SECTION 8

Evaluation of foliar-applied insecticides to control leaf-feeding insect pests of soybean in Illinois, 2012

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Locations

We established one trial at the Northern Illinois Agronomy Research Center near DeKalb (DeKalb County) and one trial at the Adam Yoeckel Farm near Morrison (Whiteside County). Funding for these experiments was provided by the Illinois Soybean Association.

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 20 ft. Densities of insect pests were determined by taking 20 sweeps per plot with a 15-inch diameter sweep net. After the application of insecticides, densities of insect pests were assessed on 7, 14, and 21 August (7, 14, and 21 days after treatment [DAT], respectively).

Planting, Insecticide Application, and Yield

Trials were planted on 14 and 15 May at Morrison and DeKalb, respectively. Both trials were planted using a four-row, ALMACO constructed planter with John Deere 7300 row units. Precision cone units were used to meter the seeds. Seeds were planted in 30-inch rows at an approximate depth of 1 inch. Insecticides were applied on 31 July at both locations with a CO_2 backpack sprayer and a four-row boom. TeeJet TTJ60-11002 spray tips were calibrated to deliver a volume of 20 gallons per acre (gal/A). Active ingredients for all insecticides are listed in Appendix II.

Yields were estimated by harvesting the center two rows of each subplot on 11 and 12 October at Morrison and DeKalb, respectively. Weights were converted to bushels per acre (bu/A) at 13% moisture.

Agronomic Information

Agronomic information is listed in Table 8.1.

Climatic Conditions

Temperature and precipitation data are presented in Appendix III.

Statistical Analysis

Data were analyzed using ARM 8 (Agricultural Research Manager), revision 8.4.2 (Copyright© 1982–2012 Gylling Data Management, Inc., Brookings, SD).

Results and Discussion

DeKalb—Prior to the application of insecticides on 31 July, there were 0.6, 8.4, 0.4, 0.1, and 0.1 bean leaf beetles, corn

TABLE 8.1 • Agronomic information for efficacy trials of foliar-applied insecticides to control leaf-feeding insect pests of soybean, University of Illinois, 2012

	DeKalb	Morrison
Planting date	15 May	14 May
Harvest date	12 October	11 October
Variety	NK S31-L7	NK S31-L7
Row spacing	30 inches	30 inches
Seeding rate	140,000/acre	140,000/acre
Previous crop	Corn	Corn
Tillage	Fall—moldboard plow Spring—mulch finisher	Fall—vertical tillage Spring—vertical tillage

rootworm beetles, grasshoppers, Japanese beetles, and stink bugs per 20 sweeps, respectively. Mean densities of these insects following the application of insecticides are presented in Table 8.2.

Mean densities of bean leaf beetles, grasshoppers, Japanese beetles, and stink bugs were very low across all sampling dates; no significant differences among treatments were observed for these insects. On 7 August (7 DAT), all insecticide treatments had significantly fewer corn rootworm beetles per 20 sweeps than the untreated check (UTC)—no significant differences among the insecticide treatments were observed on this or the remaining two sampling dates.

Mean yields are presented in Table 8.2. Although some significant differences in mean yields were observed, none of the insecticide treatments yielded significantly more than the UTC.

Morrison—Prior to the application of insecticides on 31 July, there were 0.2, 0.2, 12.2, and 0.0 corn rootworm beetles, grasshoppers, Japanese beetles, and stink bugs per 20 sweeps, respectively. Mean densities of these insects following the application of insecticides are presented in Table 8.3.

Mean densities of corn rootworm beetles, grasshoppers, and stink bugs were very low across all sampling dates; no significant differences among treatments were observed for these insects. On 7 August (7 DAT), all insecticide treatments had significantly fewer Japanese beetles per 20 sweeps than the UTC. Cobalt had significantly more Japanese beetles than all other insecticide treatments excluding the low rate of Declare. On 14 August (14 DAT), all insecticide treatments had significantly fewer Japanese beetles per 20 sweeps than the UTC. In addition, on 14 August (14 DAT), the lowest mean densities of Japanese beetles were observed for Mustang Max and the high rate of Declare, although these mean densities were not significantly different than those for Baythroid XL, Hero, and Leverage 360. No significant differences among treatments were observed for mean densities of Japanese beetles on 21 August (21 DAT).

Mean yields are presented in Table 8.3. Mean yields were statistically similar for all treatments.

