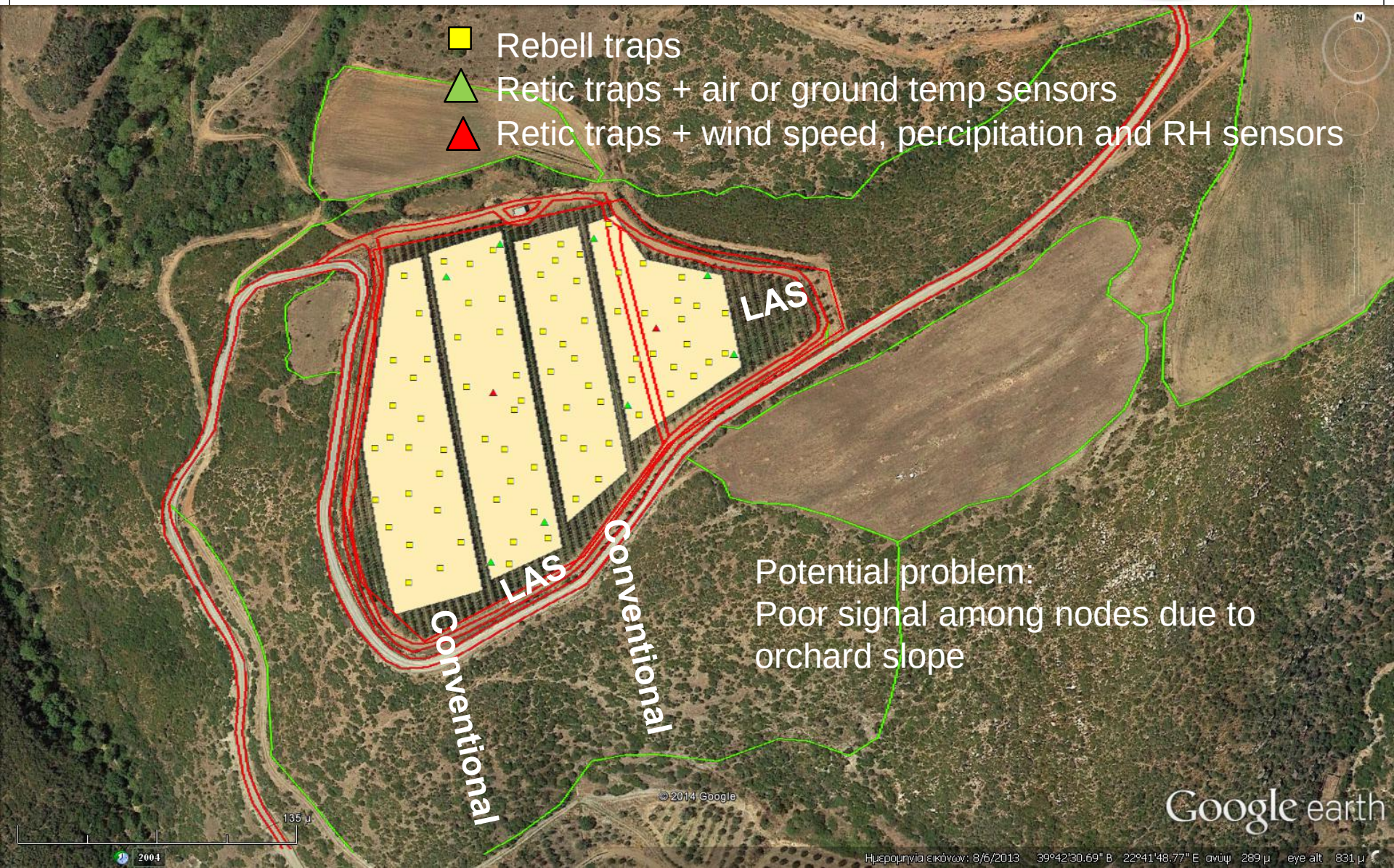
Area of Agia (Thessaly)



