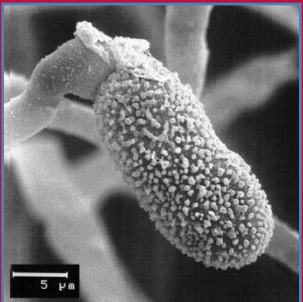
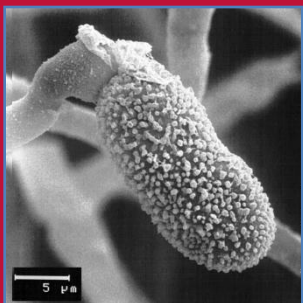


# ***INTEGRATED PROTECTION IN POME FRUITS: WHERE DID IT COME FROM AND WHERE IS IT GOING?***



***Adriana Escudero-Colomar***  
*Convenor of the subgroup Pome fruits arthropods*

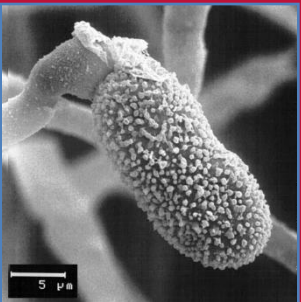


# IFP in Europe

Official legislation of IFP	Belgium, Germany, Italy, Spain, Portugal, Switzerland
Private organizations	UK, France, The Netherlands, Sweden
IOBC Guidelines	Austria

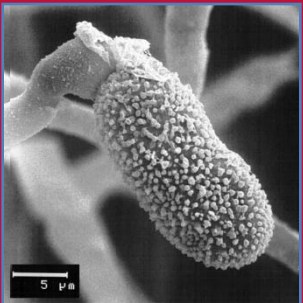
- It is applied in more acreage than that certified
- Great influence in agricultural practices
- It has environmental benefits

# Factors involved in the development of IFP in Europe



- New monitoring and control methods/tools
- More environmentally friendly chemicals
- Numerous active ingredients have been forbidden by European Commission
- Fruit distributors are making greater requirements on growers

# Factors involved in the development of IFP in Europe



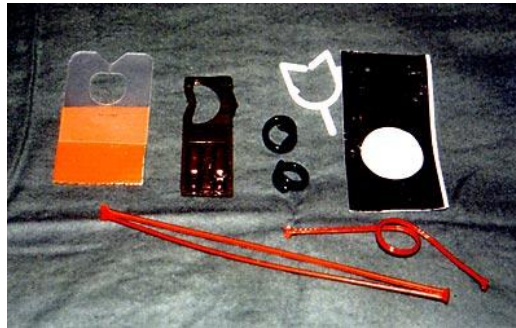
- New monitoring and control methods/tools
- New chemicals more environmentally friendly
- Numerous active ingredients have been forbidden by European Commission
- Fruit distributors are making greater requirements on growers



Codling moth (*Cydia pommonella* L.)  
Oriental fruit moth (*Cydia molesta* L.)  
Apple insect borer (*Zeuzera pyrina* L.)



