



Rice in Albufera of Valencia

Vicente Dalmau Sorlí
Head of Plant Health Service of Generalitat
Valenciana

Alessandra Moccia
Regulatory Affairs Director at Suterra



ABIM – Annual Biocontrol Industry Meeting
21° October 2020



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)

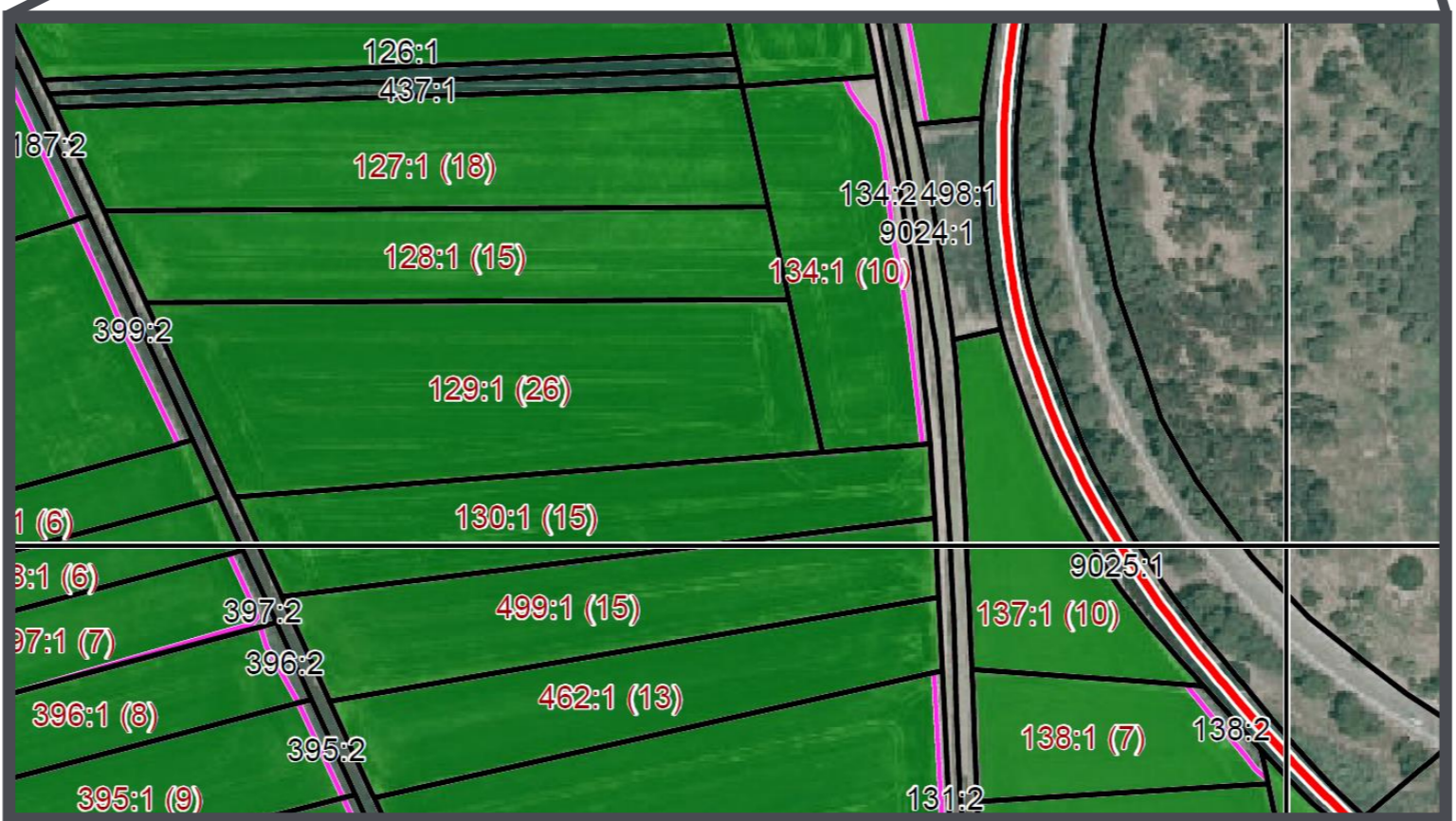
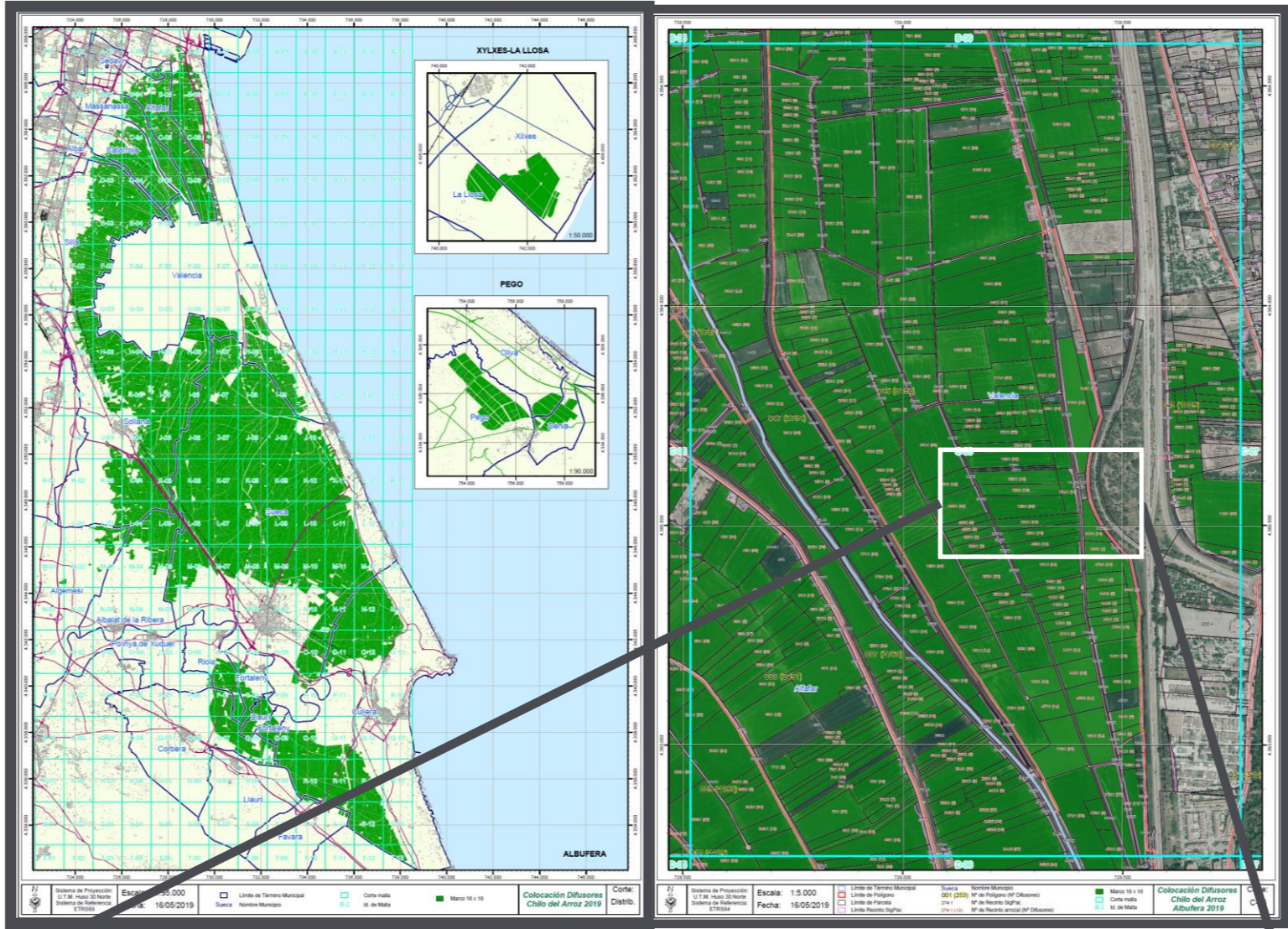
Which are the activities?



Preparation of the dispensers



Preparation of field work (GIS-CAP)



- In brackets the number of dispensers for each field, area, polygon or municipality

Placing dispensers 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

Which are the activities?

Monitoring during the season

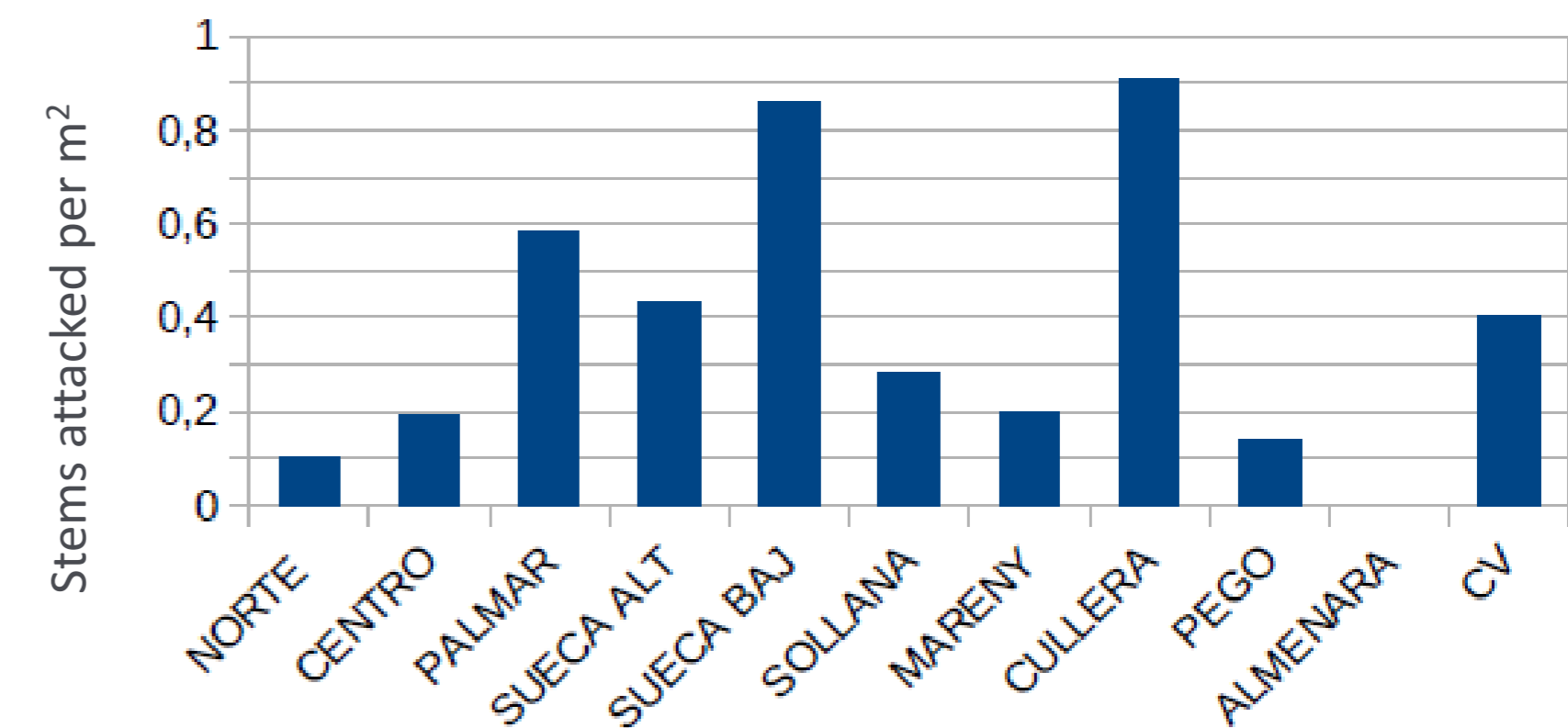
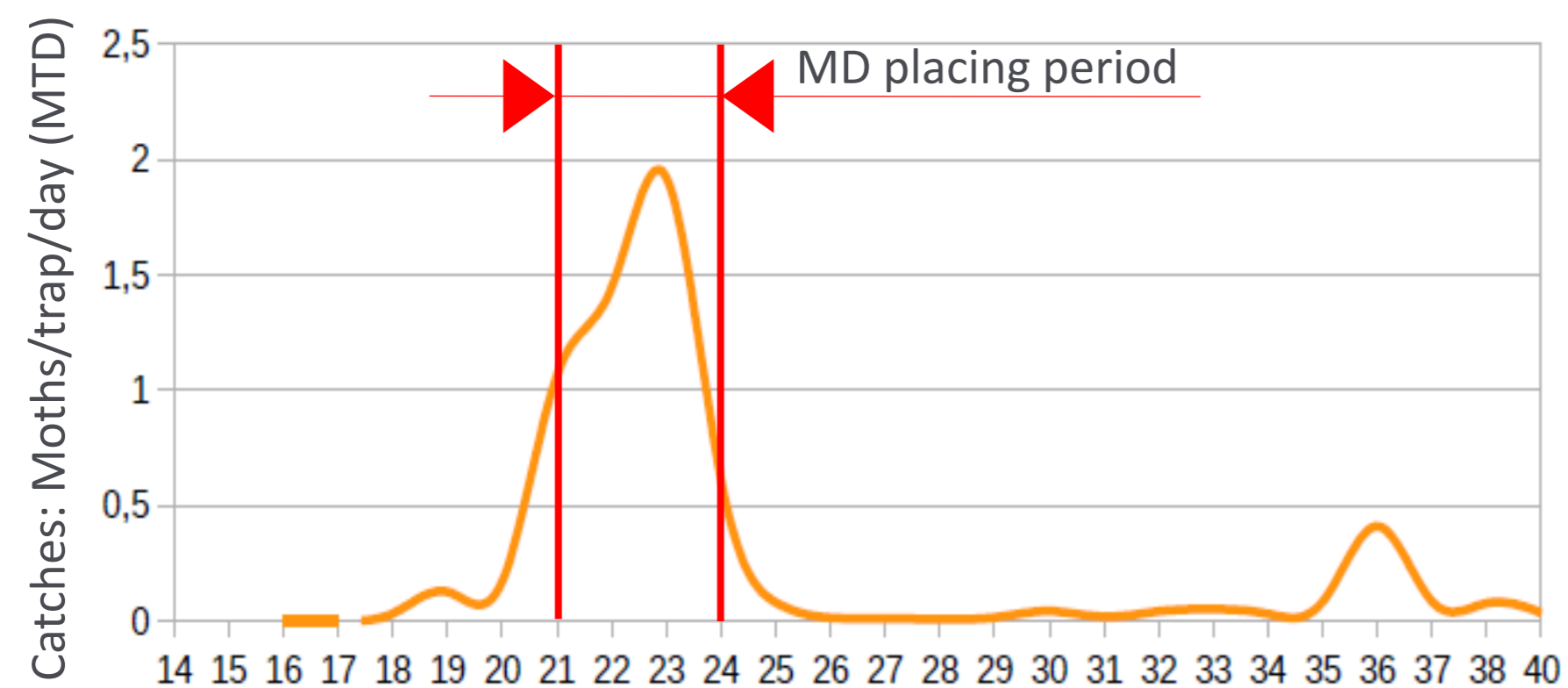


- 51 monitoring points
- Serviced weekly, even before the rice sowing
- Catches are very low (under 2 MTD) and drastically reduced after placing the pheromone dispensers
- In the 70's catches reached 60-70 MTD

Field surveys for damage



- More than 450 fields surveyed for damages
- The Economic Injury Level is 24-61 stems attacked per m²
- In the 70's, these damages were 30-90 stems attacked per m²
- Today, levels of damage in Valencia are always below 1 stem attacked per m²



Which are the activities?



Improve efficiency and cost of biocontrol

Crop Protection 28 (2009) 567-572

Contents lists available at ScienceDirect

Crop Protection

journal homepage: www.elsevier.com/locate/cropro

Optimization of pheromone dispenser density for managing the rice striped stem borer, *Chilo suppressalis* (Walker), by mating disruption

C. Alfaro*, V. Navarro-Llopis, J. Primo

Centro de Ecología Química Agrícola, Universidad Politécnica de Valencia, Camino de Vera s/n, 46022 Valencia, Spain

ARTICLE INFO

Article history:
Received 28 July 2008
Received in revised form 8 January 2009
Accepted 18 February 2009

Keywords:
Pheromone dosage
Lepidoptera
Chilo suppressalis
Mating disruption

ABSTRACT

The rice striped stem borer, *Chilo suppressalis* (Walker) (Lepidoptera: Pyralidae) is one of the most important rice pests worldwide. Rice is frequently grown in an intensive production system in areas adjacent to environmentally sensitive areas. Therefore, the use of insecticides is problematic and new techniques, including mating disruption, are being introduced. Due to the high cost of pheromones, it is essential to optimize the density of the pheromone dispensers. The main purpose of this research was to determine the minimal dosage and optimal dispenser distribution for effective mating disruption of *C. suppressalis*. To this end, we conducted a wide-area trial to test several dispenser densities, 31, 25 and 16 dispensers/ha during 3 years. Results were compared with a standard mating disruption treatment (51 dispensers/ha) and a standard aerial chemical treatment with tebufenozide. Treatment efficacy was determined by pheromone trap catches and crop damage assessment. The release rate of the pheromone dispensers was also quantified. The results of these trials suggest that such treatments provide effective pest control even with reduced pheromone dispenser densities. Longer-lasting dispensers with lower residual load at the end of trials will greatly improve the efficacy of mating disruption for *C. suppressalis*. Moreover, an important consideration is that these newly tested dispenser densities imply a significant reduction in the cost of the treatment. These results are essential in order to expand the use of mating disruption in rice crop protection.

© 2009 Elsevier Ltd. All rights reserved.



- By using a volatile capturer, and with UPV research results
- We've been able to reduce dispenser density from 100 to 31 dispensers per ha (from 10x10m to 18x18m)
- The efficacy of the technique has been maintained



Improvement of dispenser performance



- Registration of the product in Spain and submit to the call of tenders
- Improve the dispenser:
 - reducing the amount of remaining pheromone
 - biodegradability of dispensers (cellulose replacing PVC)

Link to other initiatives



Directive 2009/128/EC to achieve the sustainable use of pesticides

How to achieve sustainable use?



By using MD, the application rate is reduced almost 40 times, from 296,4 g of insecticide per ha in chemical control to only 7,75 g of pheromone per ha

Plant Health Surveys for early detection of harmful organisms

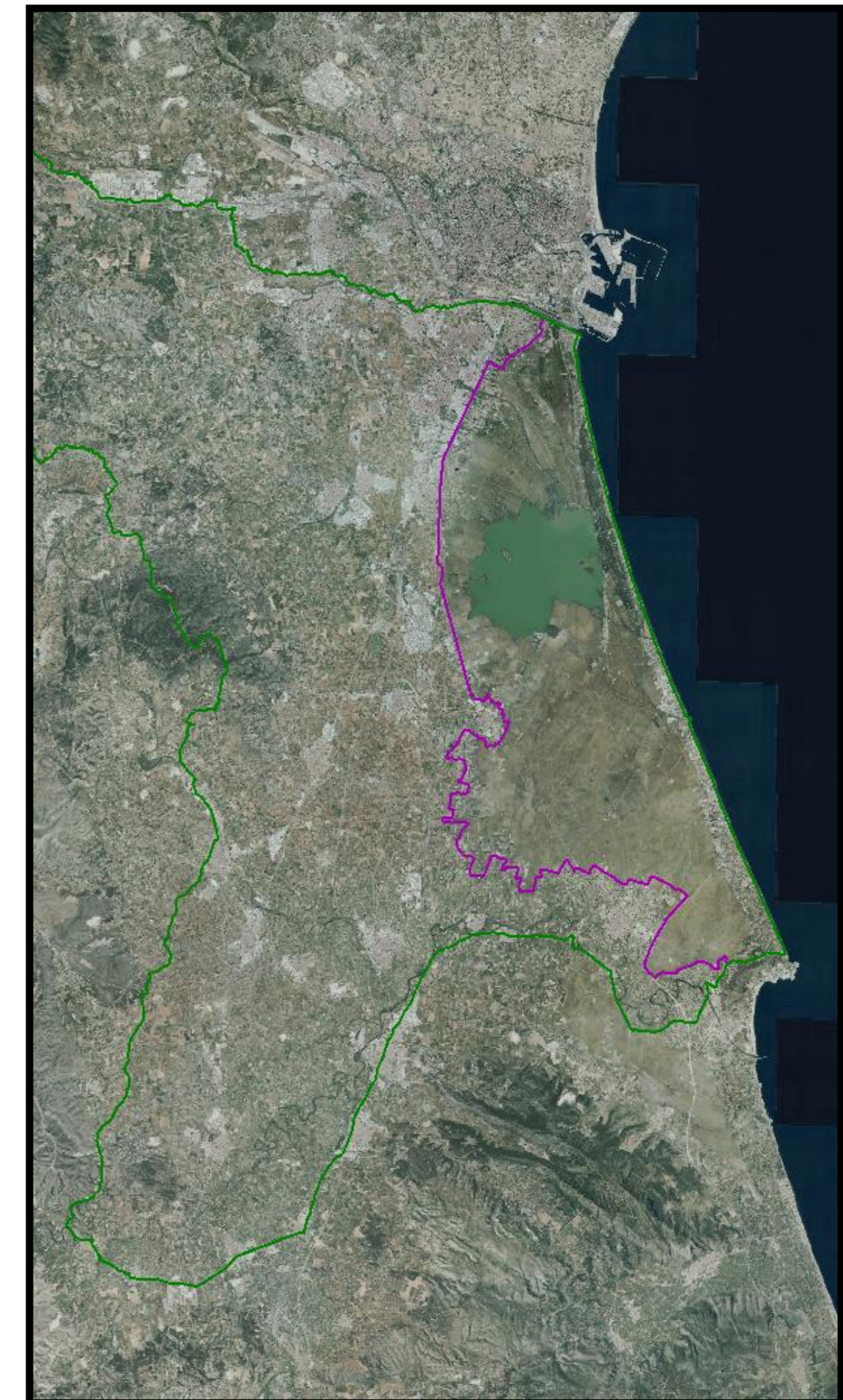


EL CARACOL MANZANA *Pomacea insularum*

Los caracoles manzana son moluscos gasterópodos del Género *Pomacea*, Familia *Ampulariidae*. Originarios de Sudamérica, se trata de especies acuáticas de agua dulce con gran capacidad de adaptación. En España se encuentra la especie *Pomacea insularum*. Detectado por primera vez en 2009, se ha extendido por el Delta del Ebro. Esta especie esta considerada como una de las 100 especies invasoras más perjudiciales



Hembra adulta y huevos de *Pomacea insularum* (Miguel A. López)
Foto: Protocolo prospección Género *Pomacea* (MAGRAMA)



What are the costs?



- Since 2002, the Spanish Plant Health Law allows to declare of Public Interest the control of a specific pest, under certain conditions
- In 2004, the regional department of agriculture declared of Public Interest the control of Rice Stem Borer (**compulsory collective control by mating disruption**).