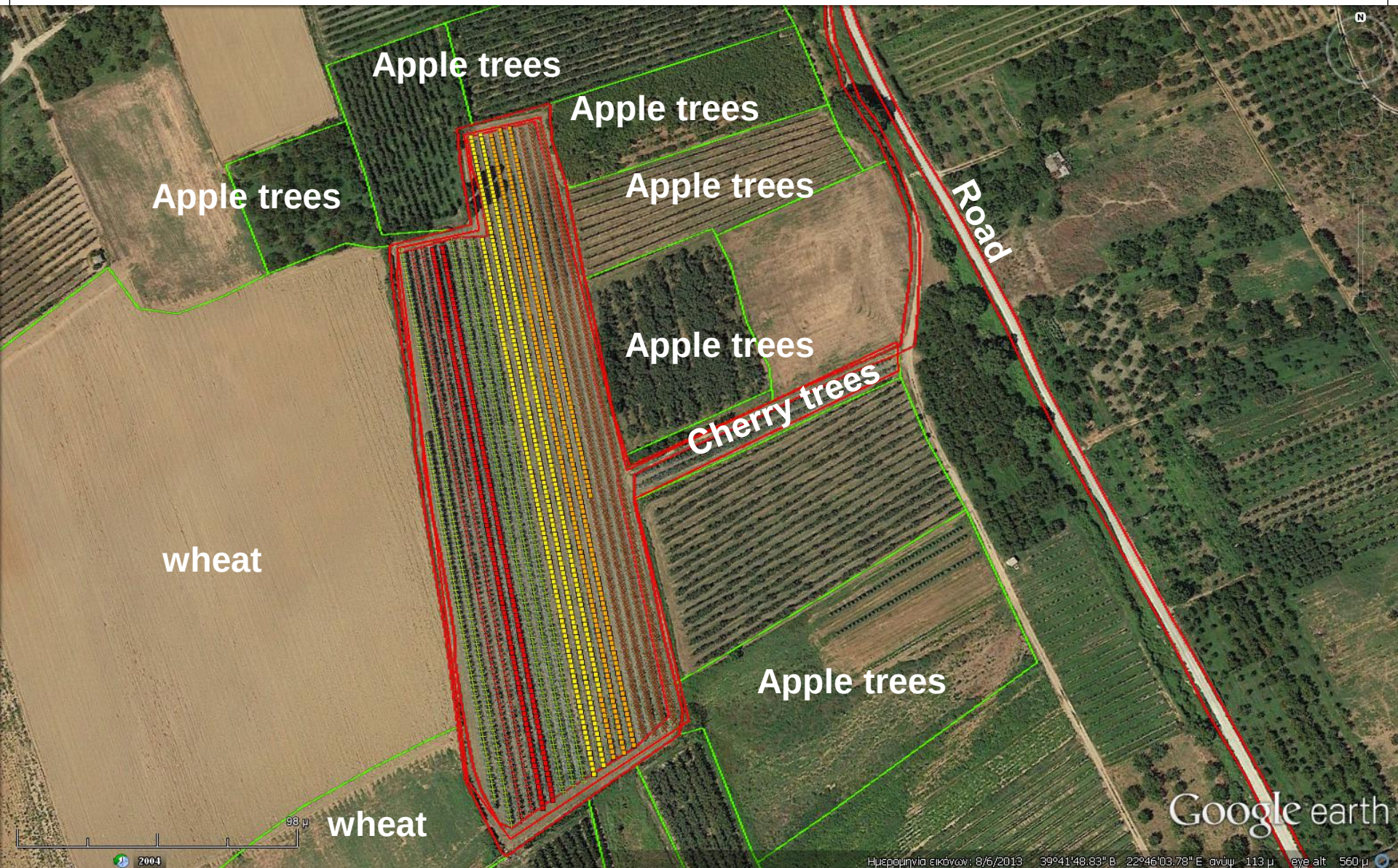
Orchard #1 LAS and conventional plots



Orchard #2 LAS and conventional plots



Orchard #3 – Land uses and roads



FruitFlyNet: Achievements

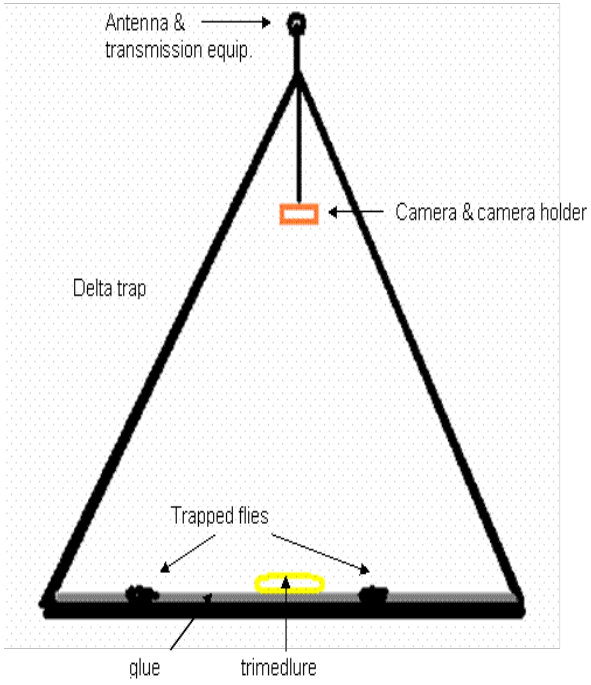
1. ***Achievement:*** An operational pilot in each one of the five (5) Med-countries. Prototyping *FruitFlyNet* solutions in representative application scenarios applied for four key-pests (21-month).
   Indicator: Five (5) WMSNs deployed in five (5) pilot regions.
2. ***Achievement:*** A semi-automatic, early identification system development based on a distributed imaging sensor network that is able to acquire and transmit images of the trapping area to a remote host station.
   Indicator: Number of visually identified invasive and/or nuisance species per trap and per study area.
3. ***Achievement:*** An e-monitoring trap system, integrated with:
   - A distributed imaging sensors network able to visually discriminate insect species or typology.
   - A Real-time Trapping and Insect Counting (ReTIC) module able to estimate insect populations, as well as, to support countering measures selection and alarm spraying levels

•.

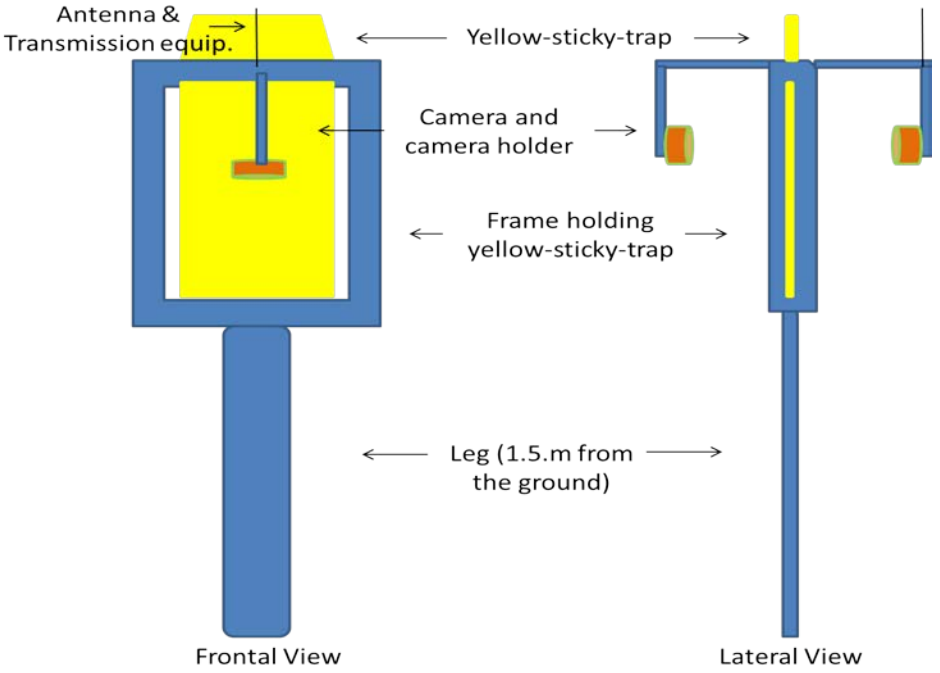
Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements – e-traps

FruitFlyNet Solutions – RETIC



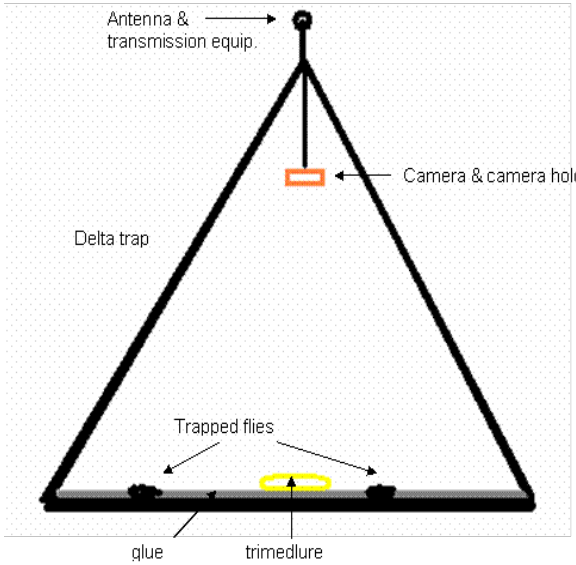
Modified Delta e-trap



Yellow sticky e-trap

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements – e-traps



ReTIC: Real-time Trapping and Insect Counting
Modified Delta e-trap
The case of Cerasi capitata (Medfly).

