



## SOYBEANS

### SECTION 6

## Evaluation of foliar- and seed-applied insecticides to control soybean aphids (*Aphis glycines*) in Illinois, 2007

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### Location

We established one trial at the David and Carol Cook Farm near Sterling/Rock Falls (Whiteside County).

### Experimental Design and Methods

The experimental design was a randomized complete block with four replications. The plot size for each treatment was 10 ft (four rows) x 30 ft. Insecticides were applied to designated plots on 3 August. At intervals before and after the insecticide application, densities of soybean aphids were estimated by counting the total number of aphids on three plants in each plot. Densities of soybean aphids after foliar insecticides were applied were assessed on 10 August (7 days after treatment, DAT), 17 August (14 DAT), and 24 August (21 DAT). Two rows from each plot were mechanically harvested on 11 October, and the weights were adjusted to bushels per acre at 13% moisture.

### Planting and Insecticide Application

The trial was planted on 24 May using a four-row, Almaco constructed planter with John Deere 7300 row units. Precision cone units were used to plant the seeds. Insecticides were applied on 3 August with a CO<sub>2</sub> backpack sprayer and a four-row hand boom. TeeJet 8002VS spray tips were calibrated to deliver a volume of 20 gal per acre.

Active ingredients for all chemical insecticides, except those with experimental numbers, are listed in Appendix II.

### Agronomic Information

Agronomic information is listed in Table 6.1.

### Climatic Conditions

Temperature and precipitation data are presented in Appendix III.

### Statistical Analysis

Data were analyzed using ARM 7 (Agricultural Research Manager), revision 7.3.6. (Copyright © 1982–2007 Gylling Data Management, Inc., Brookings, SD).

### Results and Discussion

Densities of soybean aphids throughout the season are presented in Table 6.2. Soybean aphids on three plants in each plot were counted weekly or biweekly from 15 June to 24 August. Although there are some differences in densities of soybean aphids before the foliar insecticides were applied on 3 August, the focus of this discussion will be on the densities of soybean aphids on the dates following the foliar applications.

The overall mean for all plots (including those with seed-applied insecticides) was 252.29 aphids per plant (just above the economic threshold of 250 aphids per plant) two days before treating designated plots with foliar-applied insecticides. The overall mean for the designated plots that were treated only with foliar-applied insecticides was 256.78 aphids per plant before treatment. On 10 August (7 DAT), there was nearly an 80% reduction overall in aphid densities in the plots treated with foliar-applied insecticides.

On 10 August, the lowest mean density of aphids (22.08 aphids per plant) were found in the plots treated with Cobalt 2.55EC. The Cobalt-treated plots also had significantly fewer aphids than the plots with NUP 05071 5FS and V10170-1667 5SC and one of the two untreated checks (UTCs). Ten of the 19 plots treated with a foliar-applied insecticide had significantly fewer aphids than one of the two UTCs on 10 August.

**TABLE 6.1** • Agronomic information for the efficacy trial of products to control soybean aphids, Sterling/Rock Falls, University of Illinois, 2007

Planting date	24 May
Row spacing	30 inches
Seeding rate	130,000/acre
Variety	Midwest Seed Genetics GR-2332
Previous crop	Corn
Tillage	Spring—disk



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**TABLE 6.2** • Evaluation of products to control soybean aphids, Sterling/Rock Falls, University of Illinois, 2007

