



Rice Biocontrol success story in Albufera of Valencia (Spain)

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The challenge



Project Background



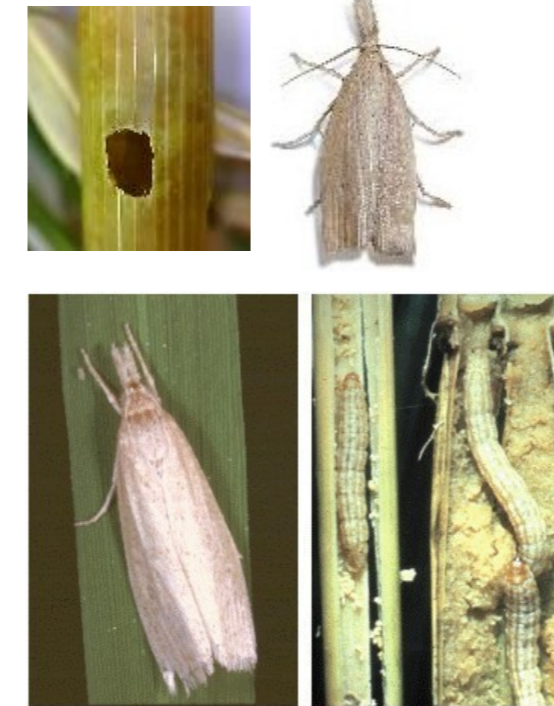
Location: Albufera de Valencia

- 15,300 ha of rice surrounding 3,000 ha of freshwater lagoon
- Rice introduction is attributed to the Arabs during the 8th century
- Paella, made with round grain rice and originated in Valencia (PDO), is the best-known dish in Spanish cuisine
- Rice fields are surrounded by an area with 2,2 millions inhabitants
- Next to touristic areas



Site of international importance for birds

- Migratory bird special site
- Natural Park since 1986
- Ramsar Convention wetland since 1989
- Special Protection Site for Birds and Nature 2000 since 1990, and
- Site of Community Importance since 2006



Problem

- First detected in 1933, Rice Stem Borer became the most important pest for Valencia rice fields
- Use of organophosphates by aerial application to control rice stem borer (ban of aerial spraying since 2009 by the Directive 128/2009 of Sustainable Use of Pesticides)
- Detrimental effect on birds, fish, insects and aquatic ecosystems



Solution

- Pest control by sex pheromone for rice stem borer integrated into farming practice
- Multi stakeholder interaction to find a solution: growers, industry, university and government for coordination and financial support



Evolution of the pest control in the area



Traditional agriculture – 30' to 50'



1933-1950
CULTURAL PRACTICES

The 'Era of synthetic insecticides' – 50' to 90'



1950-1965
ORGANOCHLORINATED & ORGANOPHOSPHATES INSECTICIDES

1965-1988
COLLECTIVE AERIAL SPRAYING (OP)

1988-2005
AERIAL SPRAYING + MATING DISRUPTION

The switch to biocontrol – 90' until today



2006-2009
HIGH DENSITY MATING DISRUPTION (100 units/ha)

2009-2013
LOW DENSITY MATING DISRUPTION (31 units/ha)

2014-Present
LOW DENSITY & BIODEGRADABLE MD (31 units/ha)

Which are the activities?