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

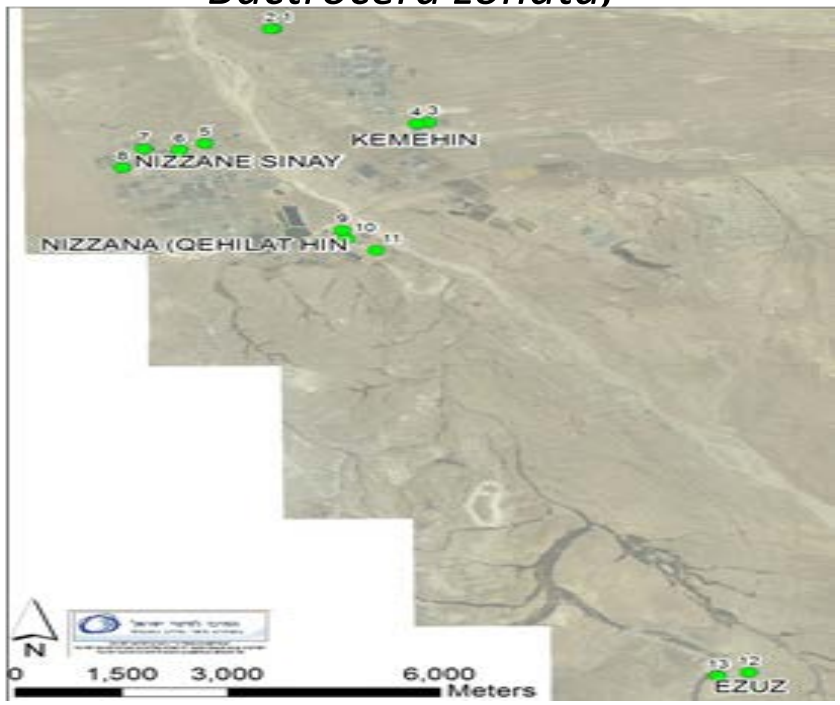
FruitFlyNet: Achievements

- Experimental Design – *InvasiveFlyNet*: Melons, Cucumbers, Peppers, etc. –

Dacus cilliatus

Pilot site: Ein Yahav South (Arava, IL, near the borders with Jordan)
Plots: Tunnels
Production: Melons, cucumbers, peppers, etc.
Fruit Fly Species: *Dacus ciliatus*

Bactrocera zonata,



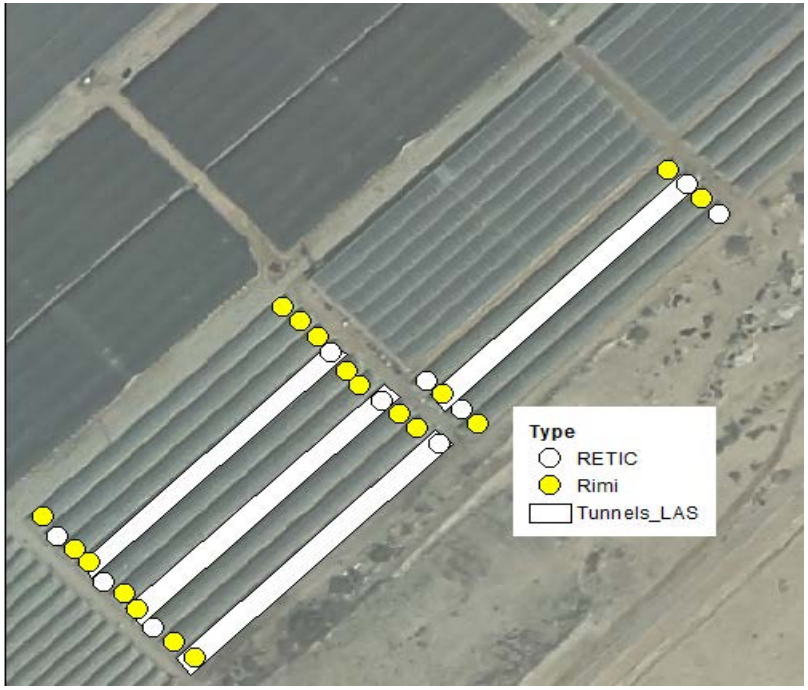
Pilot site: Nitzana Region (Negev IL, near the borders with Egypt)
Plots: NO (Home gardens)
Production: Melons, cucumbers, peppers, etc.
Fruit Fly Species: *Bactrocera zonata*

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements

- Experimental Design – *InvasiveFlyNet*: Melons, Cucumbers, Peppers, etc. –

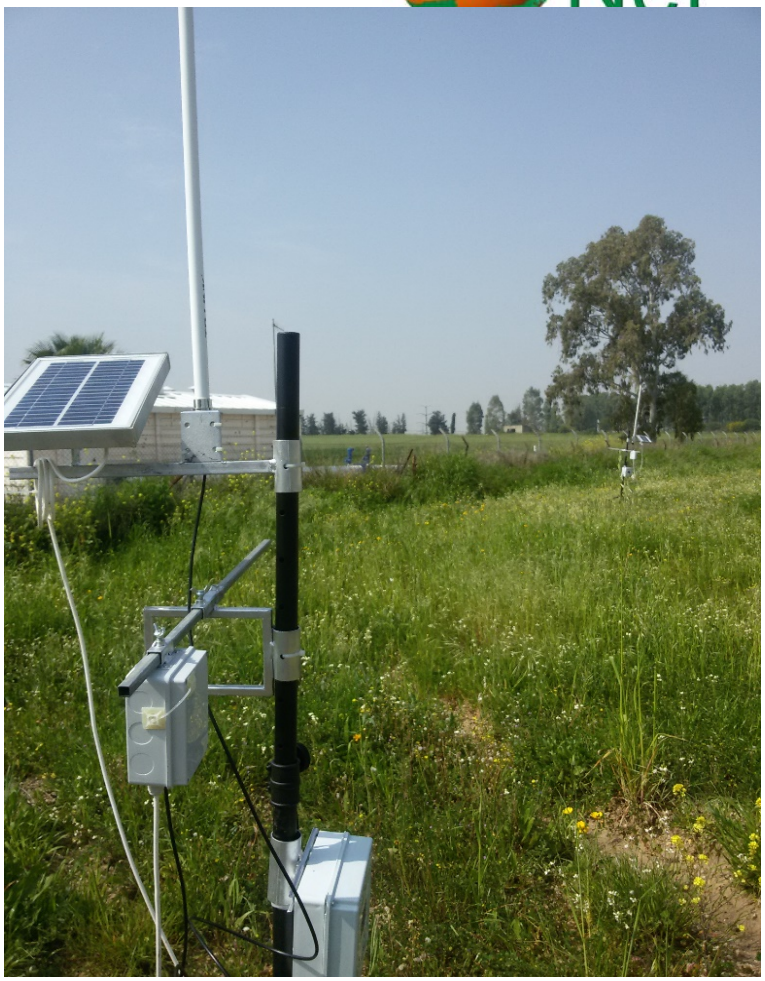
Pilot site: Ein Yahav South (Arava, IL, near the borders with Jordan)
Plots: Tunnels
Production: Melons, cucumbers, peppers, etc.
Fruit Fly Species: *Dacus cilliatus*



Pilot site: Nitzana Region (Negev IL, near the borders with Egypt)
Plots: NO (Home gardens)
Production: Melons, cucumbers, peppers, etc.
Fruit Fly Species: *Bactrocera zonata*

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements - e-traps



ReTIC: Real-time Trapping and Insect Counting
The cases of *Rhagoletis* (Cherry fly) and *D.Ciliatus* (testing), and *B.Zonata* (testing)

