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Department: Plant protection Entomology

Customer: Engelhard Corporation, FiBL

Efficacy of Surround® WP against the European pear psyllid (*Cacopsylla pyri*) in large-scale field trials

Questions: Are pre-flowering applications of Surround® WP sufficient to keep the European pear psyllid (*Cacopsylla pyri*) below the economic threshold for the whole season?

Experimental site:

- Christophe Suter, Roveray, 1170 Aubonne (**Trial I**)
- RAC Conthey, 1964 Conthey (**Trial II**)

Trial I (Christophe Suter, Aubonne)

Treatments:

- (1) Control
- (2) Surround® WP (active matter: kaolin)

Varieties:

- Conference, Harrows

Experimental design:

- 4 replications, the control was situated at the edges of the plot, in order to have a wide and compact treated area

Application technique:

- tractor air-blast sprayer

Dates of Applications:

- 20th Feb 04, stage 51 BBCH: Surround® WP (26kg/ha, 3%, 860l/ha)
- 09th Mar 04: Surround® WP (26kg/ha, 3%, 860l/ha)
- 17th Mar 04, stage 51-53 BBCH: Surround® WP (13kg/ha, 3% 430l/ha)
- 29th Mar 04, stage 54 BBCH: Surround® WP (13kg/ha, 3% 430l/ha)
- 05th Apr 04: Surround® WP (13kg/ha, 3% 430l/ha)
- 14th Apr 04: Surround® WP (13kg/ha, 3% 430l/ha)
- 20th Jun 04: release of Anthocorids in the control

Treatments against the pear bedstraw aphid (*Dysaphis pyri*): 31st May 04, local treatments with a high-pressure hand gun: 0,01% Pyrethrum FS + 1% Natural + 0,3% Sicide; 450 lt/ha

Method of control:

- Beating tray samples
- Visual controls on blossoms or young shoots

Dates of control:

- 02nd Feb 04: Beating tray sample
- 05th Feb 04: Beating tray sample
- 13th Feb 04: Beating tray sample
- 17th Feb 04: Beating tray sample
- 21st Apr 04 (stage 65 BBCH): Visual control on 50 blossom clusters per treatment and replication (5 blossom clusters per tree, 10 trees)
- 30th Apr 04 (stage 66-69 BBCH): Visual control on 50 blossom clusters
- 02nd Jun 04: Visual control on 20 shoot tips (4 top-leaves per shoot; 2 shoots per tree, 10 trees)
- 30th Jun 04: Visual control on 20 shoot tips (8 top-leaves per shoot; 2 shoots per tree, 10 trees)

Trial II (RAC, Conthey)

Treatments:

- (1) Control
- (2) Surround® WP (active matter: kaolin; 30kg/1000l)

Varieties:

- (3) Plot Ecomax: Williams, Harrows Sweet, FG 1606; Concorde, Conférence
- Plot 802: Gute Louise, Conférence

Experimental design:

- The northern halves of the plots were treated, the southern halves were left as untreated control
- Plot Ecomax: 9 rows, row length 36m; treated area: 18m x 32m
- Plot 802: 5 rows, row length 75m; treated area: 37.5m x 16m

Application technique:

- tractor air-blast sprayer

Dates of Applications:

- 21st Feb 04: Surround® WP (1600 l/ha)
- 03rd Mar 04: Surround® WP (1600 l/ha)
- 08th Apr 04: Surround® WP (1000 l/ha)
- 28th Apr 04 Ecomax & ¼ nord of the plot 802: Surround® WP (1000 l/ha); ½ south of the plot 802 & plot Collection: Envidor®
- 03rd May 04 Ecomax (whole plot): Natural® (1%), Pyrethrum FS® (0.05%) 1600l/ha; Delfin®, Mycosin®
- 14th May 04: ½ south of the plot 802 & plot Collection (adjacent orchard): Evisect® 1600l/ha
- 05th Jun 04 Ecomax: Mycosin®
- 11th Jun 04 Ecomax: Mycosin®; Sigid® (0.5%; 400l/ha)
- 22nd Jun 2004 Ecomax: Sigid® (0.5%; 400l/ha)
- 24th Jun 2004 Ecomax: Madex®; Mycosin®;

Method of control:

- Visual controls on blossoms or young shoots

- Dates of control:
- 19th Feb 04
 - 03rd Mar 04
 - 16th Mar 04
 - 05th Apr 04
 - 21st Apr 04 (stage 65 BBCH)
 - 27th May 04
 - 30th May 04
- Statistical analysis:
- JMP, Version 5.0.1.
 - Student's t-Test; Tukey Test

Results and Discussion

Trial I (Christophe Suter Aubonne)

The flight activity was monitored by beating tray samples. Generally, the activity of the over-wintering adults was very low (Table 1).

