

## Evaluation of Soil Systemic and Foliar Spray Treatments and Combinations for Control of the Florida Wax Scale on Hollies

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The Florida wax scale, *Ceroplastes floridensis* (Comstock) (Hemiptera:Coccidae) is a major pest of landscape plants, particularly of hollies (see L-5479, Florida Wax Scales: Control Measures in Texas for Hollies, on <http://tcebookstore.org/pubinfo.cfm?pubid=2314>). This demonstration was conducted to assess the effectiveness of treatment programs using selected foliar sprays applied alone or in combination with a soil applied systemic insecticide product, Merit 2G (imidacloprid) over a period of over a year or through two generations (fall and spring) of Florida wax scales. The long duration of the trial was designed, in part, to overcome the fact that scale insects killed by insecticides do not immediately fall off the plants and to document protection (prevention of scale insect infestation) of new growth.

### Methods and Materials

This demonstration was conducted on the grounds of the Covenant Presbyterian Church, College Station, TX (Judy and Brian Brochner [jbrochner@cox-internet.com](mailto:jbrochner@cox-internet.com)). Treatments are listed in **Table 1**. Plots were established Aug. 1, 2005. Forty five plots, each 10 ft. in length and containing three to four 3 ft. tall holly shrubs were established (Drees and Vassiliou). Within each plot and at least 2 ft. from each end, four terminals were selected (two from the side and two from the top of the shrub) and the number of early instar Florida wax scales present on the first 6 (Aug. 11, 2005) or 4 inches of terminal growth was estimated. Mean plot numbers of scales per terminal were calculated and arrayed from lowest to highest infestation level and divided into four treatment blocks or replicates containing 12 treatment plots each. Treatments were randomly assigned within each replicate and adjusted to minimize pre-treatment mean in scale infestation value differences (**Table 2**). Periodically thereafter (May 30 and June 27, 2006 by Drees and Summerlin)

Merit 2.5 G (1.5 cup/10 ft plot) applied on Aug. 11, 2005 and again on March 9, 2006. Foliar treatments were applied May 30, 2006, after young crawlers had hatched and settled ( Bogran, and Brown). Applications were made with a pressure sprayer using a course spray, applying about 1 gal. finished spray per 10 ft. long plot from about 8:00 a.m. through 12:30 p.m. The temperature was 81 degrees F and rain was expected. Although light sprinkles occurred during treatment, no heavy rain was received for the days following foliar application. The plots to receive Merit 2.5 G plus Merit 2 F did not receive the foliar treatment.

Mean immature scale insects per terminal data from each plot and sampling date were analyzed using Analysis of Variance (ANOVA) with means separated using Duncan’s Multiple Range Tests at  $P \leq 0.05$  (SPSS 14.0).

### Results and Discussion

The Merit® 2.5G was applied initially on Aug. 11, 2006 shortly after the second generation of crawlers had emerged and settled and young instars were visible on leaves. At that time, and due to the method for arraying treatment assignments in blocks or replications, no significant differences in numbers of scale insects per terminal between mean treatment plots occurred. The beds in which these holly shrubs were planted lined a parking lot and plots were covered with landscape cloth. This presented some concern because the granular imidacloprid was applied by scattering it over the shrubs so that particles fell through the shrub and onto the landscape cloth. The sprinkler irrigation system watered these shrubs and reduced the likelihood that granules might have been washed off the cloth due to rapid flooding caused by a heavy rain, possibly affecting neighboring plots. Regardless, variation in mean scale per treatment plot data from the initiation of this trial and initial application of Merit 2.5G on August 11, 2005 and pre-foliar spray data for May 30, 2006 show a lot of fluctuation even in plots that had received no treatment (**Table 3**).

The holly shrubs flowered in early March 2006, but no new growth was observed when plots were treated with Merit® 2.5 G for a second time. Treatment of the 240 ft of holly hedge row (six 10-ft long treatment plots replicated four times) required three 4-lb. containers of product. By May 30, after the spring generations of crawlers had hatched and infested new growth, plots that had received a late summer and early spring Merit 2.5G treatment program had significantly fewer scales than did untreated control holly shrub plots (**Table 3**). All foliar treatments were found to perform similarly by June 27, a sampling date selected prior to egg hatch of the second generation. However, foliar treatments provided no benefits beyond suppression achieved using the soil-applied systemic insecticide treatments alone.