Project funded by the EUROPEAN UNION

ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

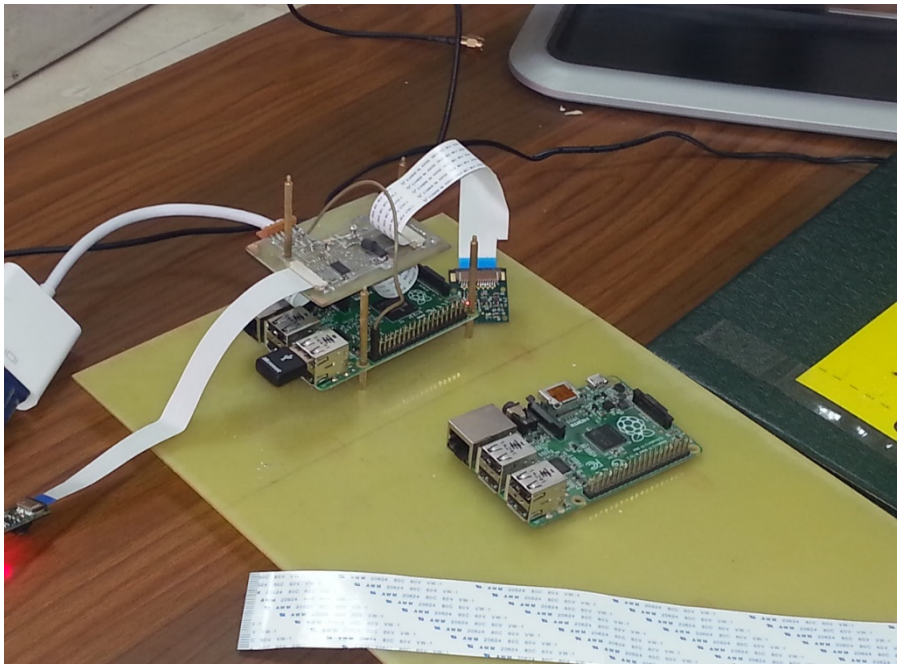
FruitFlyNet: Achievements - e-traps

ReTIC: Real-time Trapping and Insect Counting
The case *Bactrocera Oleae* (testing).

Project funded by the EUROPEAN UNION

ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements - e-traps



ReTIC: Real-time Trapping and Insect Counting
NCARE team with a multiplexer system giving the Pi two different FOVs of the trap and a board connected to the GPIO header. However, there is a constrain to install the two cameras in a small distance of around 30cm due to cable length limitations. Instead we may use a separate Pi to each camera. Which would also have the advantage of being able to space them at any desired distance, using Wi-Fi or Ethernet.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements - e-traps

ReTIC: Real-time Trapping and Insect Counting
AUA team with a 2-Pi system giving two different FOVs of the trap. The advantage is of being able to space them at any desired distance.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements - e-traps

ReTIC: Real-time Trapping and Insect Counting
AUA team with a 2-Pi system and a Control Unit automatically transfer scalar data and images to the geospatial database. The advantage is of being able to save energy by setting the Pi's in a sleep mode whenever .

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements - Kriging

4. ***Achievement:*** Development of risk maps based on the number of captured insects as well as on their distribution in order to determine the spraying levels:
Indicators: As the cases will be, estimations will be obtained, with and/or without the use of LAS, **by month (22)** selecting some of the following indicators, depending on the fruit fly species and country:

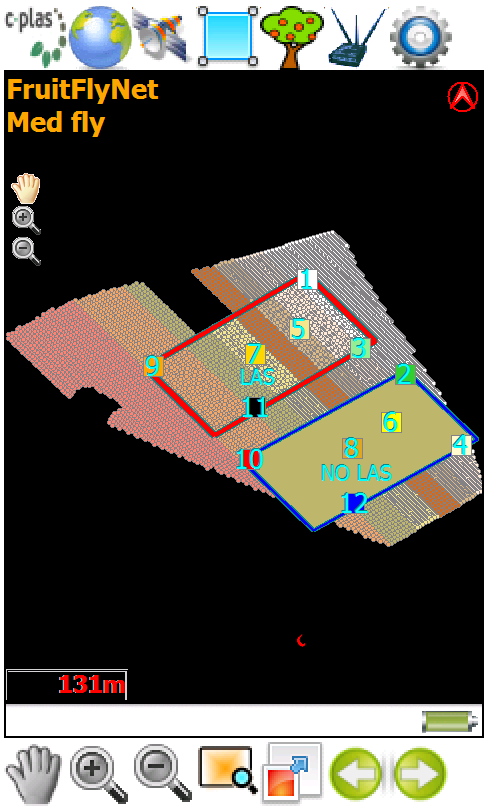
a. The number of buffer zones.
b. The area affected by the applications.
c. The areas to be sprayed.
d. The number of applications needed per study area.
e. The areas that have been sprayed by each tractor and in total.
f. The number of tress that have been sprayed, by each tractor and in total.
g. The duration and timing of each application by each tractor and in total.
h. The insecticide volume applied.
i. The amount of pesticide used.
j. Fruit Fly Infestation levels (Infestation risk) with and without LAS.
k. The number of captured fruit flies by the ReTIC/LAS trapping devices, per fly and per trap.
l. The tractor's optimum path for each spraying area.
m. The fuel consumption index
n. The water consumption for sprayings
o. Statistics acquired from the agro-meteorological stations.

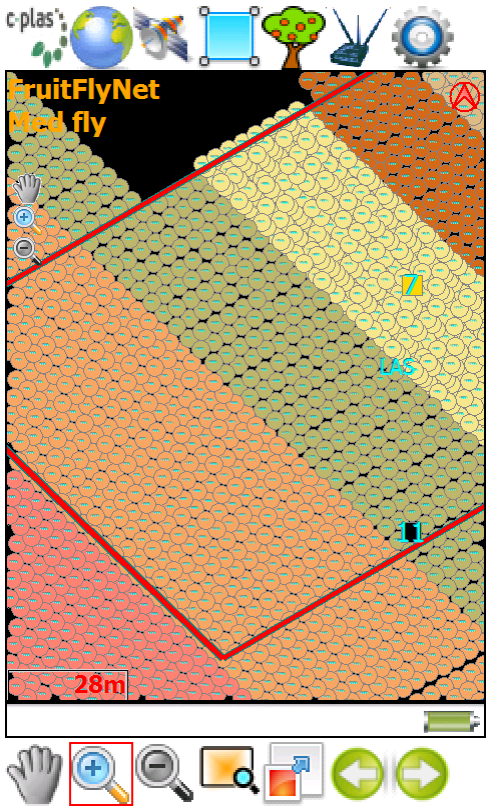
Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