- Today, supply, preparation and placing of dispensers: 450.000 €/year
- In 2008-2010 the cost was 66 €/ha, 2,2 times higher than now (30€/ha)
- They're funded entirely by the regional department of agriculture (Generalitat Valenciana)
- This aid is compatible with the internal market (R702/2014 art. 26 Aid for the costs of control of plant pests as part of a public programme at regional level)

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

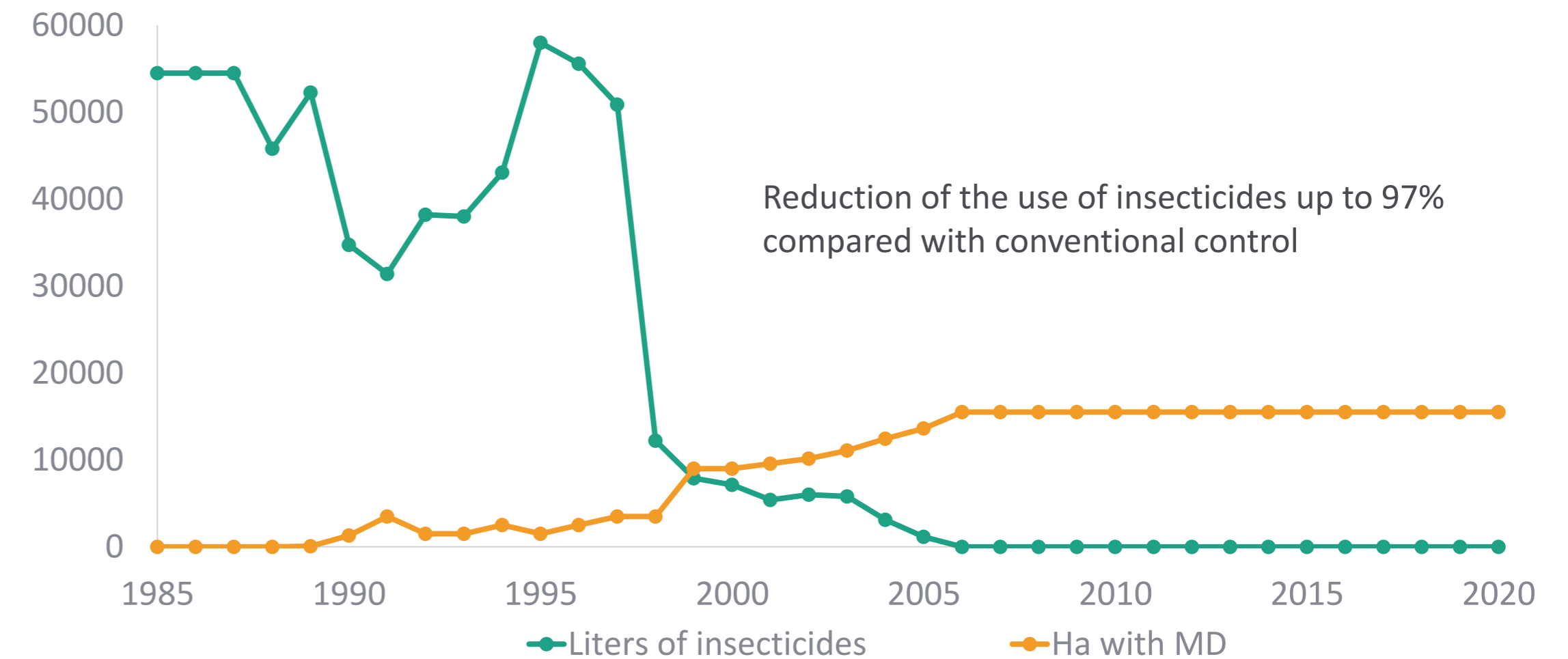
Production of insecticide-free rice. And significant reduction of operators, workers and bystander exposure to hazardous substances and chemical pesticides.