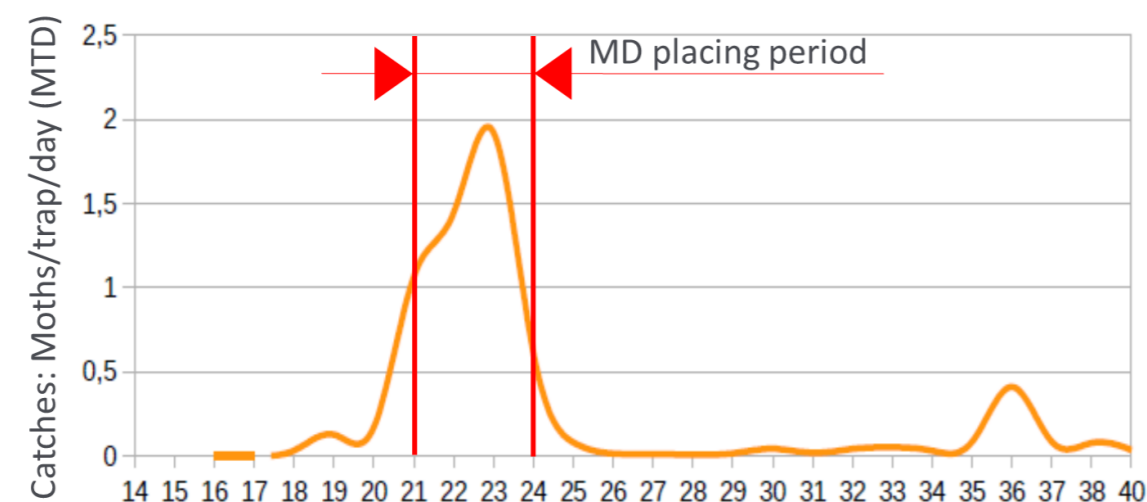
Preparation and placing in the field

- 480.000 dispensers to be prepared and placed (18x18m)
- Coordinated by Generalitat Valenciana who provides maps, GIS
- Very important ensuring to do the placement in the whole area and at the same time
- Prepared and placed by growers (Cooperatives)
- Up to 35 people working for these tasks



Monitoring and damage surveys

- Catches are very low (under 2 MTD) and drastically reduced after placing the pheromone dispensers
- In the 70's catches reached 60-70 MTD
- The Economic Injury Level is 25-60 stems attacked per m²
- Today, levels of damage in Valencia are always below 1 stem attacked per m² (in the 70's were 30-90)



Linked to other initiatives



- Directive 2009/128/EC Sustainable use of pesticides
- Early detection surveys for other harmful organisms

The costs

- Rice stem borer MD declared compulsory and of Public interest
- 450.000 €/year (30€/ha) funded by GVA
- Compatible with the internal market (R702/2014 art. 26)



What has been the impact so far?



01

TECHNICAL RESULT

Since 2006 the pest is fully controlled by mating disruption avoiding of the use of approx. 50,000 L of synthetic insecticides each year.

Close to 100% effectiveness, insignificant damage, lower than conventional spraying.

02

ECONOMIC RESULT

Lower cost than conventional spraying.

The use of mating disruption allows the coexistence of an important economic activity (such as the rice cultivation) in an area which as been declared a natural reserve and that is, additionally, a touristic site in the region.

03

SOCIETAL RESULT

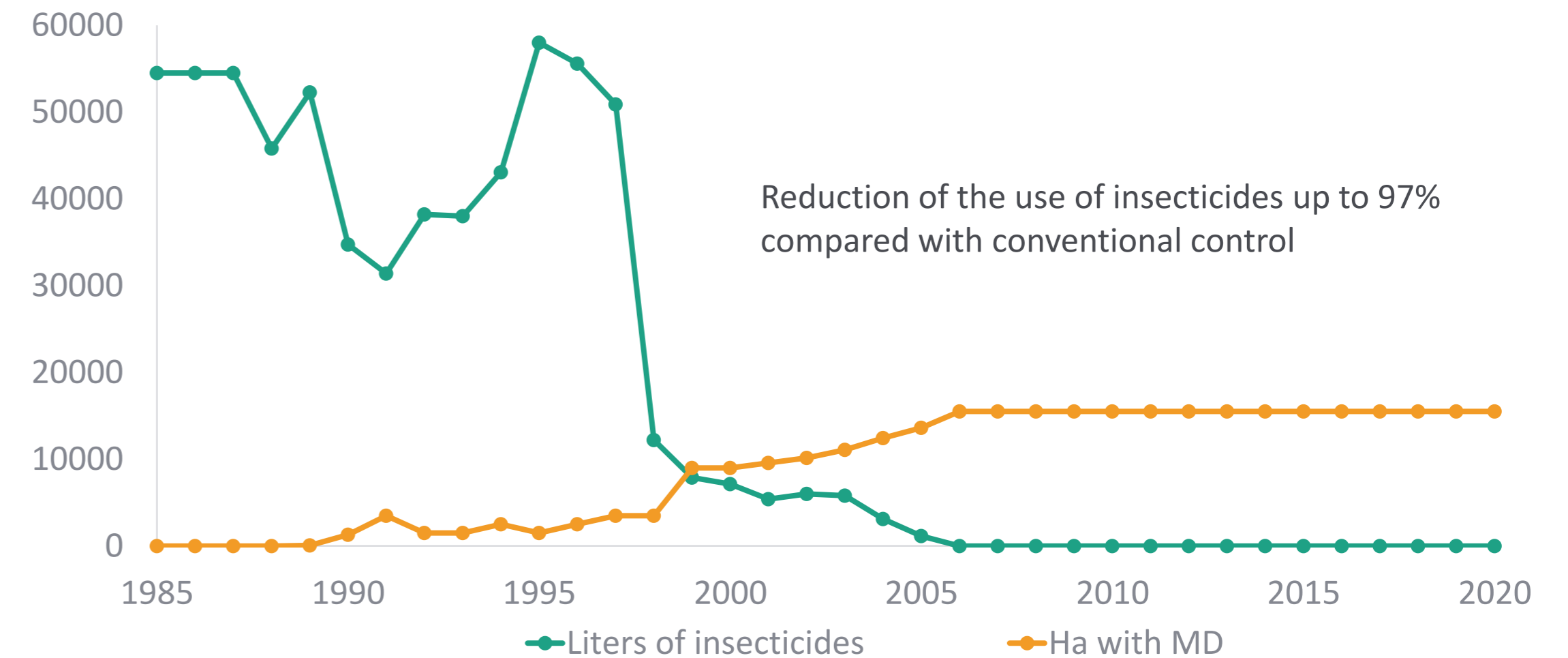
Production of insecticide-free rice. And significant reduction of operators, workers and bystander exposure to hazardous substances and chemical pesticides.

