

EVALUATION OF FOLIAR NEONICOTINOID INSECTICIDES FOR MANAGEMENT OF SILVERLEAF IN SQUASH

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Introduction

The silverleaf whitefly (SLWF), *Bemisia argentifolii*, also known as the B strain of the sweetpotato whitefly, *B. tabaci*, is a key pest of numerous vegetable crops grown in Georgia. In squash, this pest causes a plant disorder known as silverleaf, from which it obtains the common name. This disorder results in a distinct ‘silvering’ or whitish coloring of the foliage. Severe silverleaf also results in a ‘bleaching’ or loss of color in the fruit of affected plants. A small plot trial was conducted at the University of Georgia’s Lang Farm in Tifton, Georgia, to evaluate the efficacy of foliar applied neonicotinoid insecticides for management of silverleaf in squash and resulting effects on plant and fruit color.

Materials and Methods

A virus resistant squash, Destiny III, was direct seeded for this test with two rows planted on 6 foot beds. Because of stand establishment problems, plants were transplanted to establish good stands on single rows of each bed (plants moved from the row with the thinnest stand to fill in thin spots in the row used for the test). Experimental plots in the test were one row wide and 20 feet long. Treatments were arranged in a randomized complete block design with 4 replications.

Treatments evaluated were:

- F-1785 50DF at 0.05 lb AI/ac
- Experimental
- Actara 25WDG at 0.0468 lb AI/ac
- Assail 70WP at 0.05 lb AI/ac
- Non-treated check

All insecticide treatments were tank mixed with Dyne-Amic at 0.5% v/v. Treatments were applied on August 13, 18, 25, and September 1 with a CO₂ pressurized (50 PSI) backpack sprayer calibrated to deliver 30 GPA. Applications were broadcast with 3 hollow-cone ceramic nozzles per row (one over-the-top, one on drops on each side of the row).

Plots were visually rated for severity of silverleaf symptoms on foliage. A 1 to 5 scale was used as follows:

- 1 = little or no silverleaf (except on older leaves)
- 2 = silverleaf symptoms minor but apparent (good control)
- 3 = silverleaf symptoms obvious through most of plot
- 4 = silverleaf symptoms moderate to heavy throughout plot

5 = All or nearly all leaves with severe silverleaf symptoms

On each harvest date, all fruit of harvestable size were collected from each plot and weighed. Number of fruit with virus symptoms (green spots or solid green) were counted. All fruit, except solid green fruit, were categorized by color based on a scale developed with PowerPoint graphics and number of fruit in each category was recorded. Fruit were rated on a 1 (white) to 11 (dark orange) scale, with most falling in the 2 to 4 range. A 2 on this scale is near white, a 3 is cream colored and a 5 is the 'normal' bright yellow of a yellow squash.

Results and Discussion

Plot silverleaf ratings were analyzed with the PROC ANOVA procedure of PS-SAS. Harvest data were analyzed with the PROC GLM procedure of PC-SAS. Where significant differences were detected ($P < 0.05$) means were separated with LSD ($P = 0.05$)

The first silverleaf ratings were taken at 9 days after the first application. These ratings showed significantly less silverleaf in the Actara and Assail treatments (Table 1). Subsequent samples also showed less silverleaf in these two treatments, but also showed a separation of these treatments with Assail having the least amount of silverleaf.

Harvest was relatively low for all treatments, particularly after the second harvest; however, the primary interest was fruit color, not size or abundance. Assail did provide the largest harvest on each date, with the final two harvest being statistically higher (Table 2).

Fruit color showed trends similar to the silverleaf ratings, with Actara and Assail generally having darker fruit; although the two treatments were not significantly different. Fruit color was not analyzed on Sept. 3 and 8 because of low numbers of fruit in some treatments.

Overall, both Actara and Assail showed promise as foliar insecticides for management of silverleaf in squash. Assail appeared to provide slightly better control.

Table 1. Silverleaf ratings of foliage, foliar neonicotinoid test, Tifton, Georgia, 2003.

Treatment	Average Silverleaf Rating		
	8/22	8/26	8/29
Check	4.00 a	3.75 a	4.00 b
F-1785	4.00 a	4.00 a	4.25 ab
Experimental	4.25 a	4.25 a	5.00 a
Actara	2.50 b	2.50 b	3.00 c
Assail	1.50 b	1.50 c	1.75 d

Numbers within columns followed by the same letter are not significantly different (LSD; P=0.05)

Table 2. Average fruit number and color, foliar neonicotinoid test, Tifton, Georgia, 2003.

Treatment	Average number of fruit per plot				Average fruit color	
	8/26	8/29	9/3	9/8	8/26	8/29
Check	3.00 a	3.00 a	1.75 b	0.25 b	2.00 b	2.05 b
F-1785	3.25 a	2.75 a	1.25 b	0.00 b	2.00 b	2.13 b
Experimental	2.00 a	2.50 a	1.00 b	0.00 b	2.00 b	2.00 b
Actara	2.00 a	3.50 a	1.75 b	0.75 b	3.27 a	2.83 a
Assail	4.25 a	3.75 a	5.75 a	4.50 a	3.65 a	3.48 a

Numbers within columns followed by the same letter are not significantly different (LSD; P=0.05)