Mating disruption



*New systems; nets, codlemone as a control methods*



## Medfly (*Ceratitits capitata*)

SIT



Mass trapping



Attract and kill



Chemosterilants





# Biological control



*Anthocoris nemoralis*



*Forficula auricularia*



*Trechnites psyllae*



*Pilophorus perplexus*

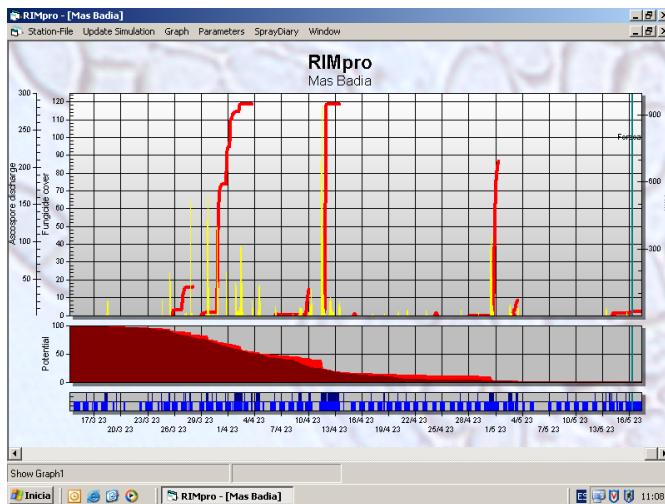


*Orius majusculus*

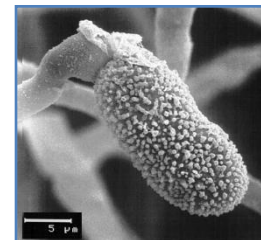
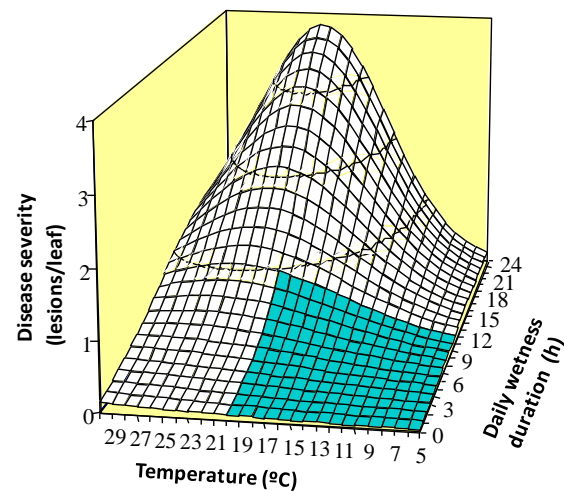


# Apple scab (*Venturia inaequalis*) Brown spot disease (*Stemphylium vesicarium*)

## Models



Model global



# Factors involved in the development of IFP in Europe

- New monitoring and control methods/tools
- New chemicals more environmentally friendly
- Numerous active ingredients have been forbidden by European Commission
- Fruit distributors are making greater requirements on growers

# Chemicals more environmentally friendly



International Organisation for Biological and Integrated Control of Noxious Animals and Plants (IOBC)  
West Palaearctic Regional Section (WPRS)

Organisation Internationale de Lutte Biologique et Intégrée contre les Animaux et les Plantes Nuisibles (OILB)  
Section Régionale Ouest Paléarctique (SROP)

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## IOBC Database on Selectivity of Pesticides

### Introduction

- ▶ [The database](#)
- ▶ [Origin of the data](#)
- ▶ [Which data have been retained?](#)
- ▶ [How to enrich the database?](#)

Select Active Ingredient ... OR Select Test Species ... OR Select Species Group ...

| [clear search](#)

- ▶ [Legends](#)

# Chemicals environmentally more friendly

Bacillus thuringiensis kurstaki OR Select Test Species ... OR Select Species Group ...

search | [clear search](#)

## Legends

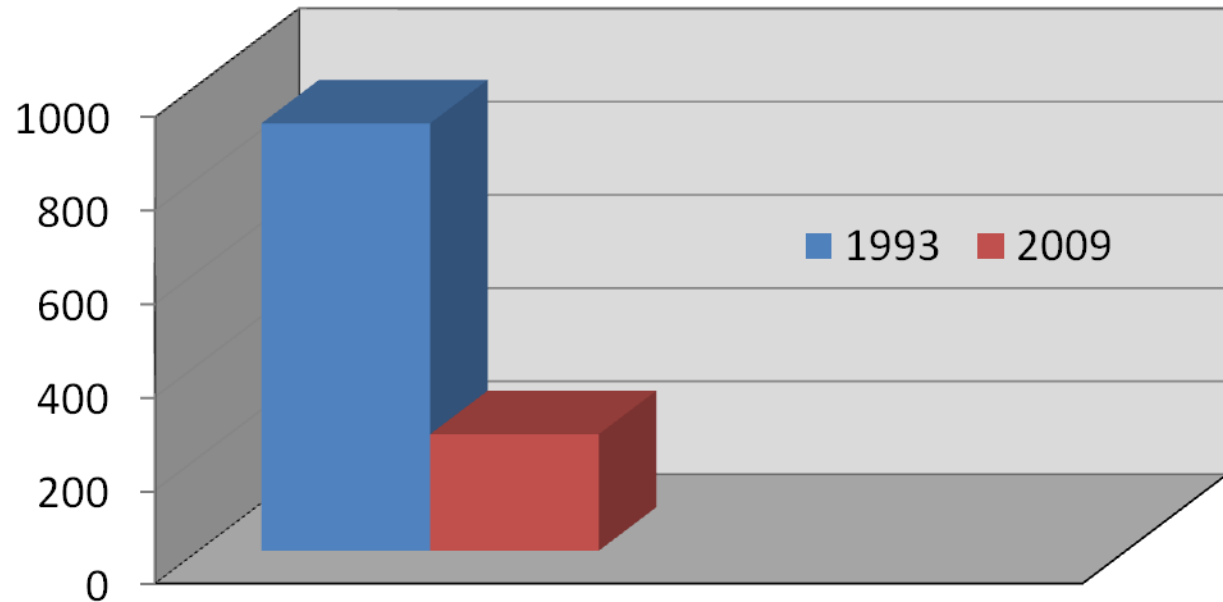
Active Ingredient	Product	g/l or kg	Cat.	Test Species	Species Group	Cat. of test	Dose tested (a.i./ha)	IOBC toxicity class	Effects and duration of activity	Field site (crop - country)	Remarks	Ref.
Bacillus thuringiensis kurstaki	Dipel		I	<i>Aphidius rhopalosiphi</i>	Parasitic hymenoptera	Initial toxicity	3900g	1				DAR
Bacillus thuringiensis kurstaki	Delfin		I	<i>Aphidius rhopalosiphi</i>	Parasitic hymenoptera	Initial toxicity	4500g	1				DAR
Bacillus thuringiensis kurstaki	Dipel		I	<i>Typhlodromus pyri</i>	Predatory mite	Initial toxicity	3900g	1				DAR
Bacillus thuringiensis kurstaki	Delfin		I	<i>Typhlodromus pyri</i>	Predatory mite	Initial toxicity	4500g	1				DAR
Bacillus thuringiensis kurstaki	Delfin	850	I	<i>Aleochara bilineata</i>	Soil dwelling predator	Extended lab	850g	1				Sterk et al., 1999
Bacillus thuringiensis kurstaki	Delfin	850	I	<i>Aleochara bilineata</i>	Soil dwelling predator	Initial toxicity	850g	2				Sterk et al., 1999
Bacillus thuringiensis kurstaki	Delfin	850	I	<i>Anthocoris nemoralis</i>	Plant dwelling predator	Initial toxicity	850g	2				Sterk et al., 1999
Bacillus thuringiensis	Delfin	850	I	<i>Aphidius matricariae</i>	Parasitic hymenoptera	Initial toxicity	850g	1				Sterk et al., 1999

# Factors involved in the development of IFP in Europe

- New monitoring and control methods/tools
- New chemicals more environmentally friendly
- Numerous active ingredients have been forbidden by European Commission
- Fruit distributors are making greater requirements on growers

- The EU in a wide reaching Directive has evaluated over 1100 existing substances and continue to evaluate newly developed ones for their use in plant protection product formulation. Only those substances which have minimal risk to man, animal and the environment are added to the Annex 1 of Council Directive 91/414/EEC. This fact has introduced big changes regarding the use of agrochemicals and biopesticides in EU.
- It is also important to remember that Directive 2009/128/EC establish the framework for Community action to achieve the sustainable use of pesticides.
- Member states shall describe in their National Action Plans how they ensure that the general principles of IPM, as set out in Annex III, are implemented by January 2014.

