

EFFICACY OF FOLIAR APPLIED INSECTICIDES FOR MANAGEMENT OF SILVERLEAF WHITEFLY ON SNAP BEANS

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Introduction

The silverleaf whitefly, *Bemisia tabaci*, has been a severe problem in fall snap bean production in recent years, with populations exceeding damaging levels in areas outside of the historic geographical pest range of this species within Georgia. For a variety of reasons, growers in these areas do not typically use systemic insecticides for management. This test was conducted at the University of Georgia's Tifton Vegetable Park in Tifton, Georgia, to evaluate foliar applied insecticides for efficacy against silverleaf whitefly on snap beans.

Materials and Methods

Snap beans were direct seeded into one row plots on 6 foot beds (insecticide treatments were applied as three foot rows). Plots were one row by 22 feet and were arranged in a randomized complete block design with four replications. Treatments were applied with a CO₂ pressurized backpack sprayer (60 PSI) in 40 GPA of water, with 3 hollow-cone nozzles per row (one over-the-top, 2 on drops). Treatments were applied on 22 and 29 September, 2009. Treatments evaluated were:

Bifenthrin at 0.1 lb AI/ac tank mixed with Orthene 0.5 lb AI/ac
Movento at 4 and 5 oz/ac + MSO at 0.5%.
Knack at 8 oz/ac
Courier 40SC at 13.6 oz/ac
Venom at 4 oz/ac
Coragen at 5 oz/ac + MSO at 0.5%.
Requiem 25EC at 2 qts/ac
Assail 30SG at 4 oz/ac
Non-treated Check

Five plants were randomly selected in each plot on 1 Oct. for direct counts of whitefly nymphs. The first trifoliolate was removed from each plant and taken to the laboratory for insect counts. Each leaf was placed under a dissecting scope and the nymphs in a single field (10X ocular, 20X magnification, circle of 15/32 inch diameter) on each leaf were counted. Nymphs were classified as small (assumed 1st and 2nd instar) or large (assumed 3rd and 4th instar).

Adult emergence from treated leaves was monitored after the second application. Leaves were collected from each plot and held in a paper bag to allow for late instar nymphs to complete development and for adults to emerge and die. All adults in the bag were then counted. If the number of adults was relatively small (< 150), the adults were directly counted. If adults were numerous, the number was estimated based on volume (9445 adults per milliliter based on research by Sparks). Ten trifoliolate leaves were collected on 1 Oct. and 5 first trifoliolate leaves were collected on 7 Oct.

Visual plot efficacy ratings were also conducted on 7 October. Five plants were pulled from each plot and visually examined. Based on the relatively populations of nymphs on these plants, plots were rated as follows:

- 0 = no control
- 1 = suppression of whitefly
- 2 = fair control (obvious suppression, but not adequate)
- 3 = good control
- 4 = excellent control

All data were analyzed with the PROC ANOVA procedure of PC-SAS. Where significant differences were detected ($P < 0.05$), means were separated with LSD ($P + 0.05$).

Results and Discussion

Pest pressure was heavy during this test. Within the nymph count data, emphasis is placed on late instar nymphs, as early instar counts (and thus total) includes individuals which may have recently hatched and not had sufficient exposure for mortality.

The trends across the various data are similar. In general, the best control was obtained with Movento followed by Knack and Courier. Knack has fairly high nymph counts and poor efficacy rating, however, this can be explained by its activity. It works primarily on eggs and last instar nymphs; thus nymphs are present in direct counts and efficacy ratings (based on nymph presence) but do not emerge (thus low adult emergence). Of the remaining insecticides, Venom provided significant suppression (but inadequate control) of large nymphs and emerged adults and was rated as fair control on plot ratings.

The lack of control with Bifenthrin+Orthene is likely a result of resistance. The lack of control with foliar neonicotinoid insecticides in snap beans has been noted previously.

Snap bean foliar insecticide trial, silverleaf whitefly, Tifton Vegetable Park, Tifton, Georgia, 2009.

Treatment	Number of nymphs per 5 fields on 1 Oct.			Number of emerged adults per sample		Efficacy rating
	Small nymphs	Large nymphs	Total nymphs	1 Oct.	7 Oct.	7 Oct.
Check	25.25 de	163.25 ab	188.50 ab	2207.8 a	2833.0 a	0.50 d
Bifenthrin	42.25 bcd	133.75 bc	176.00 abc	1342.8 ab	2715.3 a	0.50 d
Requiem	36.25 bcde	194.50 a	230.75 a	1511.0 a	2361.0 ab	0.50 d
Coragen	26.50 cde	129.25 bc	155.75 bcd	1334.0 ab	1254.8 bc	1.50 c
Assail	20.50 de	165.25 ab	185.75 ab	1912.5 a	2361.3 ab	0.75 d
Venom	81.75 a	80.00 cde	161.75 bcd	569.0 bc	506.5 c	2.38 b
Courier	50.25 bc	57.25 def	107.50 de	371.5 c	34.8 c	3.00 b
Knack	15.75 e	105.00 cd	120.75 cde	110.5 c	5.8 c	1.00 cd
Movento 4oz	32.75 bcde	24.25 ef	57.00 e	3.3 c	475.3 c	4.00 a
Movento 5oz	52.25 b	18.25 f	70.50 e	6.3 c	5.8 c	4.00 a
Days after first/second application		10/3		10/3	16/9	16/9