

Chemical Control/New Products

CONTROL OF *CAMPYLOMMA VERBASCI* WITH REGISTERED AND UNREGISTERED PESTICIDES

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Abstract: The efficacy of early season application of several newer chloronicotinyl insecticides on *Campylomma verbasci* was tested in a mixed cultivar apple block. Five-tree replicates were sprayed with test materials at pink, bloom, or petal fall timing using an airblast sprayer calibrated to deliver 200 gallons per acre. Bloom and pre-bloom application of Actara and Carzol were very effective in reducing in season nymph populations and fruit damage. The other chloronicotinyls, Calypso and Assail, are also quite active against *Campylomma* nymphs when applied early, and the fruit damage was not statistically different than Actara/Carzol. Avaunt, Raynox and Surround did not prevent fruit damage, nor was there any significant activity against nymphs. This test also confirms that timing is key: Carzol, although very toxic to nymphs, will not prevent fruit damage when applied at petal fall.

This test is part of an ongoing series of trials to determine the efficacy and timing of new materials against *Campylomma verbasci*. General parameters of the timing of damage were established by Reding et al. (2001), but recent (and possibly future) changes in the availability of chemicals make continued reappraisal necessary.

The neonicotinoids are a new class chemistry, with Provado being the best known example. A new material, Actara, was registered for use for the 2001 season, and is expected to have a similar spectrum of activity. Provado use was not allowed before or during bloom due to bee toxicity, although previous tests (exp. 9503) indicated that Provado, when timed appropriately (pink), provided good suppression of nymphs and prevention of fruit damage. Thus it was reasonable to expect other members of this class to have some activity against *C. verbasci*. For this reason, a comparative test of all the new neonicotinoids was performed. In addition, there was some indication that the particle films might also suppress nymphs, so Surround and Raynox were also tested. Carzol, the standard material for *C. verbasci*, was tested at bloom and petal fall to confirm that even an effective material, when applied too late, will not prevent fruit damage.

Materials and Methods

This experiment was conducted in a mixed 'Golden Delicious' and 'Delicious' apple (only the latter were sampled) orchard south of Orondo on the Columbia River. The experimental design was a randomized complete block with 12 treatments and 4 replicates. Each replicate consisted of 5 trees in a single row. Campyloomma and thrips populations were assessed using limb taps. Four taps were done on the center three trees in each treatment. Populations were sampled weekly until the majority of the Campyloomma had transformed to the adult stage. Fruit damage was assessed by examining 25 fruits from the upper canopy and 25 fruits from the lower canopy on the middle three trees of each treatment. The treatments were applied at pink (19 April), bloom (27 April) and at petal fall (7 May) using a multiple tank airblast sprayer (Rears Pak-Blast, Rears Sprayers, Eugene, OR) calibrated to deliver 200 gpa. Treatments were randomized on the basis of location within the block.

Data were analyzed using the Statistical Analysis System (SAS 1988). Data were tested prior to analysis for homogeneity of variance using Levene's (1960) test. Variances found to be non-homogeneous were transformed [$\ln(y+0.5)$] before analysis. PROC GLM was used to conduct an analysis of variance, and treatment means were separated using the Waller-Duncan *k*-ratio *t*-test.

Results and Discussion

Pressure in this block was substantial again this year, although peak nymph populations were much lower than in 2000. Surprisingly, fruit damage in even the best treatments in 2001 was much higher [$\approx 20\%$] than in 2000 [$\approx 6-8\%$] (although damage in the worst treatments was similar [60-65%]).

Activity against campyloomma was clearly enhanced by early (pink) application. Actara, at either high or low rate, when applied at the pink timing was very effective in keeping campyloomma populations down throughout the test period. (Table 1 and Fig. 1). Similarly, application of Calypso, Assail or Carzol at bloom led to significant campyloomma nymph population control. Actara, at both rates, and Carzol when applied at petal fall were effective in reducing nymph populations as well, though perhaps too late to prevent fruit damage. Surround, Raynox and Avaunt had no apparent effect on Campyloomma populations.

Campyloomma populations in this plot were at high levels (see Exp. 0001) in this block both pre-treatment and in the untreated trees. The peak population level in the check plots occurred in early May and reached 8 nymphs/tray. With this in mind, the early applications of Actara, and the Carzol as well as the Assail and Calypso at bloom, were very effective in reducing fruit damage (Table 2, Fig. 2). Later applications of Actara, as well as Carzol, did not reduce fruit damage to the same degree as earlier application. Fruit damage was highest in the Raynox, Surround, and Avaunt treatments and not significantly different from the untreated check.

