Chemical Control/New Products

Efficacy of Insecticides for Rosy Apple Aphid

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Abstract: The two neonicotinyls tested, Assail and Provado, provided fast knockdown and good residual control of rosy apple aphid. No effect on predators was noted.

Rosy apple aphid has become more troublesome in the past 5 years in Washington apple orchards. Although it is difficult to determine why this shift is occurring, it may be due in part to fewer applications of an organophosphate (e.g., chlorpyrifos) in combination with the delayed dormant oil treatment. This combination (oil+OP) in the delayed dormant has been a long-standing recommendation in WSU's Spray Guide for Tree Fruits in Washington (EB 0419) as a general purpose prophylactic spray for overwintering European red mite eggs, overwintering aphid eggs (apple aphid and rosy apple aphid), and San Jose scale. In some cases, oil is thought to be the more beneficial component but, with aphids, the OP was considered relatively more important. In addition, there is some anecdotal evidence that this species is spending a greater proportion of the season on the overwintering host, apple, and moving to the summer host, narrow-leaf plantain, later in the season. Either of these factors may explain why this pest, although still sporadic, is increasing in incidence and severity.

Typically, aphid populations do not become conspicuous until a very advanced stage, and often treatment is delayed until that time. The severe leaf curling produced by aphid feeding tends to protect the colony from direct contact. In the past, systemic aphicides such as Systox were the most common solution to this problem. Since the loss of many systemic OP insecticides, control of rosy apple aphid has been somewhat more problematic. The class of chemicals known as the neonicotinyls has been the replacement chemistry, and they are generally effective against aphids. Rosy apple aphid, however, remains one of the more difficult species to kill. This experiment is part of ongoing efforts to identify suitable control methods for this pest.

Materials and Methods

This experiment was conducted in a commercial orchard near Omak, WA. The experimental design was a randomized complete block with three treatments and four replicates. Each replicate consisted of single trees chosen for the presence of heavy rosy apple aphid colonies. Three colonies were tagged and the number of live aphids (adults and immatures) was counted on the most heavily infested leaf per colony. Treatments were randomized on the basis of a pretreatment count made on 9 June. The sprays were applied by using a multiple tank handgun sprayer (Parker Mfg., Wenatchee, WA) immediately following the pretreatment count. Saf-T-Cide oil was added as an adjuvant at a rate of 0.25% vol:vol to all treatments, except the check, to aid in penetration and enhance activity. Counts continued until 2 July 2004, at which time the trial was stopped due to absence of aphid populations in any of the treatment plots, including the checks.

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

RAA populations were moderately high prior to treatment, averaging 100-122 live aphids/most infested leaf. Both of the neonicotinyls tested provided statistically significant control of rosy apple aphid (Table 1, Fig. 1). By 14 June, live aphid counts were acceptably low in all treatments, while the check retained a substantial population of live aphids.

Predator populations were generally low and did not appear to be affected by any of the test chemicals (Table 1, Fig. 2). Overall, they were somewhat higher in the first post-application evaluation and generally declined with the aphid population thereafter. The lack of deleterious effect on natural enemies is desirable since they will help keep the population from resurging and perhaps slow the development of resistance.

References Cited

Levene, H. 1960. Robust tests for equality of variances. Chap. 25. *In* Olkin, I., S. G. Ghurye, W. Hoeffding, W. G. Madow and H. B. Mann (Eds.), Contributions to probability and statistics. Stanford University Press, Stanford, CA.

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Table 1. Rosy apple aphid and associated natural enemy populations before and after treatment with various insecticides, Conconully Block, Omak, WA, 2004 (Exp. 0403)

		RAA/leaf					
Treatment	Form/acre	9-Jun	14-Jun[x]	18-Jun	22-Jun[x]	25-Jun[x]	2-Jul
Provado 1.6F	8 fl oz	120.75 a	1.58 b	0.17 a	0.00 b	0.00 b	0 a
Assail 70WP	1.7 oz	121.58 a	1.42 b	0.58 a	0.08 b	0.17 b	0 a
Untreated Check	-----	100.25 b	75.50 a	46.25 a	30.83 a	25.83 a	0 a

		Total natural enemies/colony					
Treatment	Form/acre	9-Jun[x]	14-Jun	18-Jun	22-Jun	25-Jun[x]	2-Jul
Provado 1.6F	8 fl oz	0.25 a	1.00 a	0.08 b	0.00 b	0.00 b	0 a
Assail 70WP	1.7 oz	0.17 a	0.92 a	0.25 b	0.08 b	0.00 b	0 a
Untreated Check	-----	0.08 a	1.83 a	1.00 a	0.67 a	0.50 a	0 a

Means within columns followed by the same letter are not significantly different.
Treatments applied 9 June 2004, handgun, 400 gpa equivalent.
All treatments applied with 0.25% Saf-T-Side oil.
[x]Data transformed log(x+0.5) prior to analysis due to non-homogeneity of variances.