Tab. 1: Average number of adult pear psyllids of the first flying period (beating tray samples)

Date	Average number of pear psyllids / 100 beatings
02 nd Feb 04	6.0
05 th Feb 04	10.0
13 th Feb 04	1.0
17 th Feb 04	1.7

During the first visual control (21st April 2004) neither eggs nor larvae of the pear psyllid were found. During the second visual control (30th April 2004), the infestation was still very low. Not a single pear psyllid was found in the treated part, whereas in the control parts 4 psylla larvae were found on 200 blossom clusters. During the visual control on the 2nd June 2004 the number of psylla-eggs on the shoot tips (3 youngest leaves) were counted. The results are given in Figure 1. Although clearly more eggs were found in the untreated control than on the surround-treated trees, the differences were not significant. On the 30th June 2004 the infestation with psylla-larvae was counted. The infestation was still very low: only one larva was found on the treated trees, while in the control 32 larvae were found on 80 shoot tips (8 youngest leaves). Due to the fact that in three out of four replications of the control no psylla larvae were found, differences were not significant.

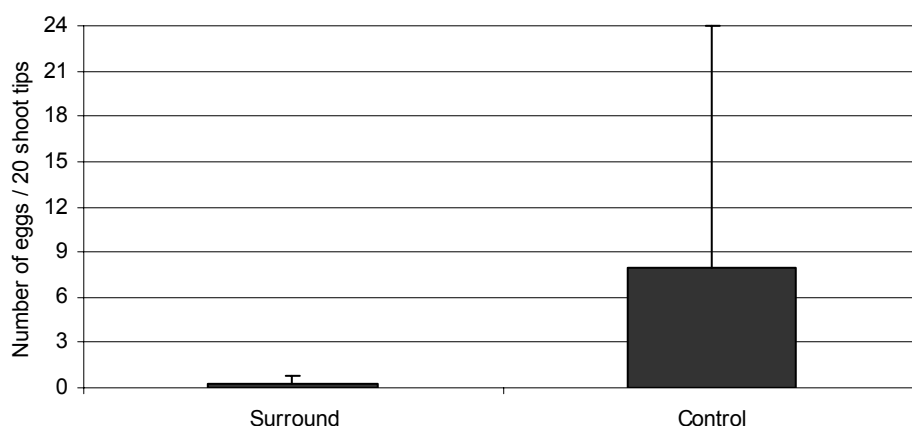


Fig. 1: Number of psylla eggs per 20 shoot tips (3 youngest leaves) on the 02nd June 2004 in Aubonne (Statistical analysis: Student's t-Test, $\alpha=0.05$, differences are not significant).

Trial II (RAC, Changins)

In the orchard in Changins higher densities of pear psyllids occurred. During the visual control on the 21st April 2004 (stage 65 BBCH) significant differences between the control and the Surround® WP treatment were found in both plots (Ecomax and plot 802; Figure 2). With a corrected efficacy of 98.31% (plot Ecomax, Abbott's formula) and 99.11% (plot 802) Surround® WP showed very good results.

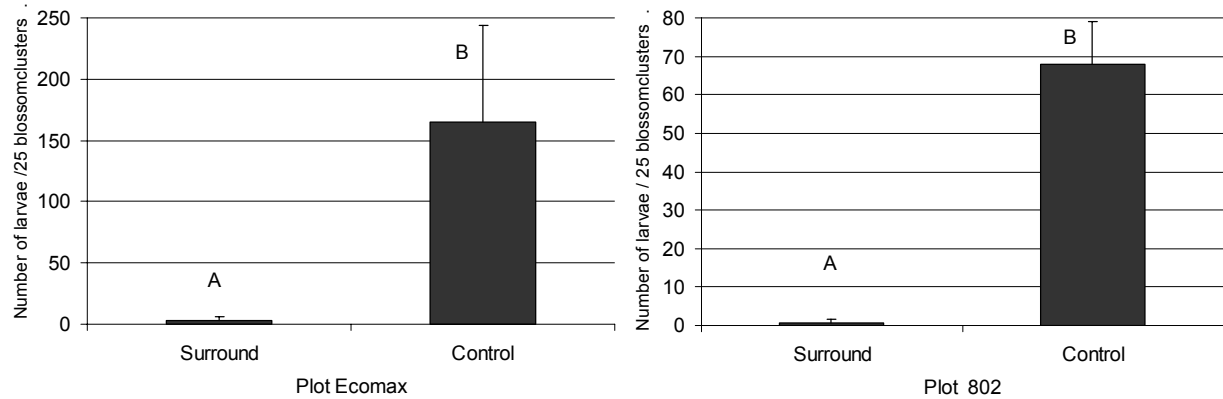


Fig. 2: Results of the visual control in Changin on the 21st April 2004 (ANOVA, $p < 0.0001$; Tukey test; $\alpha = 0.05$, treatments with different letters are significantly different).