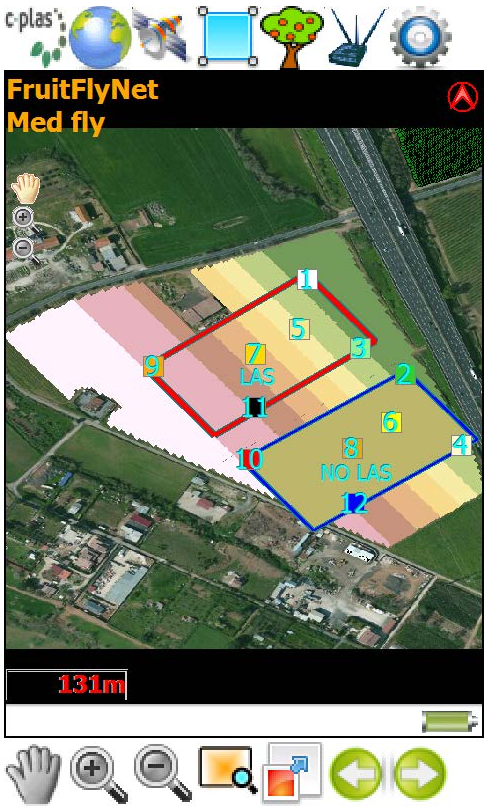
FruitFlyNet: Achievements - kriging

Mobile GIS presentation: The case of MedFly

Block 01







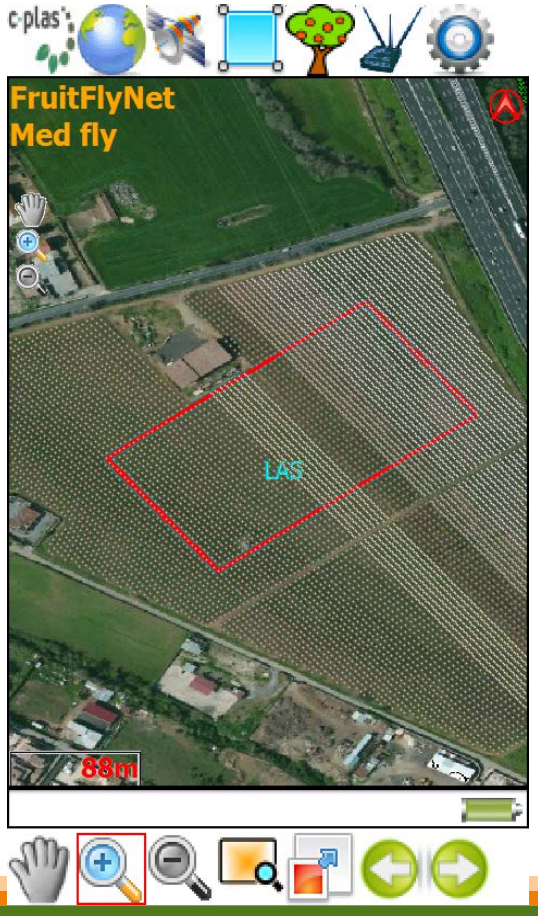
Project funded by the EUROPEAN UNION

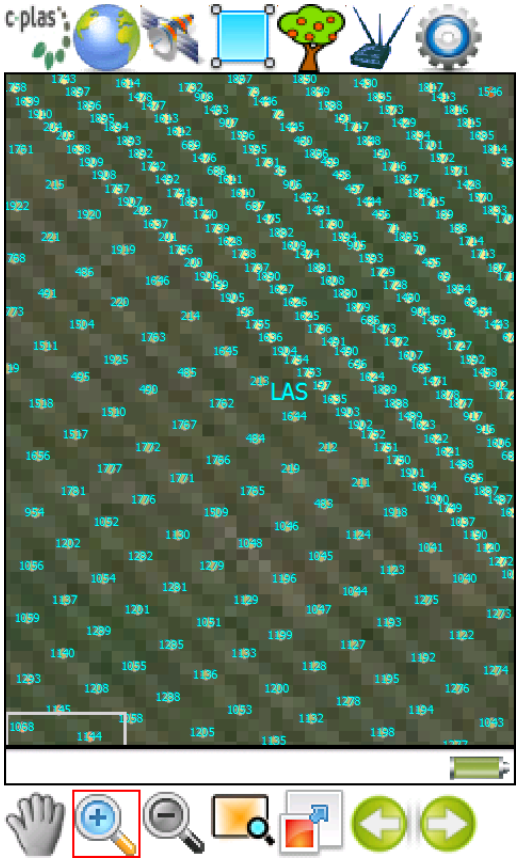
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements - Kriging

Mobile GIS presentation: The case of MedFly

Block 01





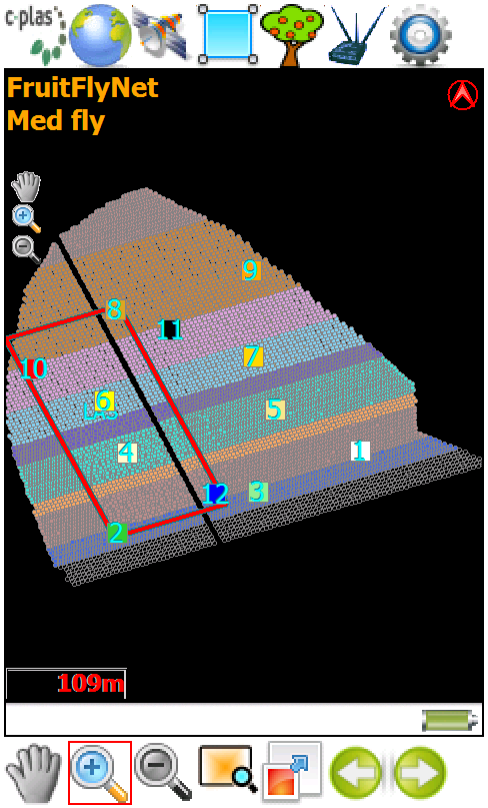
Project funded by the EUROPEAN UNION

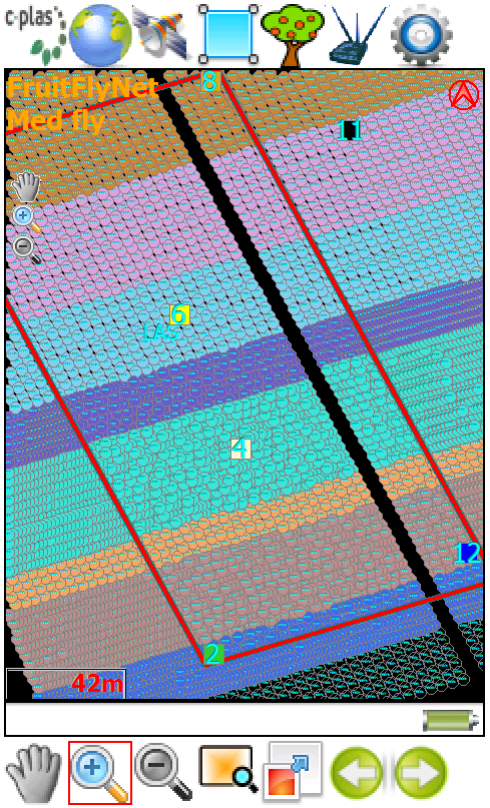
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