Product	Mean no. soybean aphids per plant <sup>1</sup>											
	Before application of foliar insecticides on 3 August							After application of foliar insecticides on 3 August				Mean yield (bu/A) <sup>4,7</sup> 11 Oct
	Rate <sup>2,3</sup>	15 June <sup>4</sup>	21 June <sup>4</sup>	6 July <sup>4</sup>	13 July <sup>4</sup>	23 July <sup>4,5</sup>	1 Aug <sup>4,5</sup>	10 Aug <sup>4,5</sup> (7 DAT <sup>6</sup> )	17 Aug <sup>4,5</sup> (14 DAT <sup>6</sup> )	24 Aug <sup>4,5</sup> (21 DAT <sup>6</sup> )		
Asana XL 0.66EC	6.4	0.00 a	0.92 a	0.42 a	0.50 b	10.17 d-g	222.50 abc	88.75 abc	0.00 d	3.75 b-f	59.79 b	
Asana XL 0.66EC + Lannate 2.4SL	6.4 4	0.00 a	0.00 b	0.00 b	0.33 b	29.83 abc	227.00 abc	64.00 bc	1.58 cd	0.83 def	59.88 b	
Asana XL 0.66EC + Lorsban 4E	6.4 4	0.00 a	0.00 b	0.00 b	0.50 b	23.17 a-f	282.33 ab	68.75 bc	9.25 a-d	2.17 b-f	58.80 b	
Baythroid XL + Lorsban 4E	2 8	0.00 a	0.00 b	0.00 b	3.67 ab	47.42 abc	324.25 ab	22.50 bc	9.25 a-d	0.42 ef	66.12 ab	
Cobalt 2.55 EC	13	0.00 a	0.00 b	0.00 b	1.00 ab	24.42 a-e	295.17 ab	22.08 c	4.25 bcd	2.25 b-f	67.82 ab	
Dimethoate 4EC	8	0.00 a	0.00 b	0.00 b	1.25 ab	25.33 a-d	212.67 abc	101.17 abc	5.75 a-d	6.75 abc	67.31 ab	
Dimethoate 4EC + Nufos 4EC	8 8	0.00 a	0.00 b	0.00 b	0.67 b	16.92 a-f	325.42 ab	40.58 bc	5.75 a-d	0.42 ef	64.22 ab	
F-6113 1.25EC	5	0.00 a	0.00 b	0.00 b	3.92 ab	57.25 ab	362.08 ab	29.42 bc	2.83 a-d	0.00 f	68.70 ab	
Lorsban 4E	12	0.00 a	0.00 b	0.00 b	1.92 ab	18.50 c-g	160.83 bc	33.58 bc	9.83 a-d	1.67 c-f	67.39 ab	
Trimax <sup>8</sup> 4SC + NIS <sup>9</sup>	1.35 0.25	0.00 a	0.00 b	0.00 b	0.00 b	14.33 c-g	134.75 bc	73.25 bc	17.00 a-d	6.42 abc	63.79 ab	
Trimax 4SC + Baythroid XL	1 2	0.00 a	0.00 b	0.00 b	1.50 ab	6.75 fg	215.08 abc	48.92 bc	6.83 a-d	3.50 b-e	67.14 ab	
Warrior 1CS	1.92	0.00 a	0.00 b	0.00 b	1.67 ab	24.25 a-f	273.42 ab	101.42 abc	6.08 a-d	4.42 b-e	66.89 ab	
Warrior 1CS	3.2	0.00 a	0.00 b	0.25 ab	1.33 ab	25.42 a-f	302.67 ab	26.25 bc	4.75 a-d	2.17 b-f	64.37 ab	
Cruiser 5FS <sup>10</sup>	50	0.00 a	0.00 b	0.00 b	0.58 b	13.50 efg	288.42 abc	77.58 abc	5.75 a-d	2.58 b-f	70.18 a	
NUP 05071 5FS <sup>11</sup>	3.2	0.00 a	0.00 b	0.00 b	0.25 b	18.00 efg	122.00 c	122.42 ab	11.25 a-d	6.33 abc	68.83 ab	
NUP 07066 5 FS <sup>11</sup>	3.5	0.00 a	0.00 b	0.00 b	1.67 ab	4.67 g	115.17 c	74.42 abc	53.25 ab	4.67 b-e	61.44 ab	
V-10170-1673 5 SC <sup>10</sup>	50	0.00 a	0.00 b	0.00 b	2.42 ab	60.08 a	271.17 ab	242.83 abc	10.00 a-d	5.75 a-d	63.84 ab	
V-10170-1667 5 SC <sup>10</sup>	50	0.00 a	0.00 b	0.00 b	0.58 b	14.25 b-g	153.92 bc	148.42 ab	20.50 a-d	6.42 abc	67.13 ab	
V-10170-1667 5 SC <sup>10</sup>	100	0.00 a	0.00 b	0.00 b	0.00 b	20.50 c-g	267.50 ab	165.25 abc	64.42 abc	7.33 abc	63.75 ab	
UTC <sup>12</sup>	—	0.00 a	0.00 b	0.00 b	2.75 ab	51.92 a-d	476.00 a	359.50 a	8.42 a-d	12.00 ab	60.47 ab	
UTC <sup>12</sup>	—	0.00 a	0.00 b	0.00 b	5.25 a	16.17 a-g	265.67 ab	115.42 abc	144.67 a	14.25 a	65.83 ab	

<sup>1</sup> Mean densities of soybean aphids were derived from the total number of aphids on three plants per treatment in each of four replications.

<sup>2</sup> Rates of application of foliar-applied insecticides are ounces (oz) of product per acre.

<sup>3</sup> Rates of application of NIS (non-ionic surfactant) are percentage volume of product per volume of spray solution (% v/v).

<sup>4</sup> Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).

<sup>5</sup> Data were transformed (log transformation) for analysis; the actual means are shown.

<sup>6</sup> DAT = days after treatment (with foliar-applied insecticides).

<sup>7</sup> Soybeans were harvested from 30 ft of the center two rows of each plot, and weights were converted to bushels per acre (bu/A) at 13% moisture.

<sup>8</sup> At the time of this publication, Trimax is currently not registered for use on soybeans.

<sup>9</sup> NIS = non-ionic surfactant.

<sup>10</sup> Rates of application for these seed treatments are grams (g) of active ingredient (a.i.) per 100 kg of seed.

<sup>11</sup> Rates of application for these seed treatments are ounces (oz) of product per hundredweight (cwt) of seed.

<sup>12</sup> UTC = untreated check.



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By 17 August (14 DAT), mean densities of soybean aphids had declined dramatically to <25 aphids per plant in all plots except one of the UTCs and the plots with the seed treatments V10170-1667 and NUP 07066, with mean densities of 144.67, 64.42, and 53.25 aphids per plant, respectively. There were no significant differences in aphid densities among the rest of the plots on 17 August. We were unable to determine the exact cause of the dramatic reductions in densities of soybean aphids from 10 August to 17 August, although evidence from nearby experiments suggested that predation by the insidious flower bug (*Orius insidiosus*) played a role. Other possible causes for the reduction in aphid densities may have been heavy rainfall and/or emigration of winged aphids away from the plots.

On 24 August (21 DAT), densities of soybean aphids had declined in all plots to a range of 0.00 to 14.25 aphids per plant. Although there were significant differences in aphid densities among the treatments, the differences were not biologically significant.

Mean yields among treatments in the trial ranged from 58.80 to 70.18 bushels per acre. The mean yield for the plots treated with Cruiser were significantly higher than the mean yields for any of the plots treated with Asana XL, either by itself or in combination with another insecticide. There were no other significant differences in yields among treatments.