After pear blossom, the control parts of the plot 802 were treated with Evisect® (active matter: Thiocyclame hydrogen oxalate) in order to kill the psylla larvae and to avoid migration. In the northern half of the Surround® WP treated area an additional application of kaolin was done after flowering (4xSurround), whereas in the other half no further applications occurred (3xSurround). The aim was to evaluate, whether three applications before flowering are sufficient to keep the pear psyllid below the economic threshold during the whole year or whether an additional treatment after flowering would lead to a better efficacy. The results are given in Figure 3. For the plot Ecomax the differences were not significant. Although the data did not allow a statistical analysis for the plot 802, the results showed interesting tendencies: The highest densities of pear psyllids were found in the plots treated three times with Surround® WP. The four times Surround® WP treated areas showed fewer pear psyllids, comparable with the densities of pear psyllids in the Evisect® treated control.

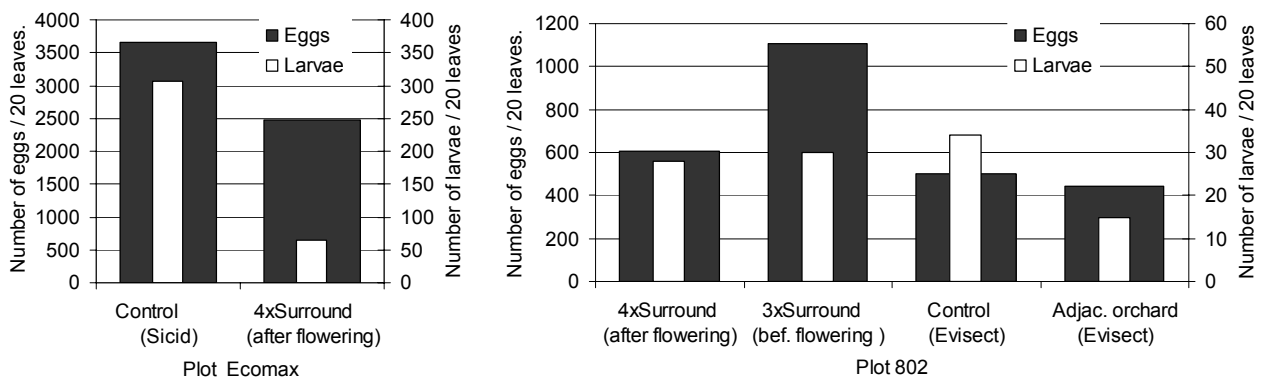


Fig. 3: Results of the visual control on the 27th May 2004 (no statistical analysis for plot 802; plot Ecomax: Student's t-Test not significant).

The last visual control was conducted on the 30th June 2004 in order to see, if the population in the treated areas recovered after a certain time (Figure 4). Although no significant differences were found, the Surround treated areas showed less pear psyllid larvae than the Evisect® treated control. No differences were found between the three times and four times Surround treated trees.

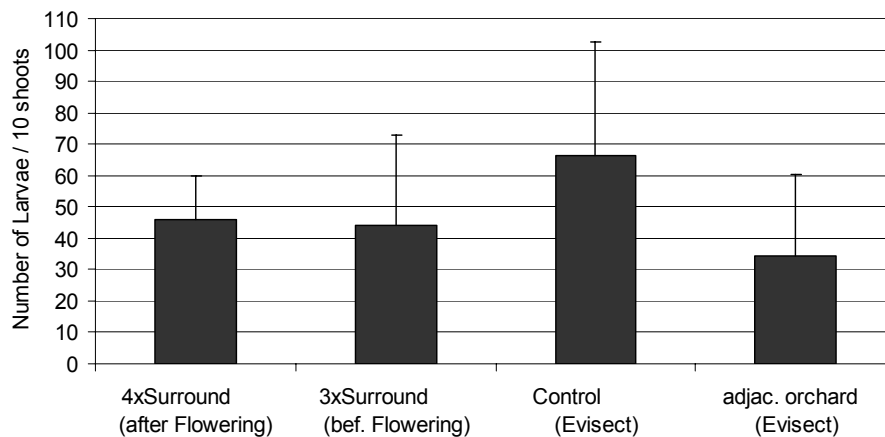


Fig. 4: Results of the visual control on the 30th June 2004 (plot 802; Student's t-Test, differences not significant)

Conclusions:

- Three kaolin applications with Surround® WP before flowering have a comparable efficacy to one insecticide application with Sigid® (Rotenone) or Evisect (Thiocyclam-Hydrogenoxalat) in stage 69 BBCH
- An additional application of Surround® WP after flowering does not enhance the efficacy

Acknowledgement

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