04

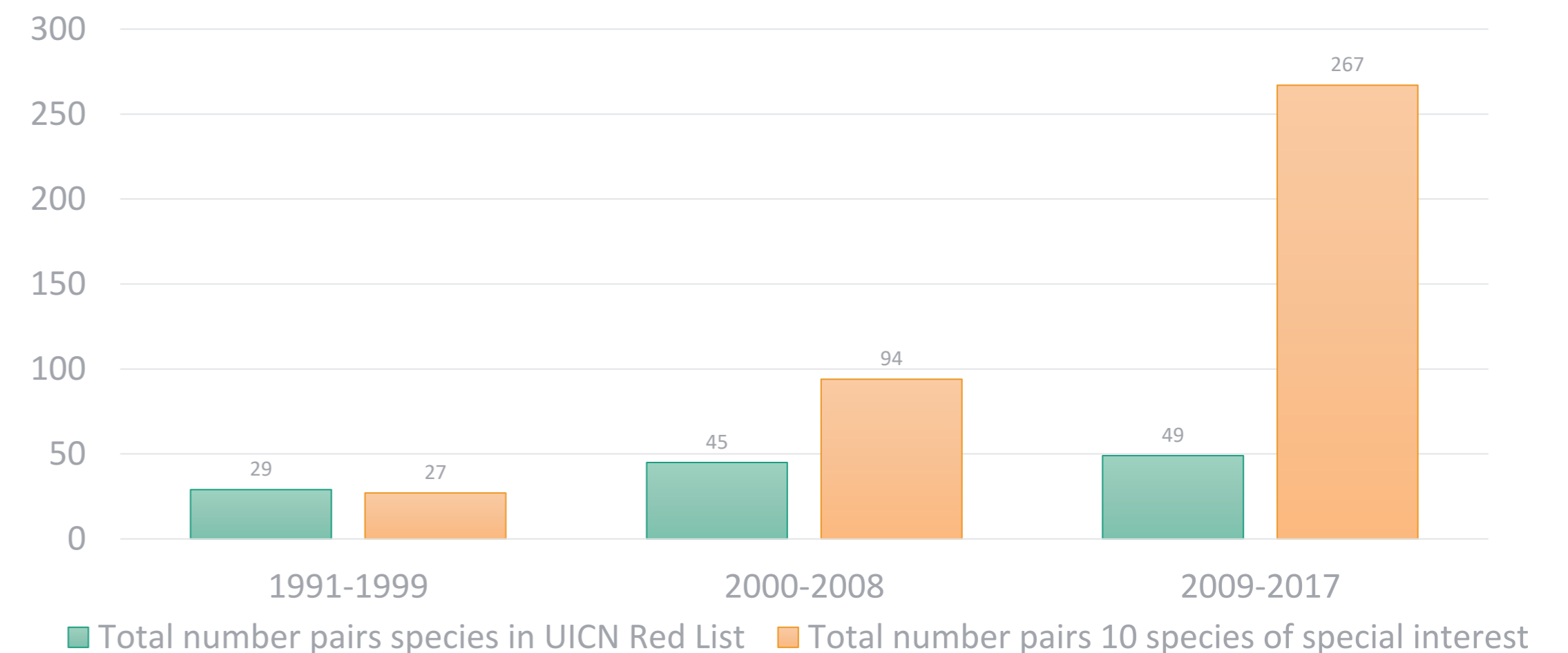
ENVIRONMENTAL RESULT

The switch to biocontrol allowed to significantly decrease pollution and environmental exposure to chemical pesticides, increasing biodiversity enabling resilient rice cropping systems.