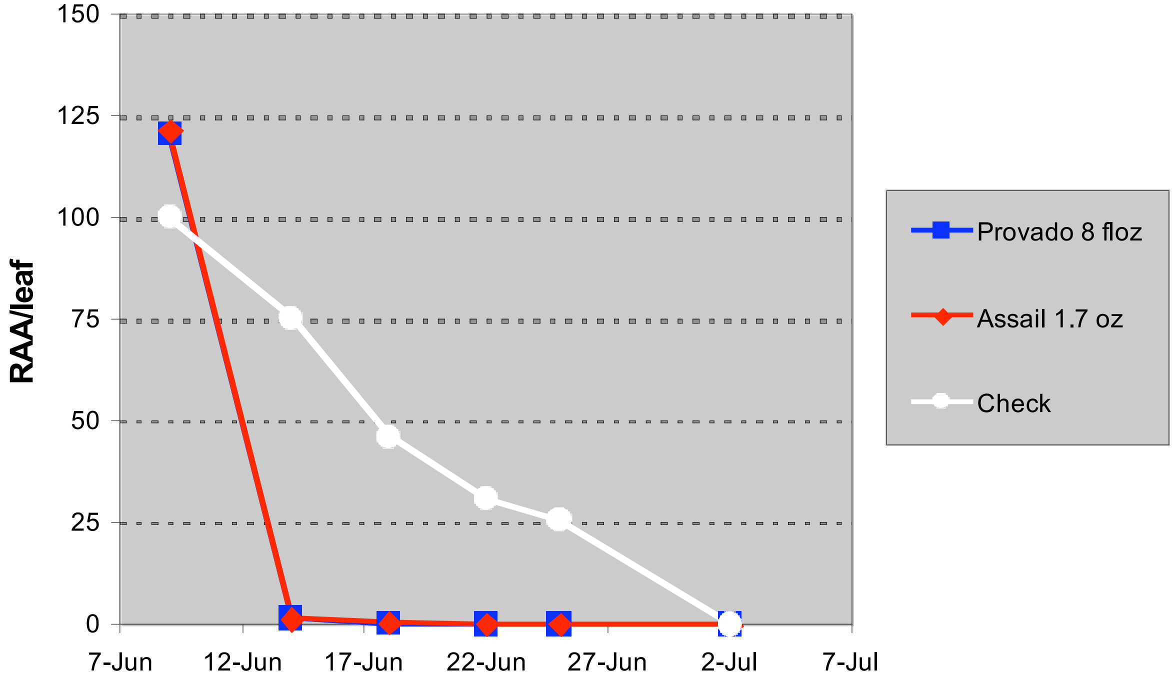

Figure 1. Rosy apple aphid populations before and after treatment with various insecticides, Conconully Block, Omak, WA, 2004.

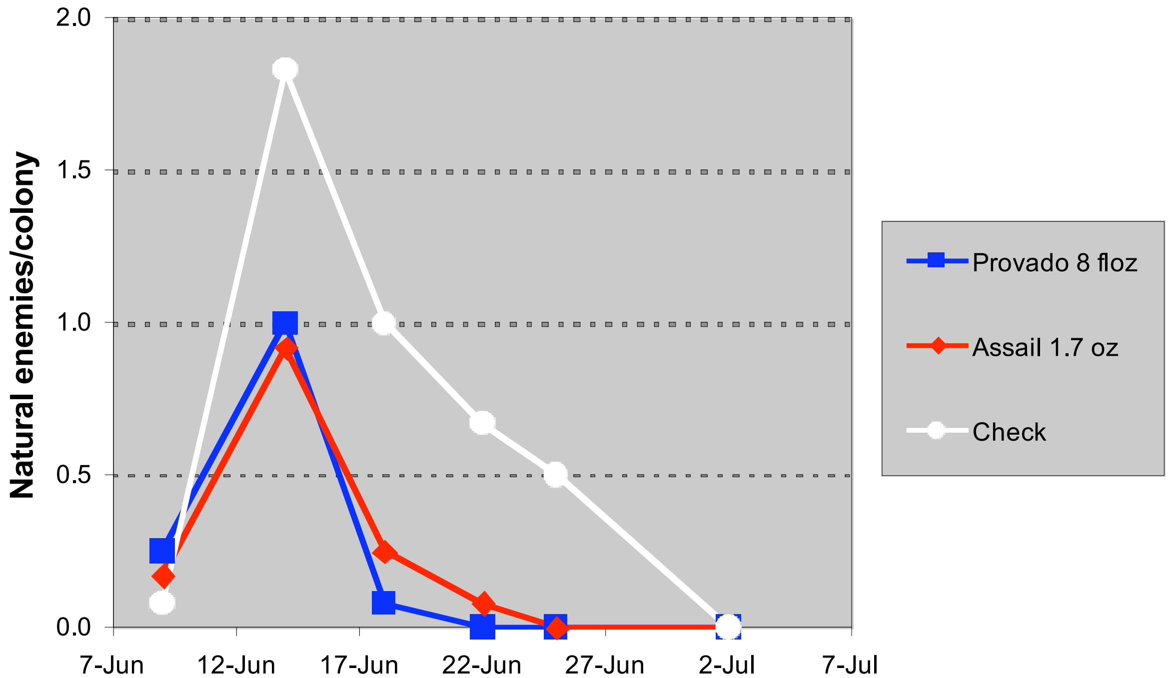

Figure 2. Aphid predator populations before and after treatment with various insecticides, Omak, WA, 2004.