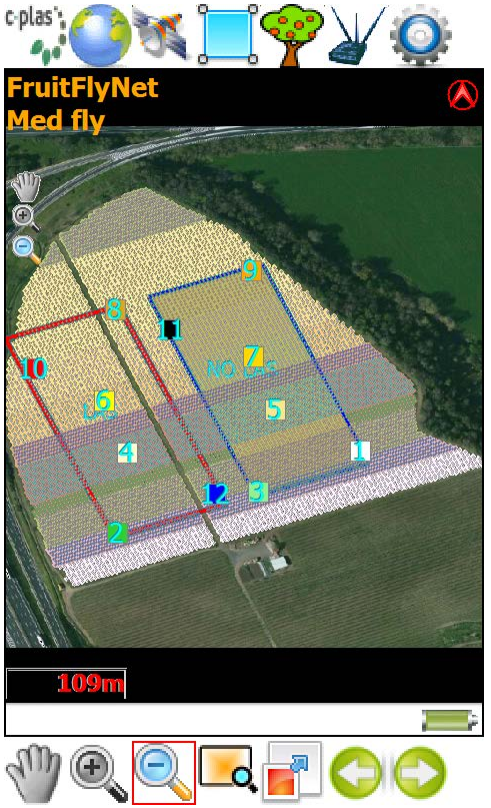
FruitFlyNet: Achievements - Kriging

Mobile GIS presentation: The case of MedFly

Block 02







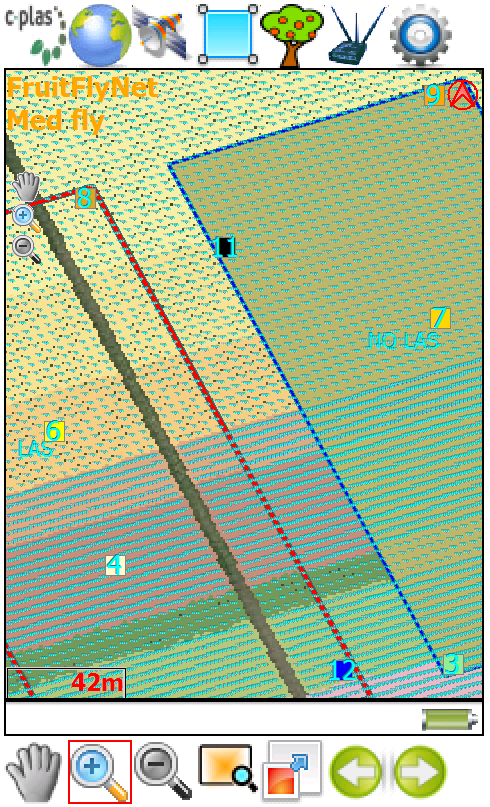
Project funded by the EUROPEAN UNION

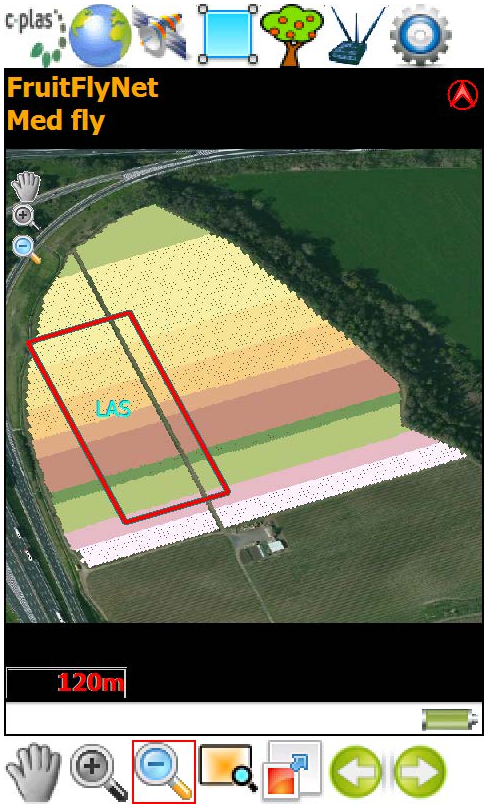
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements - Kriging

Mobile GIS presentation: The case of MedFly

Block 02





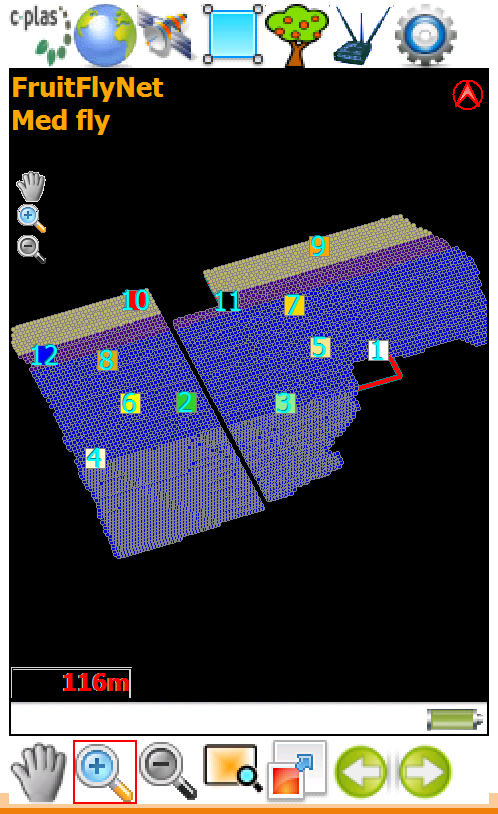
Project funded by the EUROPEAN UNION

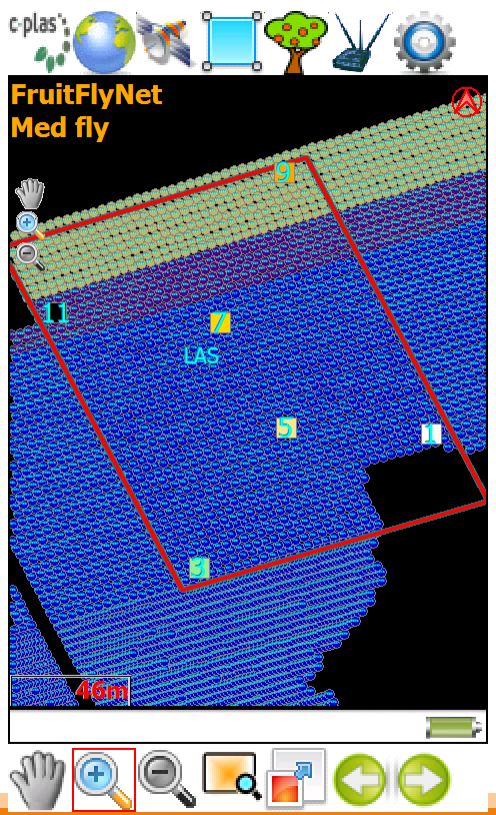
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