Thrips populations were low throughout the study and fruit damage not meaningfully affected by the materials used in this study (Table 2).

The neonicotinoids (Assail, Actara, Calypso) all show some degree of activity against *Campylomma*. Actara did not look quite as strong (in terms of fruit damage) as in last year's test (Exp. 0001) but was still ranked as one of the best treatments. Interestingly, Actara at petal fall had less damage than Carzol at the same timing, even though both treatments had excessive damage. Assail may be the most active of these compounds (in terms of nymph suppression) and also provided among the best levels of damage prevention. The ability to make an application during bloom may also be a deciding factor. The standard, Carzol at bloom, still appears to be excellent, providing high levels of knockdown and good residual control. The spectrum of activity against other pests of interest during bloom (thrips, leafrollers, leafhoppers) will also be a guiding factor in choice of material.

References Cited

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Table 1. *C. verbasci* populations before and after treatment with various insecticides

Treatment	Rate fm/acre	Timing ^z	Nymphs/tap						
			19-Apr	26-Apr	3-May	9-May	16-May	22-May	28-May
Actara 25WDG	4.5 oz	Pink	0.31 c	1.19 dc	1.94 c	1.38 d	1.75 bc	1.56 cde	1.00 ab
Actara 25WDG	5.5 oz	Pink	0.63 abc	0.69 d	1.63 cd	1.56 d	1.75 bc	1.69 bcd	1.13 ab
Actara 25WDG	4.5 oz	PF	1.44 ab	5.50 ab	6.31 ab	2.13 bcd	0.00 d	0.25 fg	0.19 bc
Actara 25WDG	5.5 oz	PF	1.38 abc	6.25 a	7.31 ab	1.50 d	0.19 d	0.25 fg	0.44 bc
Calypso 480SC	4 floz	Bloom	0.44 bc	4.31 ab	1.63 cd	1.88 cd	2.06 bc	0.88 def	0.88 abc
Assail 70WP	3.45 oz	Bloom	0.31 c	3.06 bcd	0.81 d	0.81 de	0.63 cd	0.56 efg	0.38 bc
Avaunt 30WDG	5.9 oz	Bloom	0.88 abc	3.81 abc	4.44 b	3.88 ab	7.56 a	4.81 ab	2.81 a
Carzol 92SP	1 lb	Bloom	1.50 ab	6.50 a	0.13 e	0.25 e	0.00 d	0.00g	0.31 bc
Carzol 92SP	1 lb	PF	1.19 abc	6.81 a	10.31 a	0.19 e	0.06 d	0.00g	0.06 c
Raynox ^y	40 lbs	Bloom	0.31 c	3.19 bcd	4.38 b	4.50 a	5.44 ab	3.75 abc	3.13 a
Surround	50 lbs	Bloom	0.75 abc	5.31 ab	4.25 b	4.19 abc	5.63 ab	5.88 a	3.00 a
Check	-----	-----	1.56 a	4.31 ab	8.13 ab	7.75 a	5.94 ab	4.75 abc	2.81 a

Means within columns not followed by the same letter are significantly different (Waller-Duncan *k*-ratio *t*-test, *k*-ratio=100).

^zPink spray applied 19 April (after sample taken); Bloom spray applied 27 April; Petal Fall applied 7 May 2001.

^yUndiluted.

Table 2. Fruit damage caused by *C. verbasci* and western flower thrips

Treatment	Rate fm/acre	Timing	% injured fruits	
			<i>C. verbasci</i>	Thrips
Actara 25WDG	4.5 oz	Pink	21.3 d	3.0 ab
Actara 25WDG	5.5 oz	Pink	21.3 d	3.2 a
Actara 25WDG	4.5 oz	PF	35.7 cd	0.3 ab
Actara 25WDG	5.5 oz	PF	36.3 cd	0.2 ab
Calypso 480SC	4 floz	Bloom	29.0 d	1.2 ab
Assail 70WP	3.45 oz	Bloom	25.0 d	0.7 ab
Avaunt 30WDG	5.9 oz	Bloom	60.2 ab	0.7 ab
Carzol 92SP	1 lb	Bloom	22.7 d	0.0 b
Carzol 92SP	1 lb	PF	60.0 ab	0.2 ab
Raynox	40 lbs	Bloom	50.3 bc	1.5 ab
Surround	50 lbs	Bloom	67.3 a	0.3 ab
Check	-----	-----	49.5 bc	0.8 ab

Means within columns not followed by the same letter are significantly different (Waller-Duncan *k*-ratio *t*-test, *k*-ratio=100).