By September 4, 2006, following the egg hatch and crawler settling period of the second annual generation (as indicated by increased numbers of scale insects per terminal of the untreated control plot mean), all treatments, except for the Talstar® Flowable foliar application with the pyrethroid, bifenthrin, reduced scale insects per terminal treatment plot means significantly. However, plots receiving imidacloprid (Merit® 2.5G) soil treatments, with or without a foliar spray, generally performed numerically better than those receiving only a single foliar spray. As seen on June 27, there was no significant difference or advantage between scale insect plot means following use of soil-applied systemic insecticide alone versus a program using soil-applied systemic plus a foliar insecticide spray treatment.

Foliar sprays were more time consuming to apply than granular treatments to the soil and the potential for drift is greater with liquid sprays. These data support use of an imidacloprid product such as Merit 2.5G applied to the soil for long-term Florida wax scale suppression.

**Table 1.** Foliar sprays and soil-applied systemic insecticide treatments assessed for suppression of Florida wax scale on hollies, Brazos Co., TX 2005-2006.

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<b>Treatment</b>	<b>Application rate</b>	
1 untreated control	water foliar spray, only	
<u>Soil-applied systemic:</u>		
2 Merit® 2.5 G (imidacloprid 2.5%)	1.5 cup/10 ft of hedge row	
<u>Foliar sprays:</u>		
3 Talstar® Flowable (bifenthrin 136 ppm)	21.7 <b>fl. oz/gal</b>	3.84 <b>ml/gal</b>
4 Test Compound 1 (imidacloprid 97 ppm + cyfluthrin 78 ppm)	50.0	8.80
5 Allectus® (imidacloprid 89 ppm + bifenthrin 136 ppm)	21.3	3.76
6 Merit® 2F (imidacloprid 28 ppm)	1.5	0.45
7 AE F106464 10 SC02 A1 (imidacloprid 101 ppm + tau-fluvalinate 130 ppm + tebuconazole 139 ppm)	2.7	0.48
<u>Combination treatments:</u>		
8 Merit® 2.5 G plus Talstar		
9 Merit 2.5 G plus Test Compound 1		
10 Merit 2.5 G plus Allectus		
11 Merit 2.5 G plus Merit 2F (foliar treatment not applied)		
12 Merit 2.5 G plus AE F106464 10 SC02 A1		

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**Table 2.** Plot/treatment assignments for 48 10-ft. long plots.

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Plot/Treatment	Plot/Treatment	Plot/Treatment	Plot/Treatment
1 1	13 11	25 3	37 2
2 6	14 11	26 6	38 1
3 3	15 12	27 9	39 5
4 3	16 8	28 4	40 3
5 7	17 6	29 10	41 9
6 9	18 4	30 6	42 8
7 12	19 10	31 2	43 2
8 5	20 11	32 9	44 8
9 10	21 1	33 12	45 7
10 7	22 8	34 2	46 11
11 4	23 5	35 7	47 1
12 12	24 4	36 5	48 10

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**Table 3.** Mean number early instar Florida was scales per 6 inch terminal sampled from four randomly-selected terminals per 10-ft long plot of 3-ft tall hollies, College Station, TX.

Treatment	Aug. 11, 2005	May 30, 2006*	June 27, 2006*	Sept. 4, 2006*
1 untreated control	31.9	70.3a	57.8a	193.0a
2 Merit® 2.5 G	54.4	0.3c	0.0b	0.0c
3 Talstar® Flowable	49.4	29.8bc	6.6b	129.0ab
4 Test Compound 1	51.9	54.4ab	2.7b	40.3bc
5 Allectus®	48.8	8.0c	1.3b	12.3c
6 Merit® 2F	54.4	34.5abc	5.9b	46.9bc
7 AE F106464 10 SC02 A1	54.4	23.1bc	7.8b	86.7bc
8 Merit® 2.5 G plus Talstar	51.3	5.6c	0.0b	0.0c
9 Merit 2.5 G plus Test Compound 1	56.9	35.0ab	2.3b	22.5c
10 Merit 2.5 G plus Allectus	44.4	5.5c	0.0b	0.0c
11 Merit 2.5 G	55.0	14.1bc	5.9b	39.1bc
12 Merit 2.5 G plus AE F106464 10 SC02 A1	45.6	0.0c	0.0b	0.0c
	NSD			
<i>F</i>	0.248	3.135	6.047	4.276
<i>P</i>	0.991	0.005	0.000	0.000
Mean Sig. Dif.	7.571	6.376	1.714	34.304
d. f. = 11				

\* Means followed by the same letter are not significantly different using Analysis of Variance (ANOVA) with means separated using Duncan's Multiple Range Tests at  $P \leq 0.05$  (SPSS 14.0).