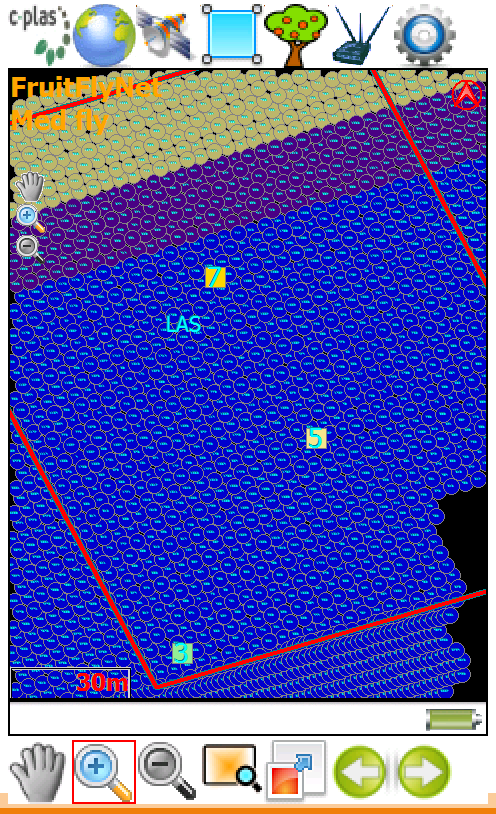
FruitFlyNet: Achievements - Kriging

Mobile GIS presentation: The case of MedFly

Block 03







Project funded by the EUROPEAN UNION

ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements - Kriging

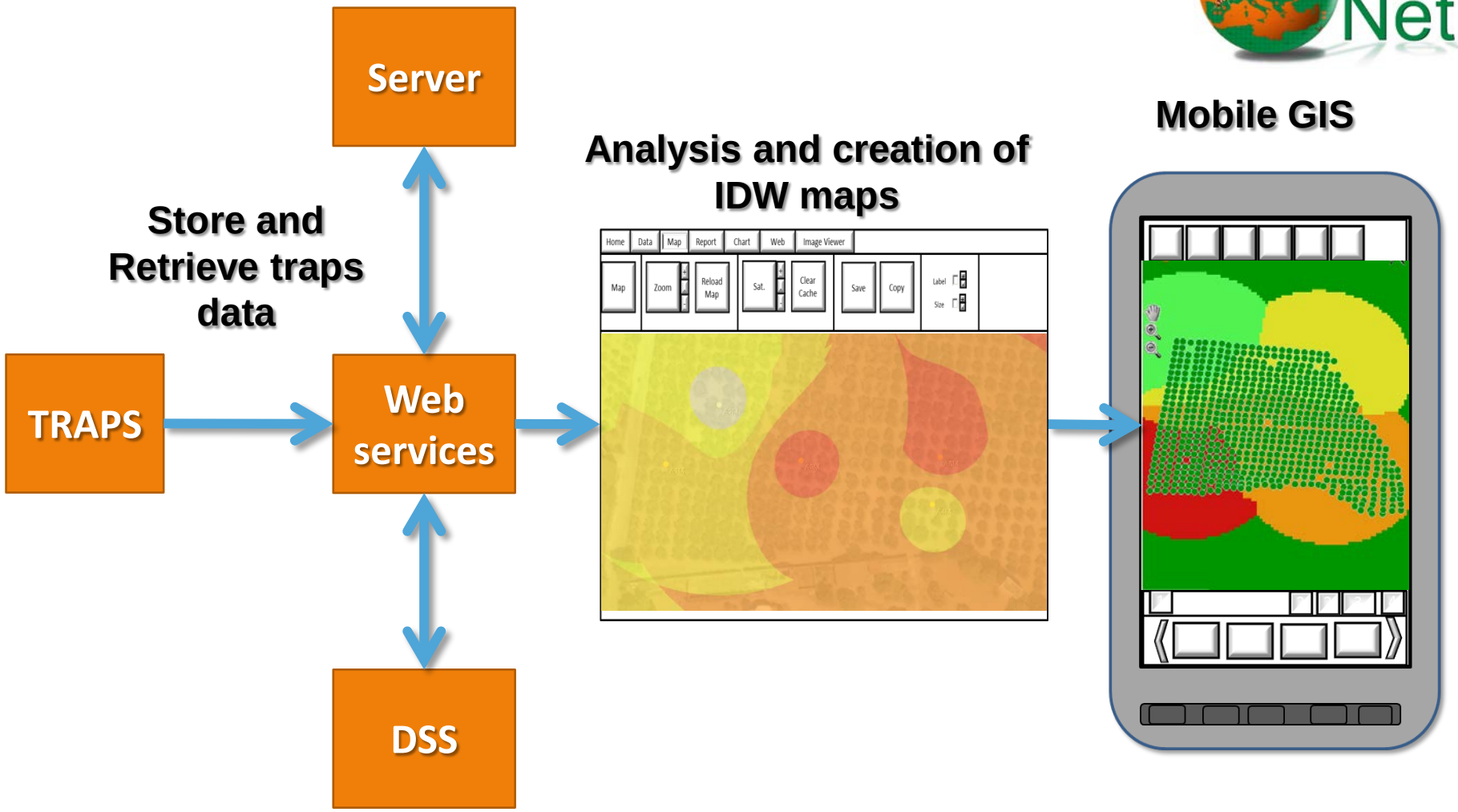
Mobile GIS presentation: The case of MedFly

Block 03

Project funded by the EUROPEAN UNION

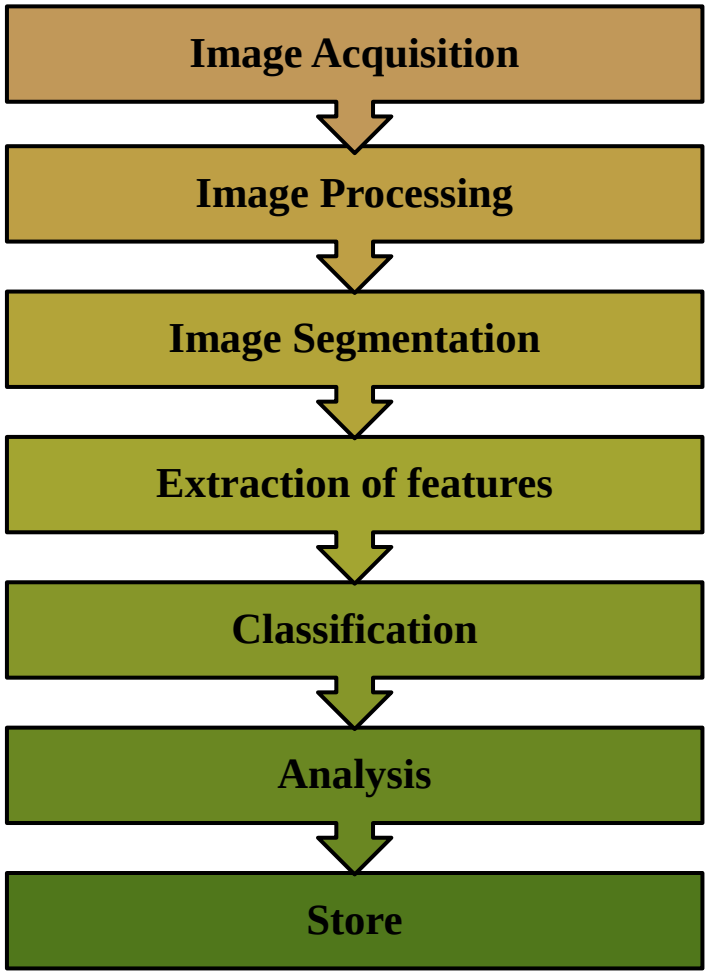
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

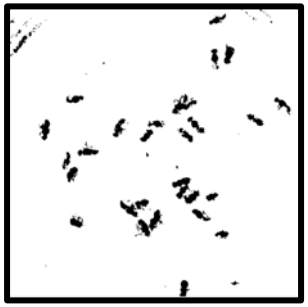
FruitFlyNet: Achievements – Spraying process