Evolution of insecticide use



Evolution of nesting aquatic birds





Medfly Biocontrol success story in Valencia (Spain)



Project Background



Location: Comunitat Valenciana

- 157,000 ha of citrus in Valencia Region
- 35,000 ha of fruit trees (other than citrus) host of MedFly (persimmon, stone fruits, loquat, pomegranate,...)
- Several Protected Designations of Origin



Importance of Citrus and fruit trees

- Spain produces 7-7,5 million tons of citrus
- Spain 6th world citrus producer (6%)
- Spain is the 1st world fresh citrus exporter (20-25%)
- Valencia represents 70% of spanish citrus exports
- Citrus exported to 95 different countries
- Economic and social importance in the region (harvest, handling and packaging, transport...)



Problem

- Endemic pest of the Mediterranean basin
- Direct fruit yield losses (up to 30% without management measures)
- Quarantine pest; Phytosanitary barrier for our exports
- Malathion resistance detected in medfly local populations
- Use of aerial application to control medfly (ban of aerial spraying since 2009 by the Directive 128/2009 of Sustainable Use of Pesticides)

Solution

- Area Wide Integrated Pest Management program
- Including several biocontrol tools
- Multi stakeholder interaction to find a solution: growers, industry, university and government for coordination and financial support



Which are the activities?



Population monitoring

- 1,230 traps distributed in the production area
- Serviced one a week
- 6 field inspectors and 21 trapping routes
- Field work with smartphones and database
- GIS support

Sterile Insect Technique

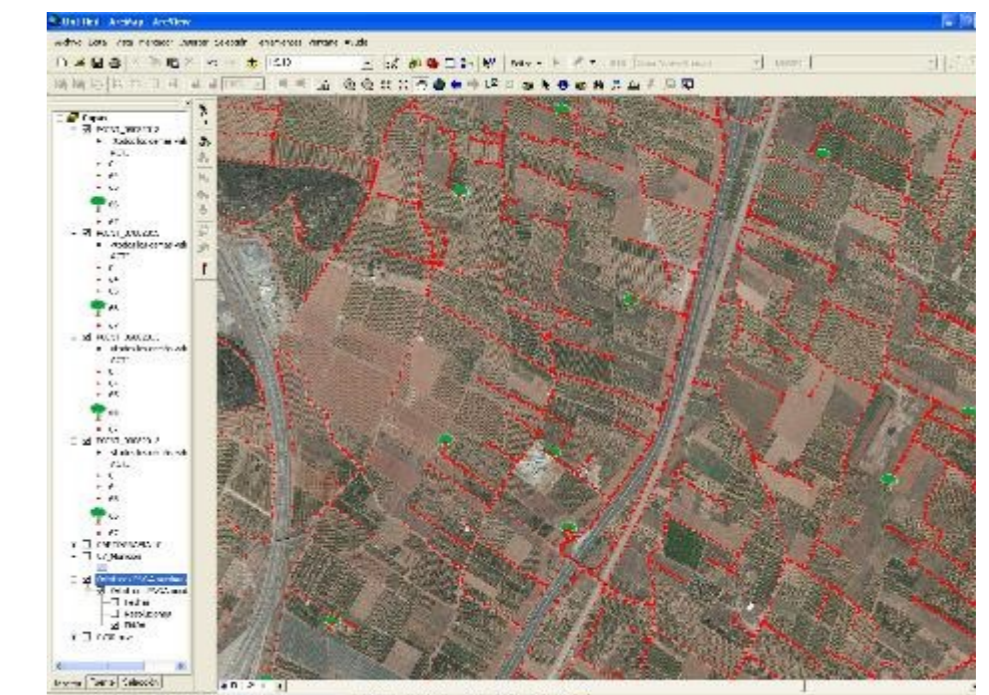
- Released sterile Medfly males seek and mate with the wild females, resulting in no offspring, thus suppressing the pest population
- 300 millions of sterile males per week over 140.000 hectares
- Preventative approach, biocontrol and species specific

Mass Trapping

- Feed attractant + deltamethrin
- 25 traps / hectare + 25 traps by growers
- For early varieties of citrus, stone fruits, fig orchards, pomegranate, persimmon and table grapes
- In 2019, 340.000 traps delivered (13.600 ha covered)
- Mass trapping reduces up to 96,5% quantity of active ingredient of insecticide per hectare

Isolated host trapping

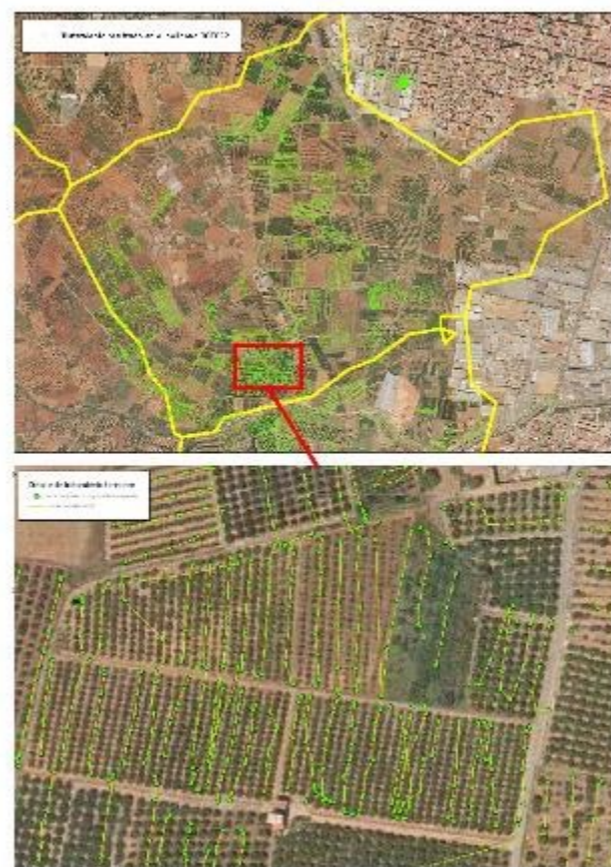
- 16.900 fig trees tracked
- 21.400 traps installed



Which are the activities?

Terrestrial spraying

- 31 ATV ground spraying
- Coordinated ground spraying:
Trigger: 0,5 FTD
- ULV spraying: Spinosad, Lambda-cyhalothrin



Delivery of Plant protection Products

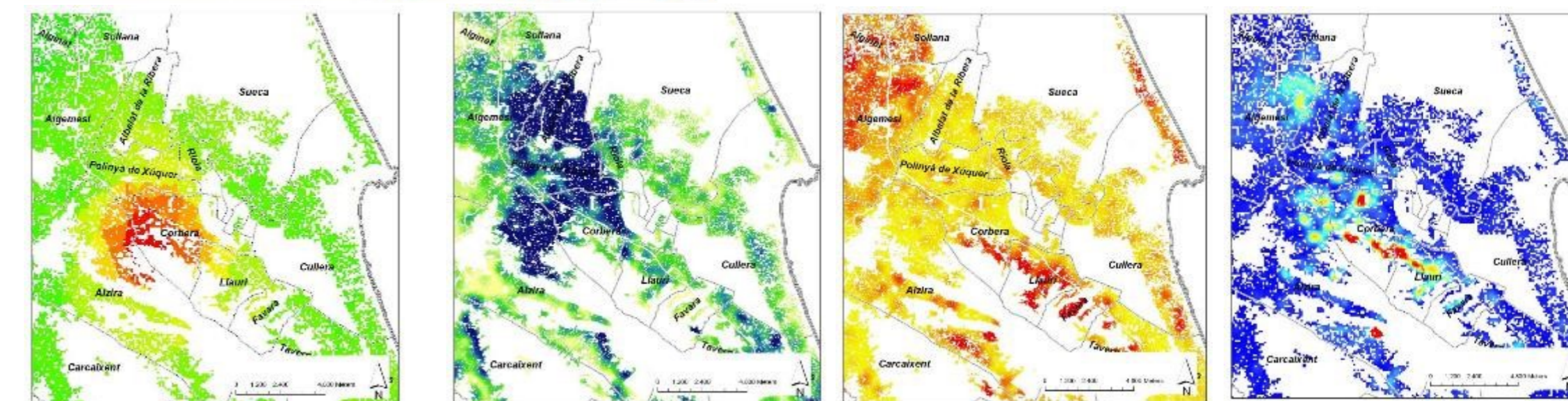
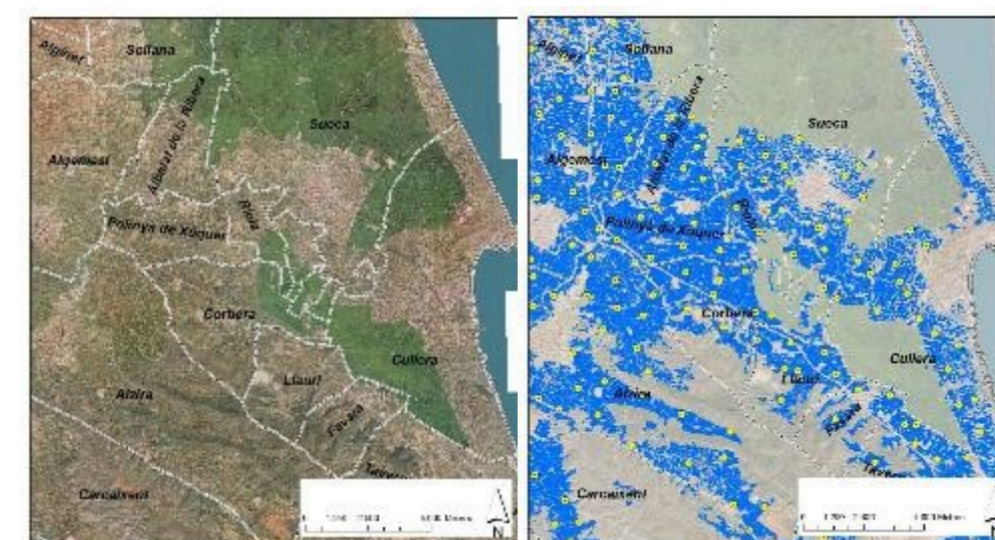
- Delivery of PPP to the growers (stone fruits and citrus earlier varieties) to do their individual treatments
- Product delivered Spinosad for bait spraying (30.000 hectares covered). Authorised for organic Farming

Aerial spraying

- Bait Spraying 40% surface treated
- Dose: 6 liter/hectare
- PPP: Spinosad (up to 150.000 hectares covered)
- From mid October
- Requirement of USDA export workplan

Information for growers

- Weekly information for growers
- Risk maps considering Medfly levels and density of receptive varieties/host (GIS)



CAP integration



LEGAL BASIS

Regulation (EU) 2017/891 supplementing Regulation (EU) No 1308/2013 with regard to the COM for fruit and vegetables and processed fruit and vegetables sectors.

OPERATIONAL PROGRAMMES FOR PRODUCER ORGANISATIONS

list of actions and expenditure eligible under OP: Specific costs for: **biological plant protection materials** (such as **pheromones** and **predators**) whether used in organic, integrated or conventional production;

Specific costs shall mean the **additional costs**, calculated as the **difference between the conventional costs and the costs actually incurred**.

Measures included for citrus: Mass Trapping, Mating Disruption and Biological Control Agents



DIRECCION GENERAL DE PRODUCCIONES Y MERCADOS AGRARIOS
SUBDIRECCION GENERAL DE FRUTAS Y HORTALIZAS, ACEITE DE OLIVA Y VITIVINICULTURA

ANEXO

CULTIVO	PLAGAS ESTRATEGIA	ESTRATEGIA DE CONTROL	IMPORTE CON CARGO AL PROGRAMA OPERATIVO (% DEL COSTE DE LA FACTURA)
LIMONERO	Planococcus citri	Liberación de <i>Anagyrus pseudococci</i>	64%
		Liberación de <i>Cryptolaemus montrouzieri</i>	
		Liberación de <i>Anagyrus pseudococci</i> y <i>Cryptolaemus montrouzieri</i>	
	Aspidiotus nerii	Liberación de <i>Aphytis melinus</i>	
	Planococcus citri + Aspidiotus nerii	Liberación de <i>Anagyrus pseudococci</i> y <i>Aphytis melinus</i> Liberación de <i>Cryptolaemus montrouzieri</i> y <i>Aphytis melinus</i> Liberación de <i>A. pseudococci</i> , <i>C. montrouzieri</i> y <i>A. melinus</i>	
NARANJO Y MANDARINO	Aonidiella aurantii	Liberación de <i>Aphytis melinus</i> Confusión sexual	55%
	Ceratitis capitata	Trampeo masivo	
		Trampas "atraer y matar"	
		Trampeo masivo	
		Trampas "atraer y matar"	
	Ceratitis capitata + Aonidiella aurantii	Control de <i>C. capitata</i> empleando trampeo masivo y de <i>A. aurantii</i> usando control biológico Control de <i>C. capitata</i> empleando trampas "atraer y matar" y de <i>A. aurantii</i> usando control biológico Control de <i>C. capitata</i> empleando trampeo masivo y de <i>A. aurantii</i> usando confusión sexual Control de <i>C. capitata</i> empleando trampas "atraer y matar" y de <i>A. aurantii</i> usando confusión sexual Control de <i>C. capitata</i> empleando trampeo masivo y de <i>A. aurantii</i> usando control biológico Control de <i>C. capitata</i> empleando trampas "atraer y matar" y de <i>A. aurantii</i> usando control biológico Control de <i>C. capitata</i> empleando trampeo masivo y de <i>A. aurantii</i> usando confusión sexual Control de <i>C. capitata</i> empleando trampas "atraer y matar" y de <i>A. aurantii</i> usando confusión sexual Control de <i>C. capitata</i> empleando trampeo masivo y de <i>A. aurantii</i> usando control biológico Control de <i>C. capitata</i> empleando trampas "atraer y matar" y de <i>A. aurantii</i> usando control biológico Control de <i>C. capitata</i> empleando trampeo masivo y de <i>A. aurantii</i> usando confusión sexual Control de <i>C. capitata</i> empleando trampas "atraer y matar" y de <i>A. aurantii</i> usando confusión sexual	

What has been the impact so far?



GENERALITAT
VALENCIANA



01

TECHNICAL RESULT

Up to 95% reduction of aerial spraying

Very strong restrictions in EU to Aerial spraying since Directive 2009/128

The use of biocontrol as SIT helps to manage the existing insecticide resistances and reduce the pressure for insecticide resistance development

02

ECONOMIC RESULT

The cost of the program is about 45 €/ha

Export trend of citrus in Valencia Region is maintained and even increased

Employment is maintained: 90.000 direct jobs for harvest, handling and packaging

Additional indirect impact: machinery, treatments, products for packaging and transport

03

SOCIETAL RESULT

Production of fruits with less pesticide residues.

Less exposure to pesticides for farmers, operators and bystanders

04

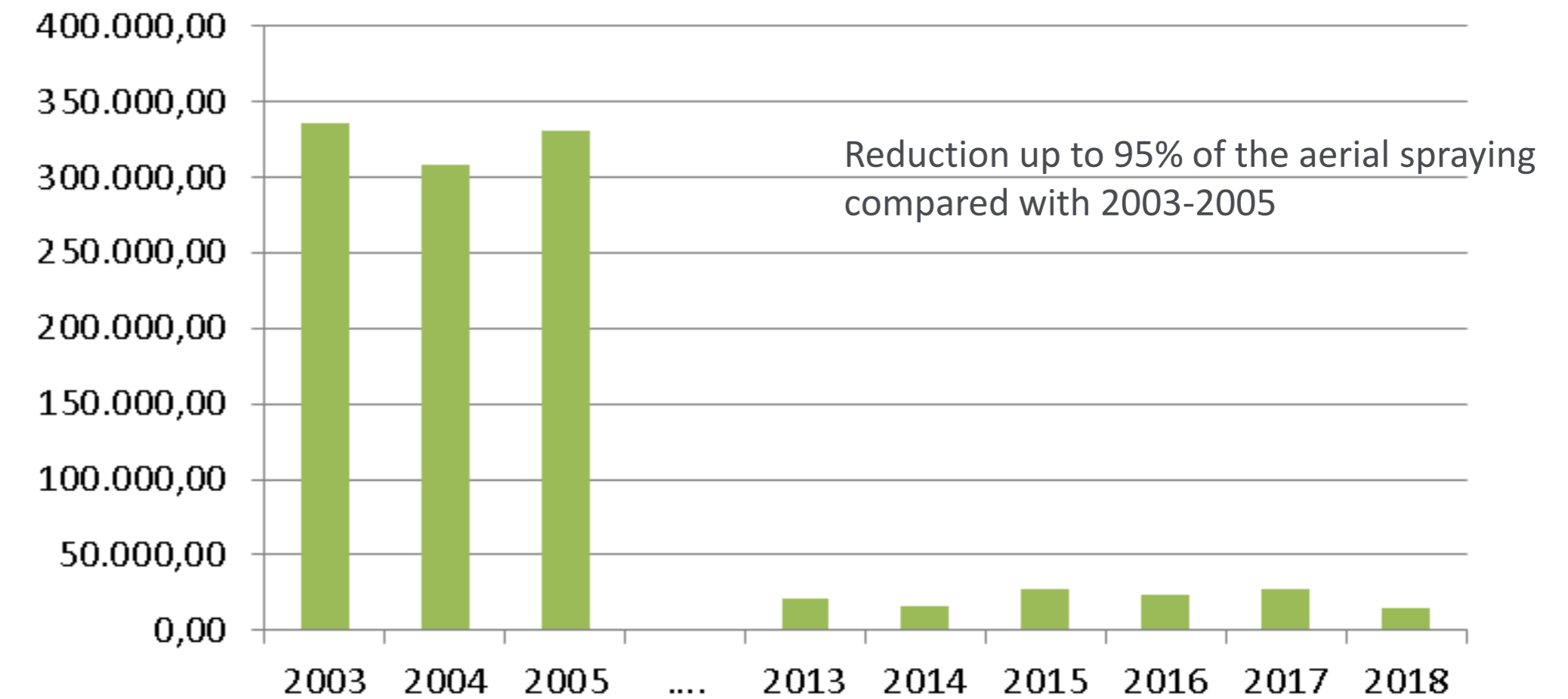
ENVIRONMENTAL RESULT

Lower impact of IPM strategies on the environment

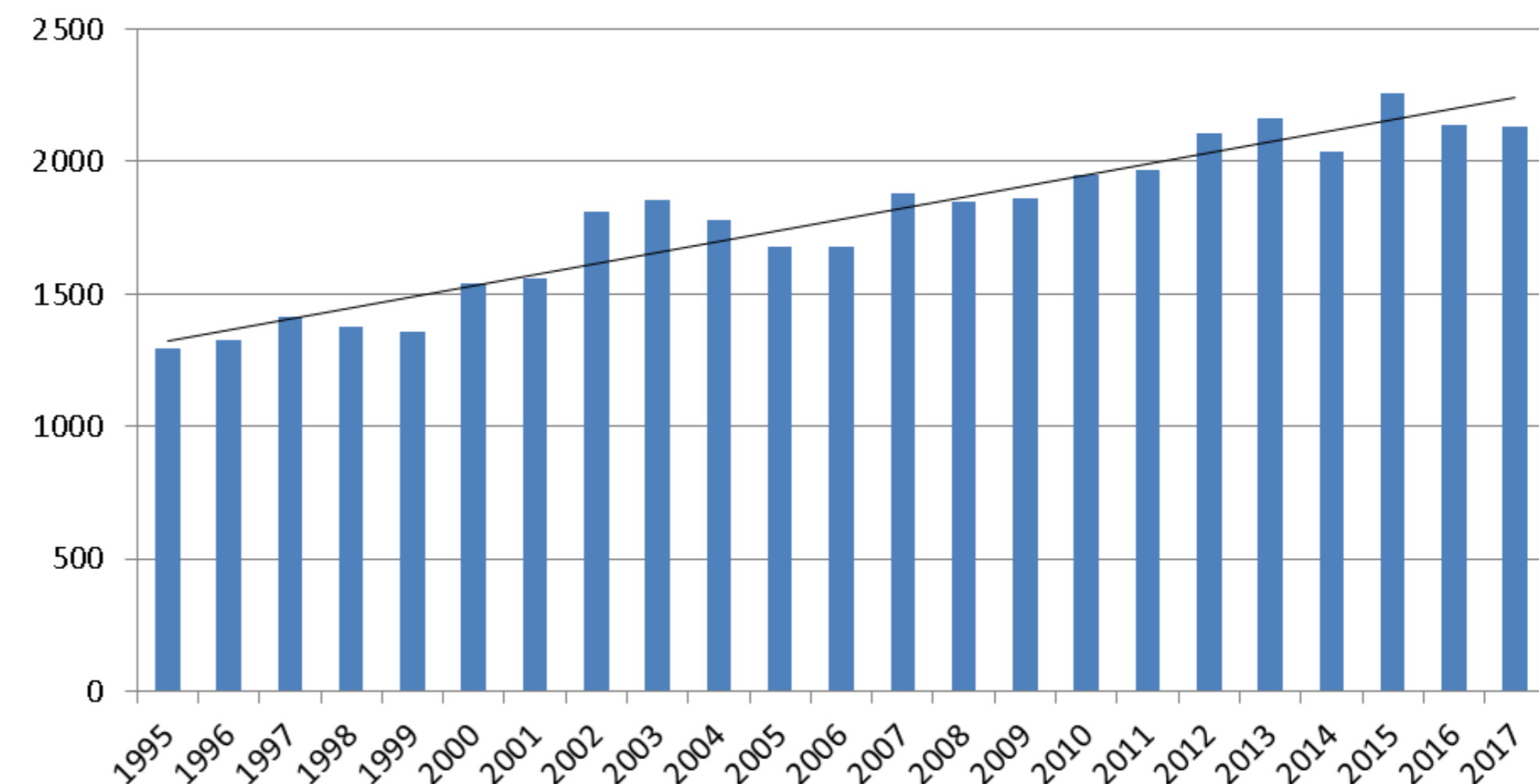
Increase of biodiversity

Fruits with a reduced carbon footprint for EU market

Aerial insecticide sprayed area (ha)



Export trend of citrus in Valencia Region (Million €)



CONTACT US

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IBMA

INTERNATIONAL BIOCONTROL
MANUFACTURERS ASSOCIATION



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**GENERALITAT
VALENCIANA**



European Network for
Rural Development