Sample taken 18 June 2001.

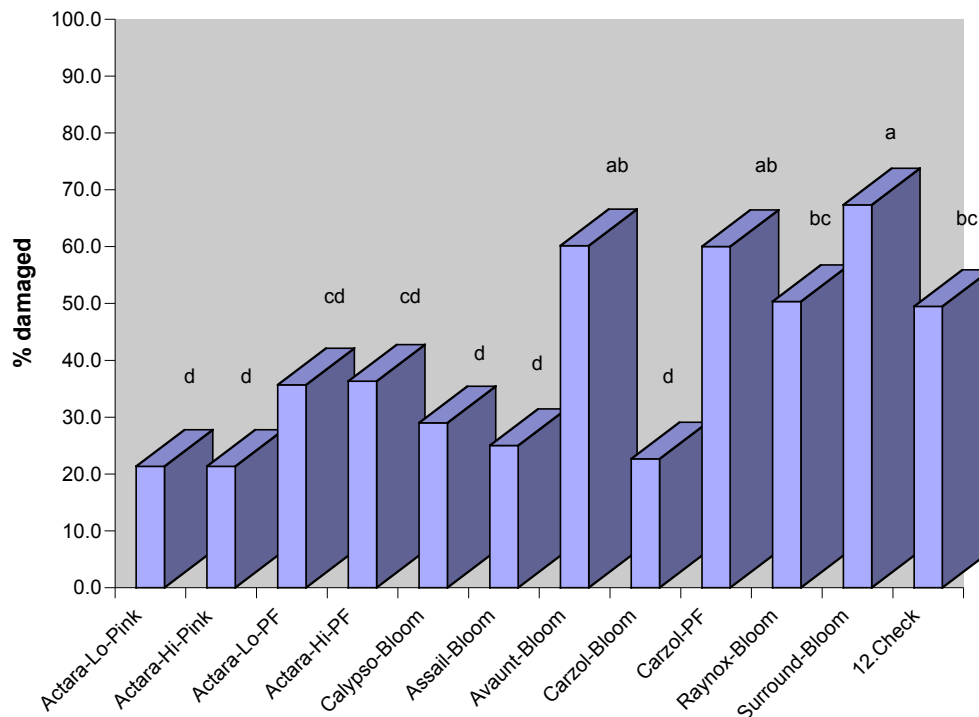
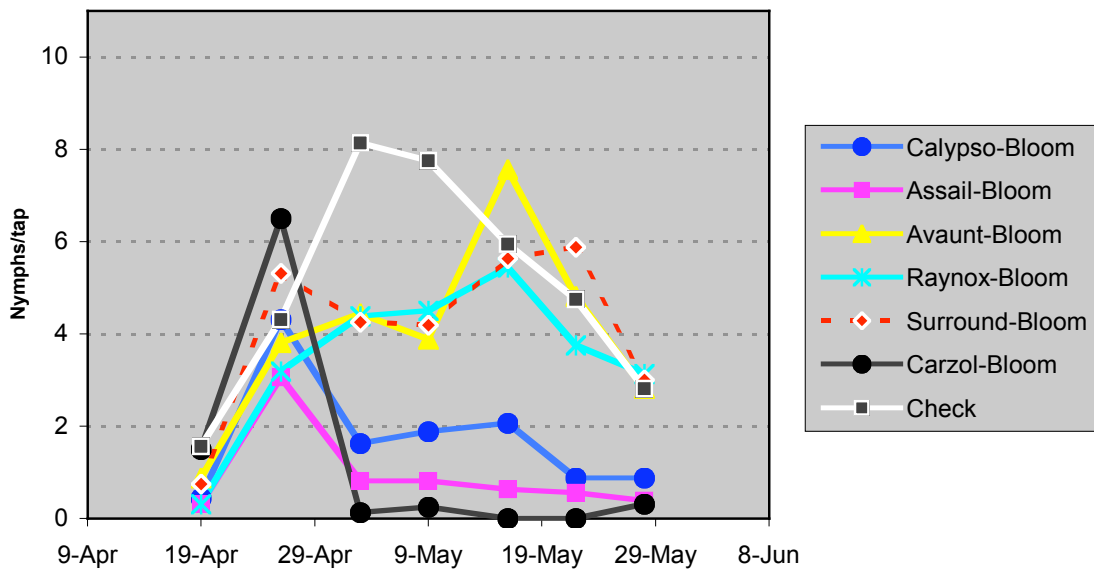
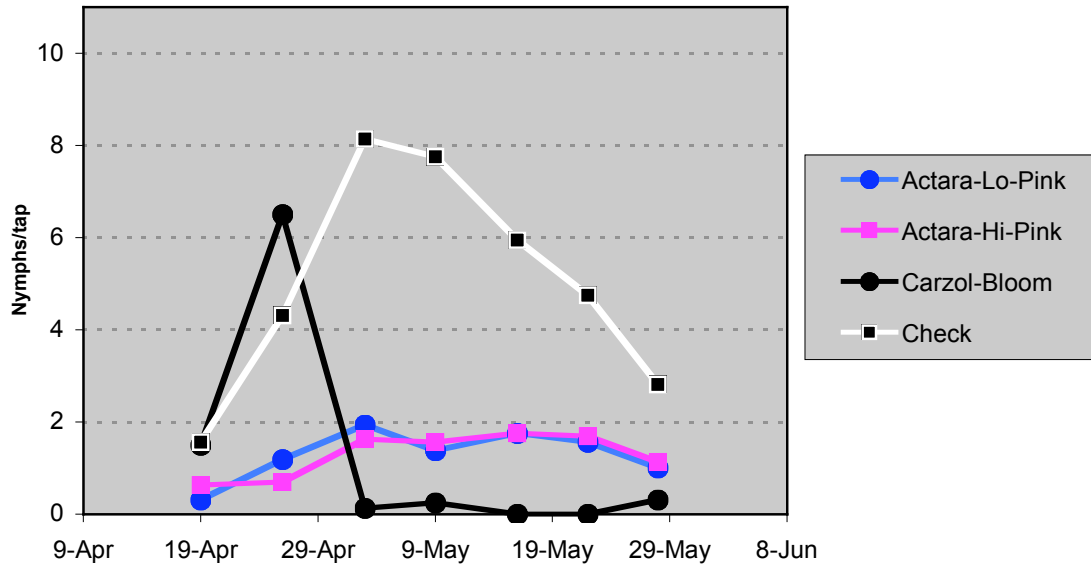