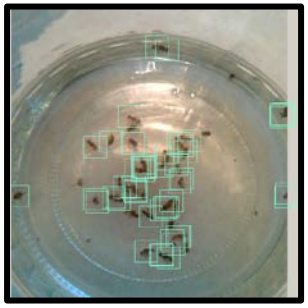


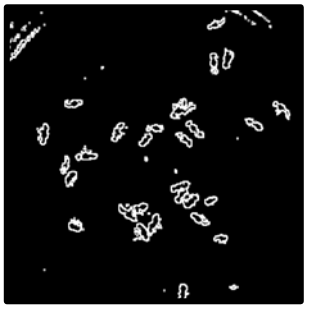
Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

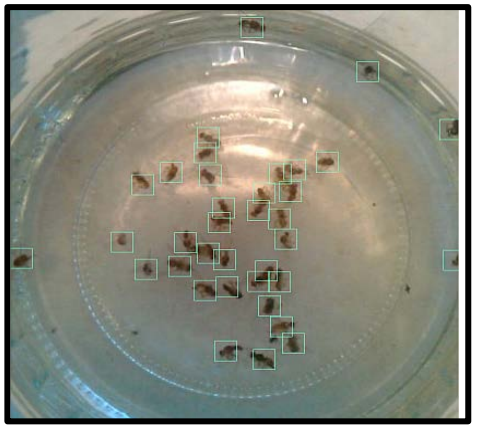
FruitFlyNet: Achievements – Image analysis
Automatic Counting









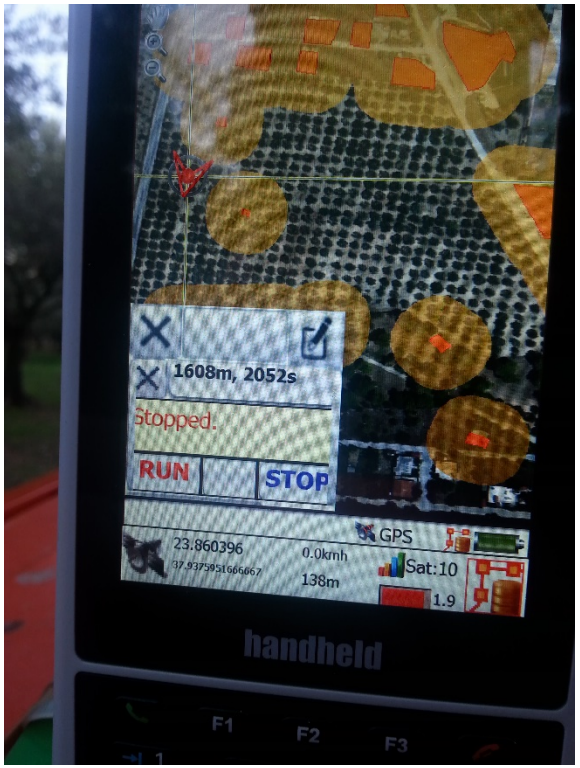


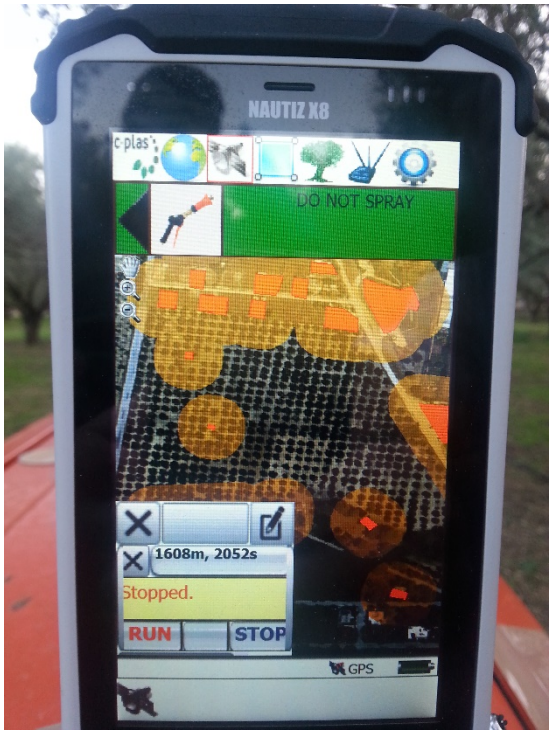
Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Achievements – Spraying process

Decision Support Systems:

- When
- Where
- How





Project funded by the EUROPEAN UNION

ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Project Indicators

5. ***Achievement:*** Conventional learning spraying application practices:

Indicators:

1. At least one (1) workshop/seminar per country (7 in total - see WP2)
   - 3 in EU Med-countries and
   - 4 in non-EU Med-countries,
   - to cover all target groups (trainee category), i.e., farmers, local bodies and trainers.
2. Number of trainers per country (at least 10), per trainee category and per fruit fly species.
3. Publications (at least 5) that are accessible to the EU legislators/bodies

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Project Indicators

5. ***Achievement:*** Web based platform for results and innovations dissemination:
   Indicators:
   - At least two (2) e-courses on
     - good agricultural practices and
     - integrated management strategies.
   - At least (1000) of hits in the project portal. The e-courses on good agricultural practices and integrated pest management strategies will be offered in farmers, specialized personnel, students, etc..
   - Knowledge transfer will also include local phytosanitary organizations (at least 10) for all countries involved (through training in local bodies).

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Conclusions

- Up to the end of this project.
  - The experimental design per pilot case has been determined.
  - The architectural designs of all WMSNs have been completed.
  - The RETIC e-traps (modified delta και Yellow sticky) have been designed, constructed and implemented. Tests for the RETIC e-traps have been made.
  - The common data base has been created.
  - All the web services have been designed and they have been implemented properly (at least in the case of the *OliveFlyNet*).
  - The graphical User Interface (GUI) toolbox has been designed and developed in cases of *CherryFlyNet*, *MedFlyNet* and *OliveFlyNet*.
  - The spraying DSSs per insect examined have been algorithmically developed tested and implemented (*MedFlyNet* and *OliveFlyNet*).
  - Training courses/e-courses have been finalized.

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Conclusions

Open problems - What needs to be done

- WMSN Deployment, Management, and Operation needs further work to solve particular problems identified on:
  - Network architecture
    (WiFI, ZigBee, stand-alone e-traps with 3G/4G connection).
  - Energy savings (battery limitations)
  - Web services
- Care should be taken so as to keep the geodatabases uniform and compatible. Data needs to be uploaded in the required format.
- Image interpretation: visual/semi-visual/automated need to be considered closely.
- Develop an e-protocol for the spraying process.
- Optimizing the new spraying process

Project funded by the EUROPEAN UNION

ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

FruitFlyNet: Project Outputs

Compared to common spray tactics against olive, cherry, med, and some invasive fruit flies population the project is expected to achieve:

1. An increase by 5% (?) of the efficacy of the sprays from ground.
2. A reduction by 5% (?) of the mean spray.
3. A reduction by 15% (?) of the mean spray duration of the spray applications.
4. A reduction by 20% (?) of the spraying volume.
5. A reduction by 30% (?) in the number of insecticide applications.

- Making sprayings more easier and effective
- Achieving fewer, locally applied and more effective sprayings.
- Creating a less polluted and healthier Med-basin Environment

Project funded by the EUROPEAN UNION
ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

Thanks for your attention !!!!

4th (Final) Consortium Meeting
December 7-10, 2015
Athens – Volos, Greece

Project funded by the EUROPEAN UNION

ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN