



Farmer's protection strategies in peach orchards: aphid communities in S-E France as a case study

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Farmers' protection strategies in peach orchards : aphid communities in S-E France as a case study

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INRA Avignon



Introduction

- 16 000 ha (2% in OF), and 84% in the S-E of France;
- Aphids are major pests due to several species and different symptoms;
- Management control based on chemicals, but resistance and effects on non-target species;



Myzus varians

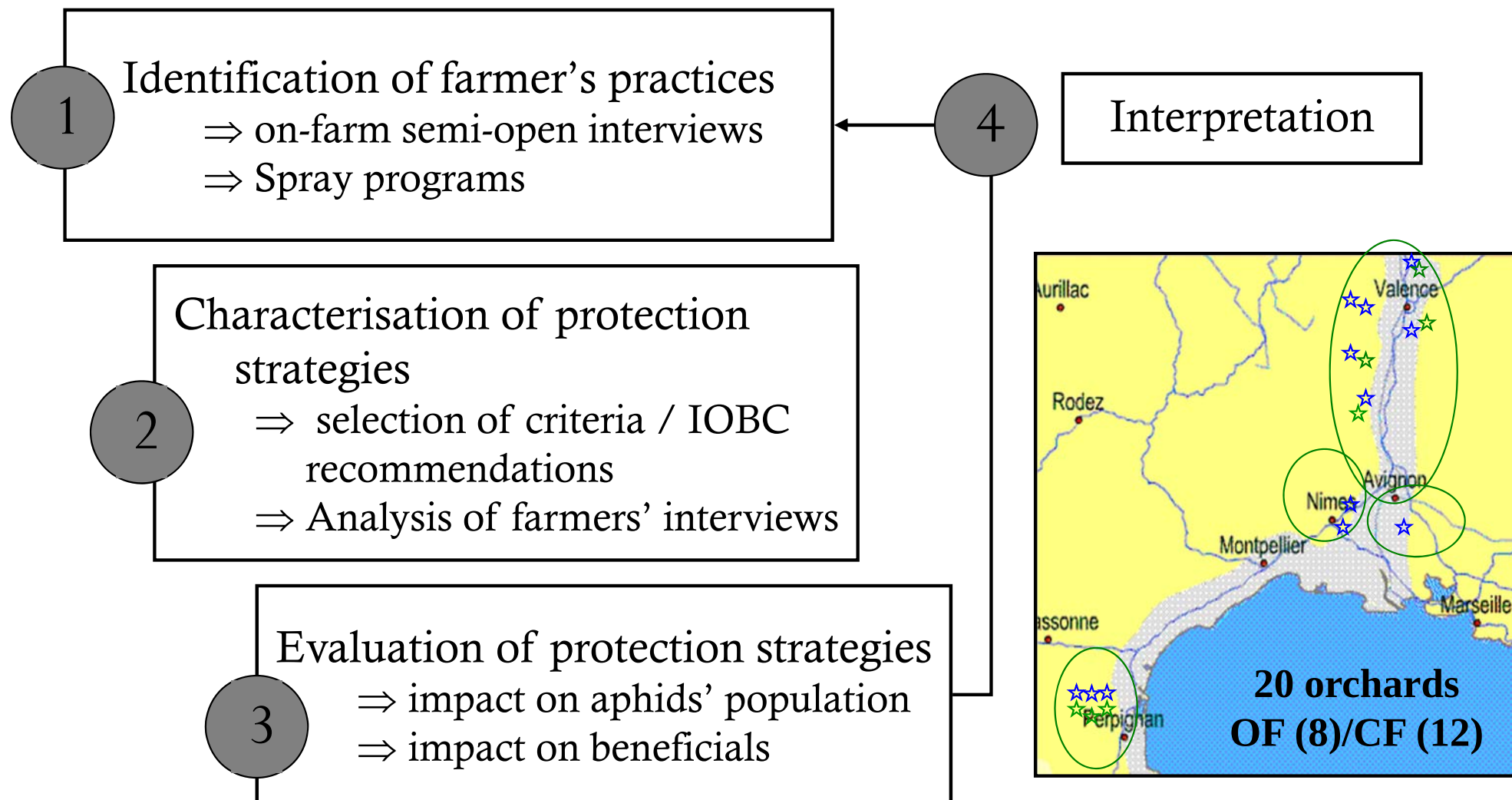


*Brachycaudus
schwartzii*



Plum Pox Virus

Approach and outline of the presentation



1/ Identification of protection practices



Cultural methods
Nb foliar fertilisation
Vigour management (0/1)
Fertilisation management (N unit)
Nearby environment management (0/1)
Weed strips : shearing intensity (0 = high, 1 = low)