# Active ingredients permitted



- Some of the active ingredients permitted have the same mode of action, as a consequence the rotation of products for avoiding resistance is almost impossible
- For some pests and crops there only are chemicals of wide spectrum action (medfly in pome fruits)

Source: Ministry of Agriculture, AEPLA and EUROSTAT

# Improvement in natural biological control

## Mites

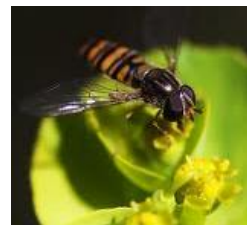
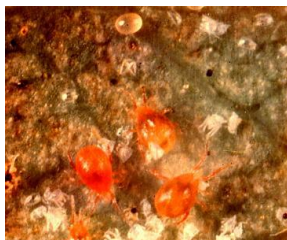
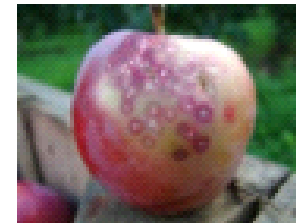
*Panonychus ulmi* (Koch)  
*Aculus schlechtendali* (Nal.)  
*Epitrimerus piri* (Nal.)  
*Tetranychus urticae* (Koch)

## Aphids

*Aphis pomi* (de Geer)  
*Dysaphis plantaginea* (Pass.)  
*Eriosoma lanigerum* (Haus.)

## Scales/ Mealybugs

*Quadraspidiotus perniciosus* (Com.)  
*Pseudococcus viburni* (Sig.)



# Factors involved in the development of IFP in Europe

- New monitoring and control methods/tools
- New chemicals more environmentally friendly
- Numerous active ingredients have been forbidden by EU and individual European countries
- Fruit distributors are making greater requirements on growers

# Control's parameters regarding residues \*

- Maximum n<sup>o</sup> of active ingredients (3-5)
- % of the MRL
- The sum of the residues found can't be greater than the % maximum they establish

	Nº	MRL	%WMRL
<b>Distributor 1</b>	4	70%	<80%
<b>Distributor 2</b>	4	50%	
<b>Distributor 3</b>	5	33%	<100%
<b>Distributor 4</b>	5	100%	
<b>Distributor 5</b>	5	Different labels (green yellow, red)	

\* Source: AFRUCAT (Fruit companies association of Catalonia)

# Control's parameters regarding residues \*

## Distributor 1

A.I.	Residue mg/kg	MRL	%MRL < 70%
A	0.10	1	10% OK
B	0.20	1	20% OK
C	0.30	1	30% OK
D	0.30	1	30% OK
Sum			90% >80%....NO

- This requirements are a high pressure for growers, that in some cases have few tools for fighting against pests and diseases.

\* Source: AFRUCAT (Fruit companies association of Catalonia)



# For improving...

- No economic value added to production
- Consumer do not properly know IFP
- Agronomy aspects need more development



# And ...

- New pests and pathogens
- Directive 2009/128/EC must be completely applied in 2014 in all EU countries.
- Market requirements
- To listen what customers want for fresh consuming
- Innovation plays an important role

# WHERE IS IFP GOING?

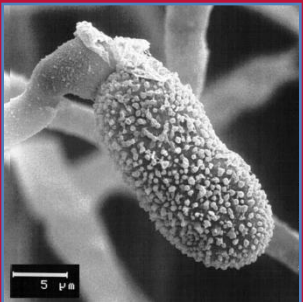
- To produce fruits without detectable residues
- To integrate agronomy of fruit plants and postharvest management in a complete IFP system

Is it an utopia?

*The economical production of high quality fruit, giving priority to ecologically safer methods, minimising the undesirable side effects and use of agrochemicals, to enhance the safeguards to the environment and human health*

**This definition is still indicating us the way....  
after 20 years.**

# INTEGRATED PROTECTION IN POME FRUITS: WHERE DID IT COME FROM AND WHERE IS IT GOING?



Thank you for your attention!!!

