

EFFICACY OF INSECTICIDE DRENCHES FOR MANAGEMENT OF SILVERLEAF WHITEFLY ON SNAP BEANS

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Introduction

In much of the snap bean production in Georgia, the silverleaf whitefly is an inconsistent pest and growers monitor populations and apply insecticides as needed. As this pest appears to becoming a more consistent pest of fall grown snap beans, there is a greater potential for preventive use of systemic insecticides. This test was conducted at the University of Georgia's Tifton Vegetable Park in Tifton, Georgia, to evaluate the efficacy of selected systemic insecticides applied as a row drench for control of silverleaf whitefly on snap beans.

Materials and Methods

Snap beans were direct seeded on single rows on 6 foot beds. Plots were a single row (treated as 36 inch rows) by 22 feet and were arranged in a randomized complete block with four replications. Insecticides evaluated were Admire Pro (at 7 oz/ac), Platinum (at 11 oz/ac), Venom (at 5 oz/ac), Coragen (at 5 oz/ac), and Durivo (at 11 oz/ac). All treatments, except Admire Pro, were evaluated as a single at-planting drench and as a delayed drench application. Admire Pro was evaluated only as an at-planting drench. A non-treated control was included for comparison.

At-planting applications were applied as a row drench on 26 August, 2009. After planting, the treatments were applied in 3 liters of water per plot in a roughly 4 inch band. The delayed applications were made in a similar manner on 10 September, 2009 (15 days after planting). Rates for all treatments were calculated based on area of the plot (36 inch row by 22 feet).

Whitefly nymph densities were monitored on five leaves selected from each plot on each sample date. Leaves were removed from the plants and taken to the laboratory for 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). Unifoliate leaves were sampled on 11, 18 and 24 September. First trifoliate leaves were sampled on 25 and 30 September.

Whitefly adult emergence from treated leaves was also monitored as a measure of efficacy. Ten leaves were collected from each plot and held in paper bags to allow later instar nymphs to complete development and emerge. The bags were held long enough to allow emergence and death of the adults. Adult whiteflies in each bag were then counted. Counts of

about 100 or less were directly counted under a dissecting scope. In plots with high numbers of emerging adults, the number of adults were estimated based on the volume of adults (aspirated and “compressed” in a pipette; 9445 adults per milliliter based on research by Sparks). Unifoliate leaves were sampled on 24 September. First trifoliate leaves were sampled on 30 September.

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 trial. Because the insecticides evaluated are systemic, the eggs must hatch, nymphs emerge and feed before mortality can occur. Therefore, small nymphs (and total nymphs) are probably not a proper stage for evaluation as this would include nymphs which have not had adequate time for mortality. Therefore, this discussion is based on the large nymphs. In general, activity was detected only with the at-planting applications, with the exception of the delayed Venom application. All of the insecticides applied at-planting, except Admire, showed significant reductions through 29 days after application (24 Sept.). In the delayed applications, only Venom showed significantly reduced populations and only at 8 days after application (18 Sept.). Because of high variability, no significant differences were detected in adult emergence on either sample date. However, numerical trends on 24 September are similar to trends in the nymphs counts. The Venom, Coragen and Durivo at-planting and the Venom delayed application showed an obvious, but not statistically significant, reduction in adult emergence.

The at-planting applications appear to have worked better than delayed applications (Admire and Platinum probably worked well early, but played out earlier than the other insecticides because of more severe resistance; this assumption is supported by data from other trials). The fact that Venom worked better in the delayed application could be a result of quicker uptake. That said – the method of evaluation may have masked efficacy in the delayed applications. While the at-planting applications should have had insecticide distributed throughout the plant (it was present from planting), the delayed application may have effected distribution. At the time of the delayed application, the leaves ultimately sampled were already developed and may not have picked up as much insecticide as younger leaves. However, if this is the problem, it would also present a problem in commercial fields.

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

Treatment	Application timing	Number of adults emerged per sample	
		24 Sept	30 Sept
Check		62.00 a	1005.30 a
Admire	at planting	55.25 a	2589.00 a
Platinum	at planting	26.75 a	725.00 a
Venom	at planting	3.75 a	1075.50 a
Coragen	at planting	3.50 a	522.30 a
Durivo	at planting	9.50 a	1442.30 a
Platinum	delayed	95.00 a	2344.50 a
Venom	delayed	12.25 a	1444.00 a
Coragen	delayed	44.00 a	1653.50 a
Durivo	delayed	85.75 a	2156.30 a
Days after at-planting application		29	35
Days after delayed application		14	20

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

Treatment	Application timing	Number of SLWF large nymphs (3 rd -4 th instar) per 5 fields				
		11 Sept	18 Sept	24 Sept	25 Sept	30 Sept
Check		20.75 ab	39.00 a	135.75 a	45.75 a	65.00 a
Admire	at planting	26.25 a	50.25 a	114.50 a	17.50 a	66.50 a
Platinum	at planting	10.75 bc	2.75 b	33.75 bcd	27.50 a	35.25 a
Venom	at planting	8.00 c	1.00 b	12.00 d	5.50 a	22.50 a
Coragen	at planting	6.75 c	8.75 b	26.50 cd	26.50 a	50.50 a
Durivo	at planting	10.75 bc	3.00 b	32.50 cd	46.50 a	73.25 a
Platinum	delayed	27.00 a	46.25 a	97.25 abc	32.00 a	89.25 a
Venom	delayed	24.50 a	11.75 b	98.25 abc	10.25 a	48.00 a
Coragen	delayed	21.25 ab	39.75 a	105.00 ab	53.00 a	62.75 a
Durivo	delayed	24.50 a	43.50 a	110.00 a	33.25 a	63.00 a
Days after at-planting application		16	23	29	30	35
Days after delayed application		1	8	14	15	20