Figure 1. Fruit damage resulting from various pesticides and timing against *C. verbasci*, 2001.



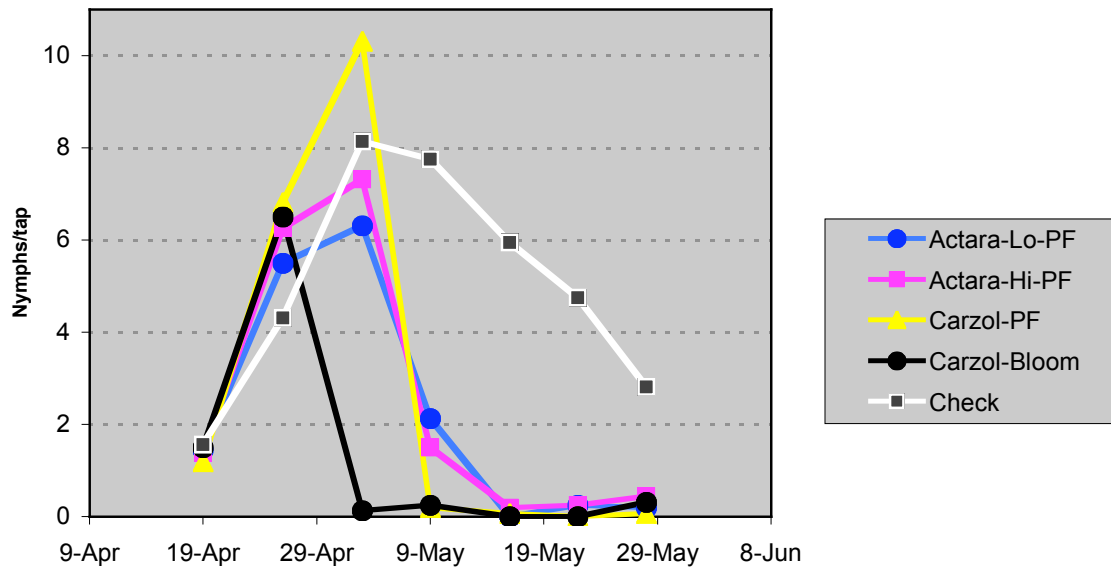


Figure 2. Campyloomma nymph populations before and after treatment with various pesticides (presented in 3 groups by timing of application, in comparison to the standard [Carzol at Bloom] and the check).