04

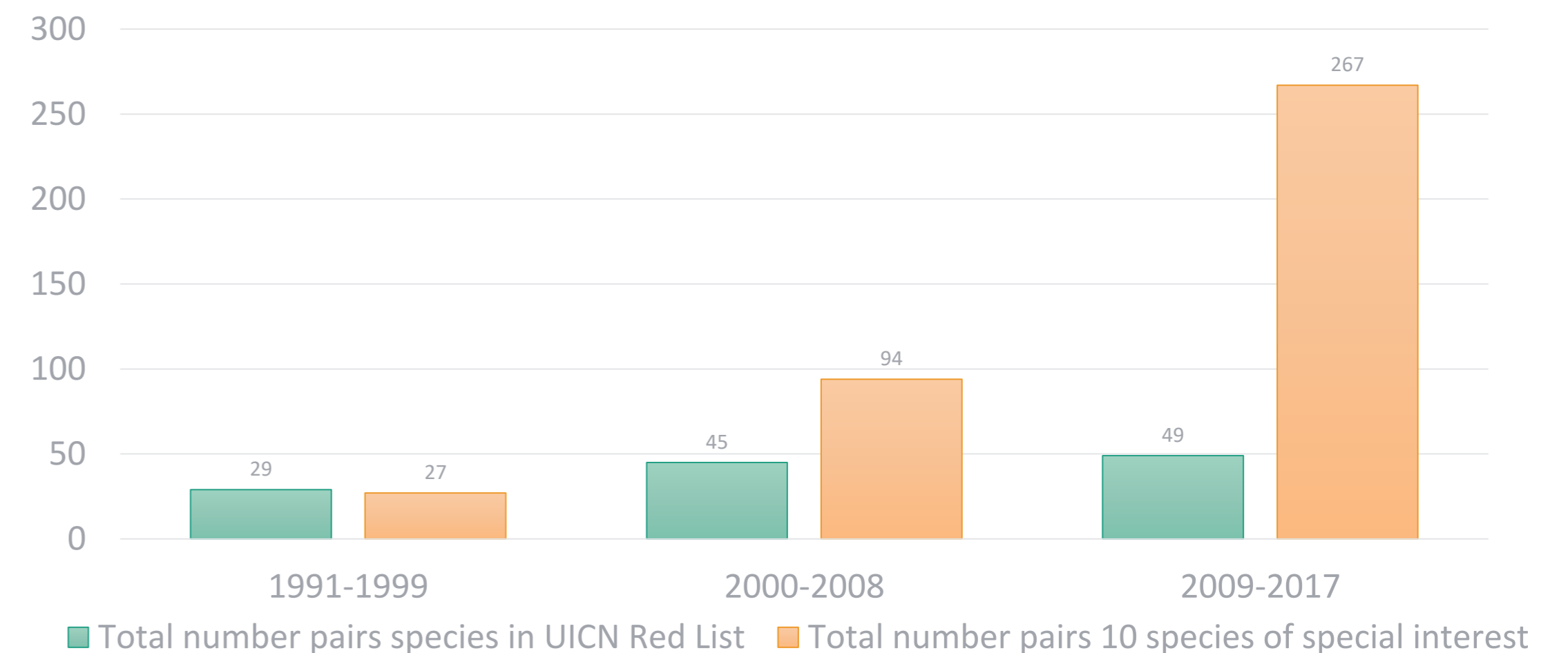
ENVIRONMENTAL RESULT

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





The future...

- Reduce the number of dispensers/ha (reduce the placing costs: 10 dispensers per ha)
- Reduce the winter populations and spraying only pest refuges or foci
- Adjust treatment dates by selective pheromone application at hotspots

Suterra[®]



CONTACT US

IBMA

International Biocontrol Manufacturers
Association AISBL

Rue de Treves 61, 1040 Brussels, Belgium

WWW.IBMA-GLOBAL.ORG



HEAD OF PLANT HEALTH SERVICE GENERALITAT VALENCIANA

Vicente Dalmau Sorlí

dalmau_vic@gva.es



REGULATORY AFFAIRS DIRECTOR AT SUTERRA & SEMIOCHEMICALS PG CHAIR

Alessandra Moccia

Alessandra.Moccia@suterra.com



CONSULTANT

Dr Owen Jones

owenj@plaga.co.uk