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Impact of Insecticide Residue on Silverleaf Whiteflies

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Significance to Industry: In 2005, the Q-biotype of *Bemisia tabaci* was identified in the United States. This find and increased problems with management of the silverleaf whitefly (B-biotype of *Bemisia tabaci)* have resulted in a national effort to develop a comprehensive management plan for whiteflies on ornamental crops. The objective of the following study was to evaluate the activity of insecticide residue against silverleaf whitefly to aid in the development of a whitefly resistance management program. This initial study indicated that Judo, Avid, Sanmite, Enstar II, Endeavor, and Distance provide poor residual control of adult whiteflies. However, Judo, Avid, and Distance provided excellent control of immature whiteflies and eggs that resulted from adult whitefly exposed to plants 16 days after application of the pesticides.

Nature of Work: In 2005, the Q-biotype of *Bemisia tabaci* was identified in the United States. This population was found to have reduced susceptibility to many of the insecticides used by ornamental producers. This find and increased problems with management of the silverleaf whitefly (B-biotype of *Bemisia tabaci)* have resulted in a national effort to develop a comprehensive management plan

for whiteflies on ornamental crops. The objective of the following study is to evaluate the activity of insecticide residue against silverleaf whiteflies to aid in the development of a whitefly resistance management program.

In this study we evaluated pesticide residue at three time intervals after a single foliar application to poinsettia (Freedom Red) plants. The following treatments were evaluated at labeled rates: Judo (spiromesifen), Avid 0.15EC (abamectin), Sanmite 75WP (Pyridaben), Enstar II (S-kinoprene), Endeavor 50WG (pymetrozine), Distance IGR (pyriproxyfen), and an untreated control (see Table 1 for rates). Clip cages were placed onto leaves at 7 hrs, 8 days, and 14 days after the application. These leaves were fully expanded when the plants were treated. Ten adult whiteflies of mixed sex and age were then placed into each cage. After 48 hours the number of eggs and dead whiteflies were recorded. Eggs were allowed to hatch, nymphs develop, and adults emerge. The number of emerged adults was then recorded.

Data were transformed using an arcsine transformation prior to analysis. Data were analyzed with ANOVA and means separation was accomplished by using the least significant difference test (LSD) at the $P<0.05$ level. All data are presented as original means.

Results and Discussion: No insecticide provided greater that 70% direct adult mortality (Table 1). Distance provided 100% control of the resulting generation on all sample dates (Table 2). Judo provided greater than 80% control of the resulting generation on all sample dates. Avid provided greater than 90% control for the first two sample periods. The other insecticides have varying levels of residue activity.

These results indicate that none of the products evaluated will provide effective control of adults once the insecticides have dried. However, Distance, Judo and Avid provided excellent immature whitefly control during the period evaluated.

Sanmite managed to kill over 60% of the nymphs during the periods evaluated. This trial will be repeated and additional trials are planned to evaluate the residue activity of other insecticides used to manage whiteflies. These results will enable grower and extension personnel to better understand the residual activity of insecticides. This will in turn result in better insecticide rotation programs for the management of whiteflies.

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Table 1. Percent (±SEM) adult mortality after 48 hours of exposure to insecticide residue.

		Cage Placement		
	Rate / 100 gal	7 -55 hours	8-10 day	14-16 days
Judo	4 fl oz	31.0±5.1 bc	11.4±3.5	6.8±3.4
Avid 0.15EC	8 fl oz	68.6±12.2 a	14.6±3.7	5.5±5.5
Sanmite 75WP	6 oz	31.6±10.9 bc	25.8±5.1	7.9±5.0
Enstar II	10 fl oz	55.5±10.2 ab	9.1±3.5	9.1±3.9
Endeavor 50WG	5 oz	10.6±6.3 c	7.9±4.2	15.0±6.1
Distance IGR	8 fl oz	21.3±5.2 c	10.9±2.7	1.4±1.4
Untreated Control		9.1±6.5 c	5.5±5.5	7.9±5.6

Means within a column followed by different letters are significantly different ($P<0.05$, LSD). Statistical analysis not conducted on second two columns due to low adult mortality rates.

Table 2. Percent (±SEM) of eggs that failed to produce adults after exposure to insecticide residue.

		Cage Placement		
	Rate / 100 gal	7 -55 hours	8-10 day	14-16 days
Judo	4 fl oz	99.1±0.6 a	94.0±3.0 b	82.6±6.8 b
Avid 0.15EC	8 fl oz	100 a	95.5±1.5 ab	55.4±12.3 bc
Sanmite 75WP	6 oz	73.4±4.2 b	60.8±9.5 c	73.0±8.7 b
Enstar II	10 fl oz	81.6±5.1 b	36.5±8.3 d	31.1±11.6 cd
Endeavor 50WG	5 oz	24.3±8.9 c	49.5±6.4 cd	26.6±8.1 d
Distance IGR	8 fl oz	100 a	100 a	100 a
Water Spray		35.9±12.2 c	28.7±6.6 d	9.6±4.5 d

Means within a column followed by different letters are significantly different ($P<0.05$, LSD).