TABLE 8.2 • Evaluation of foliar-applied insecticides to control leaf-feeding insect pests of soybean, DeKalb, University of Illinois, 2012

Product	Rate[1]	Mean no. bean leaf beetles per 20 sweeps[2,3]			Mean no. corn rootworm beetles per 20 sweeps[2,3]			Mean no. grasshoppers per 20 sweeps[2,3]		
		7 Aug (7 DAT[4])	14 Aug (14 DAT[4])	21 Aug (21 DAT[4])	7 Aug (7 DAT[4])	14 Aug (14 DAT[4])	21 Aug (21 DAT[4])	7 Aug (7 DAT[4])	14 Aug (14 DAT[4])	21 Aug (21 DAT[4])
Baythroid XL	2.8	0.0 a	0.3 a	0.0 a	2.0 b	7.5 a	7.5 a	0.0 a	0.0 a	0.0 a
Cobalt	13	0.0 a	0.0 a	0.0 a	5.0 b	8.5 a	12.0 a	0.5 a	0.5 a	0.3 a
Declare	1.02	0.0 a	0.0 a	0.3 a	2.0 b	13.8 a	6.8 a	0.3 a	0.0 a	0.0 a
Declare	1.28	0.0 a	0.0 a	0.0 a	3.3 b	12.5 a	7.8 a	0.3 a	0.8 a	0.5 a
Declare + Dimethoate	1.02 4	0.0 a	0.0 a	0.0 a	2.3 b	13.0 a	9.5 a	0.3 a	0.3 a	0.5 a
Hero	5	0.0 a	0.0 a	0.0 a	2.8 b	11.3 a	6.5 a	0.0 a	0.0 a	0.8 a
Leverage 360	2.8	0.0 a	0.3 a	0.0 a	2.5 b	8.3 a	8.3 a	0.0 a	0.3 a	0.0 a
Mustang Max	4	0.0 a	0.0 a	0.0 a	2.0 b	8.3 a	4.3 a	0.3 a	0.0 a	0.5 a
Warrior II	1.54	0.0 a	0.3 a	0.0 a	0.8 b	13.3 a	7.0 a	0.0 a	0.3 a	0.8 a
UTC[7]	—	0.3 a	0.5 a	0.0 a	15.0 a	11.5 a	7.3 a	0.3 a	0.5 a	0.3 a

[1] Rates of application for foliar insecticide are ounces (oz) of product per acre.
[2] Means were derived from the numbers of insects per 20 sweeps in each plot in each of four replications.
[3] Means for the same date and followed by the same letter do not differ significantly ($P = 0.05$, Duncan's New Multiple Range Test).
[4] DAT = days after treatment (with insecticide).
[5] Soybeans were harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 13% moisture.
[6] Means followed by the same letter do not differ significantly ($P = 0.1$, Duncan's New Multiple Range Test).
[7] UTC = untreated check.

TABLE 8.2 (CONTINUED) • Evaluation of foliar-applied insecticides to control leaf-feeding insect pests of soybean, DeKalb, University of Illinois, 2012

Product	Rate[1]	Mean no. Japanese beetles per 20 sweeps[2,3]			Mean no. stink bugs per 20 sweeps[2,3]			Mean yield (bu/A)[5,6] 12 Oct
		7 Aug (7 DAT[4])	14 Aug (14 DAT[4])	21 Aug (21 DAT[4])	7 Aug (7 DAT[4])	14 Aug (14 DAT[4])	21 Aug (21 DAT[4])	
Baythroid XL	2.8	0.0 a	0.0 a	0.0 a	0.0 a	0.5 a	0.0 a	63.8 ab
Cobalt	13	0.0 a	0.3 a	0.0 a	0.0 a	0.3 a	1.0 a	63.6 ab
Declare	1.02	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	0.5 a	63.9 ab
Declare	1.28	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	62.8 b
Declare + Dimethoate	1.02 4	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	61.9 bc
Hero	5	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	58.9 c
Leverage 360	2.8	0.0 a	0.3 a	0.0 a	0.0 a	0.3 a	0.0 a	61.0 bc
Mustang Max	4	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	0.5 a	62.3 b
Warrior II	1.54	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	0.5 a	66.5 a
UTC[7]	—	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	63.2 ab

[1] Rates of application for foliar insecticide are ounces (oz) of product per acre.
[2] Means were derived from the numbers of insects per 20 sweeps in each plot in each of four replications.
[3] Means for the same date and followed by the same letter do not differ significantly ($P = 0.05$, Duncan's New Multiple Range Test).
[4] DAT = days after treatment (with insecticide).
[5] Soybeans were harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 13% moisture.
[6] Means followed by the same letter do not differ significantly ($P = 0.1$, Duncan's New Multiple Range Test).
[7] UTC = untreated check.

