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

Penvern S., Fauriel J., Bellon S., Sauphanor B.

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;
Approach and outline of the presentation

1. Identification of farmer’s practices
   ⇒ on-farm semi-open interviews
   ⇒ Spray programs

2. Characterisation of protection strategies
   ⇒ selection of criteria / IOBC recommendations
   ⇒ Analysis of farmers’ interviews

3. Evaluation of protection strategies
   ⇒ impact on aphids’ population
   ⇒ impact on beneficials

4. Interpretation

20 orchards
OF (8)/CF (12)
1/ Identification of protection practices

**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)

**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)

**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

Observations (axes F 1 et F 2 : 72,07 %)

-3 -2 -1 0 1 2 3 4 5

F1 (47,95 %)

F2

Cultural Methods

Before blooming

Nber Ttm/season

Efficacy

Nbre Ttm/Aphids

Toxicity

Alternative Methods

Management indicators

P_reventive

Chemical

Efficiency

Integrated

OF CF

OF CF
3/ Evaluation of the strategies (1/3)

Aphid communities

*Myzus persicae* (Sulzer)

*Brachycaudus schwartzi* (Börner)

*Brachycaudus persicae* (Passerini)

*Hyalopterus amygdalii* (Blanchard)

*Myzus varians* Davidson

*Chrysopidae*

*Coccinellidae*

*Syrphidae*

*Forficulidae*
3/ Evaluation of the strategies (2/3)
Impact on aphids

Kruskal-Wallis :
Df=3, P=0,000
3/ Evaluation of the strategies (3/3)
Impact on beneficials

Kruskal-Wallis:
R : Df=3, P=0.006
H : Df=3, P=0.008

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4/ Interpretation (2/2)

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

- 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?