Chemical Control/New Products

Field Experiments with Horticultural Mineral Oil on Mites and Leafhoppers

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Keywords: horticultural mineral oil, mites, leafhoppers, *T. occidentalis*, Oracle, Agri-Mek, Vendex, Orchex, Confirm, Comply, Sevin, apple

Mites

This experiment was conducted in a mature 'Fuji' orchard in Pateros, WA. A pre-treatment count was used to randomize the treatments among trees with similar mite populations. Three single tree replicates per treatment were used. Treatments were applied with a handgun sprayer to the point of drip on 28 August 1996. Mites were sampled by collecting 20 leaves/replicate. Data were analyzed using analysis of variance on each count date and means were separated with the Waller-Duncan *k*-ratio *t*-test.

The check population post-treatment was so low that it was not possible to draw any conclusions about the materials' efficacy as miticides (Table 1). The extremely high *T. occidentalis* population, however, provided a good opportunity to asses contact toxicity toward this species. All treatments left a significant population of predators, which was not significantly different from the untreated check. This indicates that all materials tested may be compatible with integrated mite control.

Leafhoppers

The test was conducted in a mature apple orchard (several strains of 'Delicious') on the grounds of the TFREC. Treatments were replicated 4 times, with each replicate consisting of a single tree. The experimental design was a randomized complete block, using pre-treatment leafhopper populations as the blocking factor. The experimental treatments were applied on 16 May (PF and 75DD) and 3 June (1C) (1st generation) and 21 August (2nd generation), which coincided with the first appearance of adults of the second generation. Pesticides were applied with a handgun sprayer to the point of drip. Leafhopper populations were sampled ca. weekly by counting *in situ* all live nymphs on 20 leaves per tree distributed throughout the tree canopy. Treatment variances were examined for inequality using Levene's (1960) test. If variances were heterogeneous, they were transformed (In[y+0.5]). Data were analyzed using analysis of variance (GLM procedure; SAS 1988) and means were separated using the Waller-Duncan *k*-ratio *t*-test.

Gen. 1. The single application at PF provided adequate suppression, although there was a tendency for a second population peak about 2 weeks after treatment (Table 2). The single application at 1C did not provide quite as good a level of knockdown as the PF treatments and populations were lower in the PF treatments about 4 days after the timing of the 1C treatment (this difference was significant for Orchex 692). The double application provided the lowest overall populations during the first generation, although the difference in the population had disappeared by 4 days after 1C. Orchex 796 was not different from Orchex 692 on any date within treatment groups.

Gen. 2. All three oils suppressed leafhoppers somewhat but left substantial residual populations. None were equivalent to the current standard, carbaryl (Table 3). There was no difference in the performance of the three materials.

Table 1. *T. occidentalis* populations, Pateros, WA, 1996.

		T. occidentalis/leaf	
Treatment	Rate fm/acre or [conc.]	26 Aug	30 Aug
Oracle 60WP	0.833 lb	2.07a	0.45a
Agri-Mek 0.15EC	10 fl oz	3.25a	0.55a
Vendex 50W	1.5 lb	1.37a	1.35a
Orchex 692	[1% v/v]	1.87a	0.53a
Orchex 796	[1% v/v]	1.88a	1.58a
Check	--	2.75a	0.73a

Table 2. White apple leafhopper populations, Gen. 1, TF 29N, 1996.

			White apple leafhopper nymphs/leaf				
Treatment	Rate/acre	Timing	9 May	24 May[x]	30 May[x]	7 Jun	12 Jun
Confirm	19.2 fl oz	1C	0.39a	0.49ab	0.48abc	0.29a	0.19a
Agri-Mek 0.15EC	10 fl oz	PF	0.38a	0.29abc	0.34abcd	0.11bc	0.10a
CGA215944 50WP	0.66lb	75 DD	0.41a	0.31abc	0.30bcde	0.13bc	0.10a
Comply 25WP	8 oz	75 DD	0.41a	0.56a	0.40abc	0.21ab	0.14a
Orchex 796	1%	PF	0.59a	0.15cd	0.06f	0.05c	0.13a
Orchex 692	1%	PF	0.43a	0.03d	0.23cdef	0.03c	0.10a
Orchex 796	1%	PF, 1C	0.39a	0.06cd	0.09ef	0.05c	0.10a
Orchex 692	1%	PF, 1C	0.41a	0.15cd	0.13def	0.03c	0.05a
Orchex 796	1%	1C	0.55a	0.21bcd	0.55ab	0.13bc	0.15a
Orchex 692	1%	1C	0.44a	0.45ab	0.63a	0.20ab	0.09a
Sevin XLR Plus	2 pt	PF	0.45a	0.00d	0.00f	0.05c	0.04a
Sevin XLR Plus	2 pt	1C	0.53a	0.28abc	0.44abc	0.01c	0.06a
Check	---	---	0.38a	0.23bcd	0.55ab	0.25a	0.14a

[x]Data transformed log(y+l) due to non-homogeneity of variances (Levene's test).

Table 3. White apple leafhopper, Gen. 2, TF-29N, 1996.

		White apple leafhopper nymphs/leaf		
Treatment	Rate/acre	19 Aug	23 Aug	30 Aug
Confirm 2F	19.2 fl oz	2.64a	2.08a	1.81ab
Agri-Mek 0.15EC	10 fl oz	2.95a	1.49bcd	1.29b
CGA215944 50WP	0.66 lb	2.84a	1.56abc	1.74b
Comply 25WP	8 oz	2.70a	2.00ab	2.36a
Orchex 692	1%	2.89a	1.20cd	0.64c
Orchex 796	1%	2.79a	1.00d	0.39cd
Orchex 892	1%	2.86a	1.10cd	0.36cd
Sevin XLR Plus	2 pt	2.98a	0.05e	0.03d
Check	---	2.81a	2.09a	1.54b