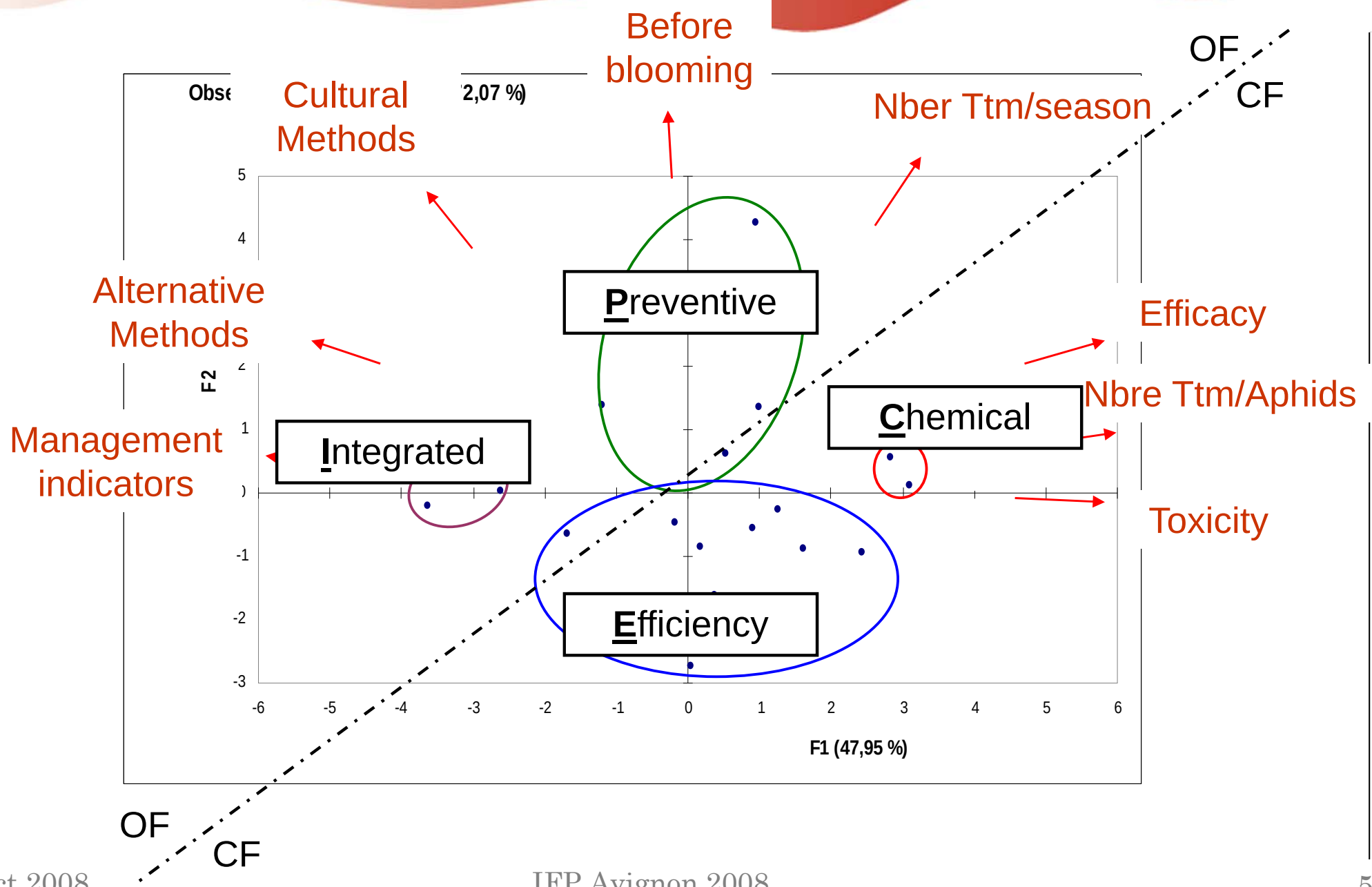
Management Indicators
Level of monitoring (1/2/3)
Previous infestation (0/1)
Guidelines (0/1)
Antagonists (0/1)
Tolerance threshold (1)
Aphid biology (0/1)

Alternative methods
Mating disruption (0/1/2)
Infested branch manual prune out (0/1)
Nb autumn kaolin applications
Nest box installation (0/1)



Direct control
Total Nb of treatments
Nb of treatments against aphids
Product's efficacy (Peff)
Application before blooming (Pos)
Product's toxicity (Tox)

2/ Characterisation of protection strategies



3/ Evaluation of the strategies (1/3)

Aphid communities



Myzus persicae
(Sulzer)



Brachycaudus schwartzi
(Börner)



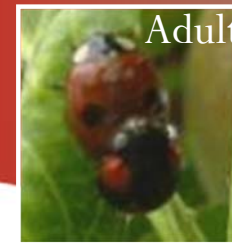
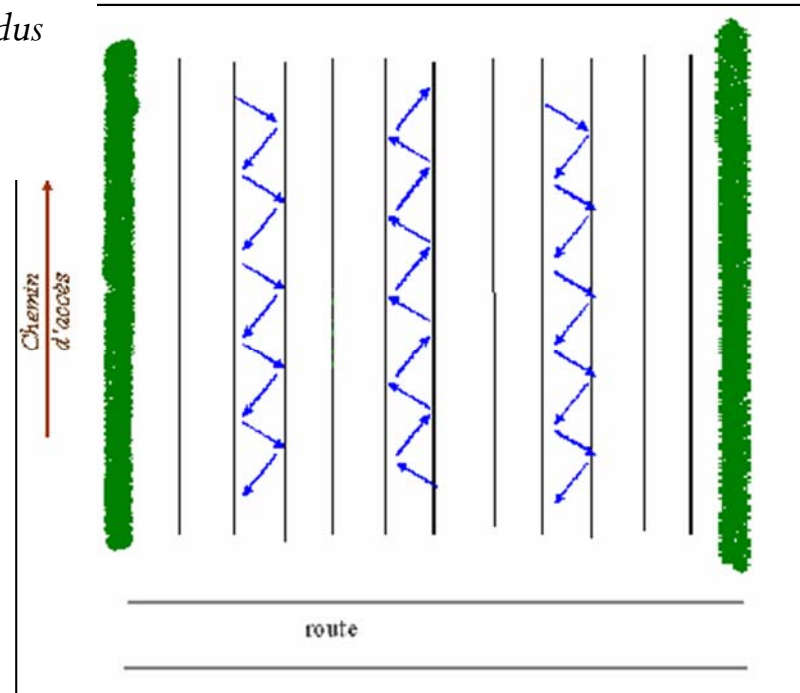
Brachycaudus persicae
(Passerini)



Hyalopterus amygdalii
(Blanchard)



Myzus varians
Davidson



Adult

Coccinellidae



Larvae



Syrphidae



Adult

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Larvae



Eggs

Chrysopidae

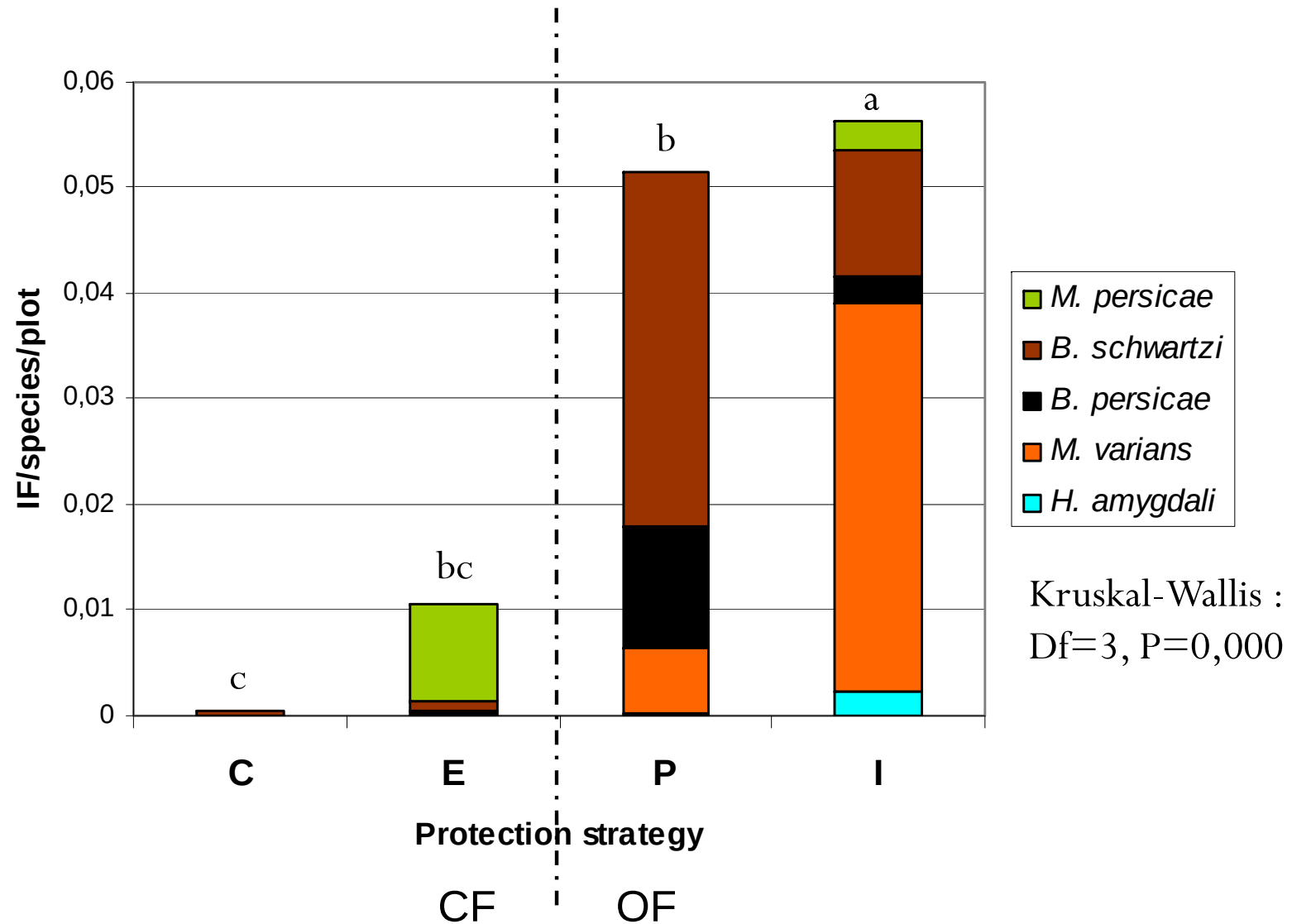


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Forficulidae

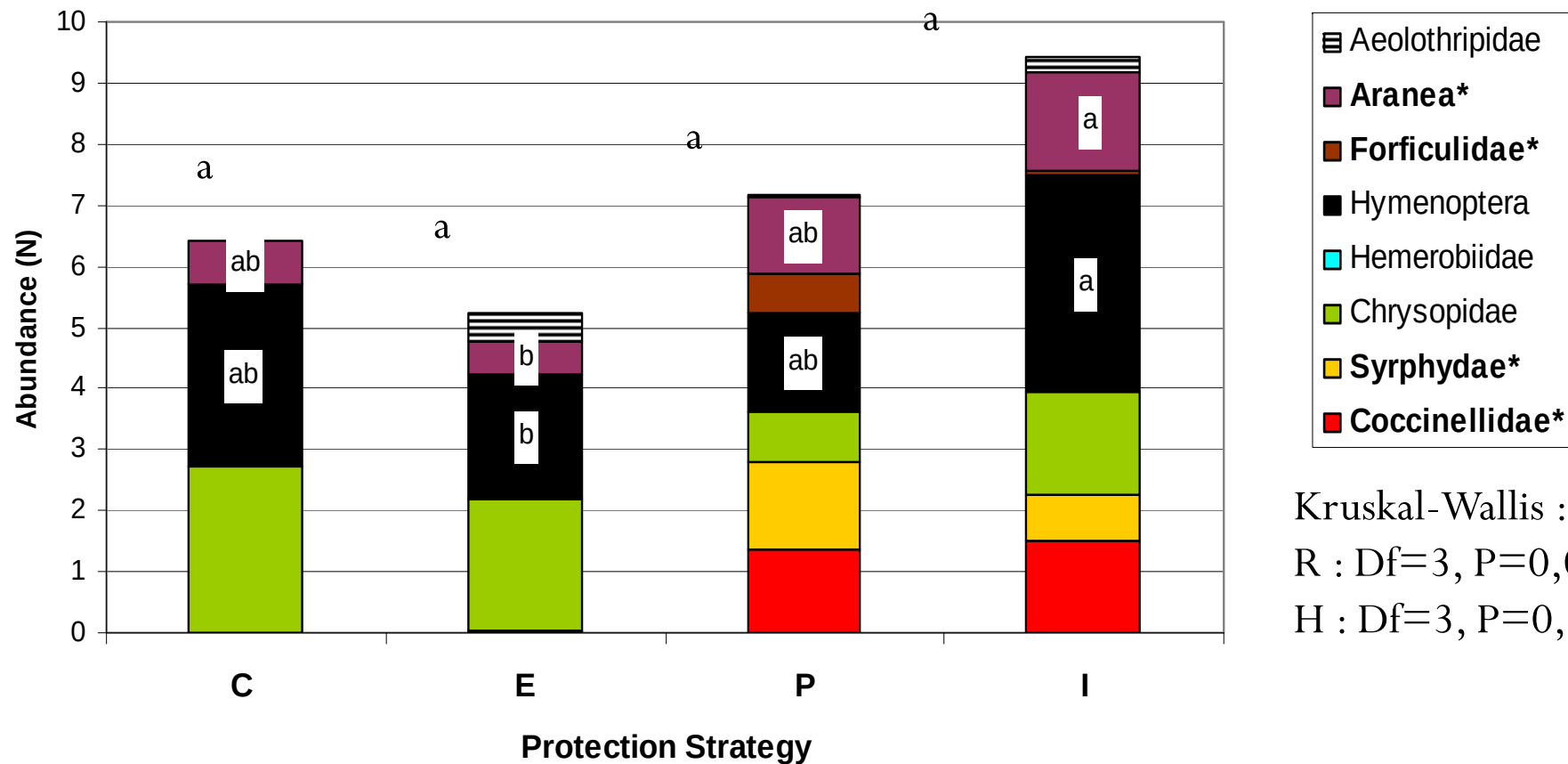
3/ Evaluation of the strategies (2/3)

Impact on aphids



3/ Evaluation of the strategies (3/3)

Impact on beneficials



Kruskal-Wallis :
R : Df=3, P=0,006
H : Df=3, P=0,008

	<i>B. schwartzi</i>	<i>B. persicae</i>	<i>H. amygdali</i>	<i>M. varians</i>	IFT
Coccinellidae		0.58		0.533	0.702
Syrphydae	0.473		0.481	0.639	0.606

4/ Interpretation (1/2)

	<i>M. persicae</i>	<i>B. schwartzi</i>	<i>B. persicae</i>	<i>H. amygdali</i>	<i>M. varians</i>	IF	N	R	H	E
<u>Management Indicators</u>							0,479	0,558		
Level of monitoring										
Previous infestation consideration							0,459			
Guidelines consideration										
Antagonists consideration		0,455	0,45			0,68		0,735	0,681	
Tolerance level								0,464		
Aphids' biological knowledge					0,506					
<u>Alternative methods</u>	-0,574		0,564					0,72	0,732	
Mating disruption use	-0,454							0,495	0,542	
Infested branch manual prune out						0,565	0,543	0,707	0,613	
Number autumn kaolin application										
Nest box installation		0,658	0,526				0,519			
<u>Cultural methods</u>			0,539			0,6		0,733	0,69	
Number of foliar fertilisation				0,525	0,546					
Vigour management										
Fertilisation management						0,679	0,574	0,596	0,499	
Nearby environment management										
Weed strips : shearing intensity		0,555	0,551			0,649	0,547	0,768	0,698	
<u>Direct control</u>										
Total Number of treatment							-0,562			
Number of treatment toward aphids										
Product's efficacy		-0,495						-0,558		
Application before blooming	-0,576	0,508				-0,508				
Product's toxicity					-0,490	-0,510	-0,482	-0,635	-0,486	

4/ Interpretation (2/2)



➤ Direct control methods with efficient and toxic products are correlated with low IF (the number of treatment being independant)

➤ No correlation between IF and management indicators, cultural and alternative methods



➤ However, such methods promote diversity in aphid communities.

Discussion

Can protection strategies be both efficient and ecologic ?

- Efficiency and Ecology appear as incompatible,
 - Adequacy with farmer's objectives and production strategy.
- ⇒ Need for new methods (peach tree resistance, environment management, eligible alternative products, etc.).

Relevance of protection strategies and steps towards integration :

- Internal variability within organic and conventional management systems,
- Organic as a prototype for integration? « Integrated Organic » strategy appears as a more advanced stage...
- Trajectories from chemical to integrated ?