TABLE 8.3 • Evaluation of foliar-applied insecticides to control leaf-feeding insect pests of soybean, Morrison, University of Illinois, 2012

Product	Rate[1]	Mean no. corn rootworm beetles per 20 sweeps[2,3]			Mean no. grasshoppers per 20 sweeps[2,3]		
		7 Aug (7 DAT[4])	14 Aug (14 DAT[4])	21 Aug (21 DAT[4])	7 Aug (7 DAT[4])	14 Aug (14 DAT[4])	21 Aug (21 DAT[4])
Baythroid XL	2.8	0.3 a	0.5 a	5.0 a	0.3 a	0.3 a	0.0 a
Cobalt	13	0.3 a	0.8 a	2.5 a	0.0 a	0.0 a	0.3 a
Declare	1.02	0.5 a	0.3 a	2.5 a	0.0 a	0.3 a	0.0 a
Declare	1.28	0.3 a	0.5 a	2.0 a	0.0 a	0.3 a	0.3 a
Declare + Dimethoate	1.02 4	0.3 a	1.3 a	4.0 a	0.3 a	0.3 a	0.3 a
Hero	5	0.3 a	0.0 a	1.5 a	0.0 a	0.0 a	0.0 a
Leverage 360	2.8	0.5 a	0.5 a	2.5 a	0.0 a	0.0 a	0.3 a
Mustang Max	4	0.3 a	2.0 a	2.5 a	0.0 a	0.3 a	0.0 a
Warrior II	1.54	0.3 a	0.8 a	2.8 a	0.3 a	0.0 a	0.0 a
UTC[7]	—	1.0 a	1.3 a	1.8 a	0.0 a	0.3 a	0.3 a

[1] Rates of application for foliar insecticide are ounces (oz) of product per acre.
[2] Means were derived from the numbers of insects per 20 sweeps in each plot in each of four replications.
[3] Means for the same date and followed by the same letter do not differ significantly ($P = 0.05$, Duncan's New Multiple Range Test).
[4] DAT = days after treatment (with insecticide).
[5] Soybeans were harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 13% moisture.
[6] Means followed by the same letter do not differ significantly ($P = 0.1$, Duncan's New Multiple Range Test).
[7] UTC = untreated check.

TABLE 8.3 (CONTINUED) • Evaluation of foliar-applied insecticides to control leaf-feeding insect pests of soybean, Morrison, University of Illinois, 2012

Product	Rate[1]	Mean no. Japanese beetles per 20 sweeps[2,3]			Mean no. stink bugs per 20 sweeps[2,3]			Mean yield (bu/A)[5,6] 11 Oct
		7 Aug (7 DAT[4])	14 Aug (14 DAT[4])	21 Aug (21 DAT[4])	7 Aug (7 DAT[4])	14 Aug (14 DAT[4])	21 Aug (21 DAT[4])	
Baythroid XL	2.8	0.5 c	1.5 bcd	1.3 a	0.0 a	0.3 a	0.0 a	59.1 a
Cobalt	13	6.8 b	3.0 bc	4.8 a	0.3 a	0.0 a	0.0 a	55.5 a
Declare	1.02	3.8 bc	3.5 bc	3.8 a	0.0 a	0.3 a	0.3 a	57.7 a
Declare	1.28	2.0 c	0.5 d	4.8 a	0.0 a	0.0 a	0.0 a	55.5 a
Declare + Dimethoate	1.02 4	2.8 c	3.8 b	4.8 a	0.0 a	0.0 a	0.3 a	57.9 a
Hero	5	0.8 c	1.3 cd	1.8 a	0.0 a	0.0 a	0.0 a	54.6 a
Leverage 360	2.8	1.0 c	1.3 cd	2.8 a	0.0 a	0.0 a	0.0 a	55.8 a
Mustang Max	4	0.0 c	0.5 d	4.3 a	0.0 a	0.0 a	0.0 a	54.0 a
Warrior II	1.54	2.5 c	3.5 bc	4.3 a	0.0 a	0.3 a	0.0 a	57.0 a
UTC[7]	—	11.3 a	6.0 a	5.3 a	0.0 a	0.5 a	0.3 a	55.8 a

[1] Rates of application for foliar insecticide are ounces (oz) of product per acre.
[2] Means were derived from the numbers of insects per 20 sweeps in each plot in each of four replications.
[3] Means for the same date and followed by the same letter do not differ significantly ($P = 0.05$, Duncan's New Multiple Range Test).
[4] DAT = days after treatment (with insecticide).
[5] Soybeans were harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 13% moisture.
[6] Means followed by the same letter do not differ significantly ($P = 0.1$, Duncan's New Multiple Range Test).
[7] UTC = untreated check.