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Chemical Management of Late-Season Bean Leaf Beetles in Northeast Iowa Soybeans

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Abstract
The bean leaf beetle can be a serious pest of soybeans. There are three populations of beetles that feed on soybean plants throughout the growing season - the overwintered population at plant emergence, the first generation during late June and July, and the second generation during August and September. The second generation can cause significant damage to pods, which reduces both soybean quality and quantity. In central Iowa, this insect reached historically high numbers during late summer of 2002. Recently, it was found that this insect also transmits bean pod mottle virus, a yield reducing plant pathogen. The objective of this experiment was to measure the performance of several insecticides for control of second-generation bean leaf beetles.

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Chemical Management of Late-Season Bean Leaf Beetles in Northeast Iowa Soybeans

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Introduction

The bean leaf beetle can be a serious pest of soybeans. There are three populations of beetles that feed on soybean plants throughout the growing season the overwintered population at plant emergence, the first generation during late June and July, and the second generation during August and September. The second generation can cause significant damage to pods, which reduces both soybean quality and quantity. In central Iowa, this insect reached historically high numbers during late summer of 2002. Recently, it was found that this insect also transmits bean pod mottle virus, a yield reducing plant pathogen.

The objective of this experiment was to measure the performance of several insecticides for control of second-generation bean leaf beetles.

Materials and Methods

A natural population of bean leaf beetles infested soybeans (Pioneer 92B38RR) at the Northeast Iowa Research and Demonstration Farm, Nashua, Iowa. The field was no-till planted May 17, 2002, in 30-inch rows at a rate of 196,433 seeds/acre. The field was scouted for adult bean leaf beetles by taking 20 sweeps with a net at four locations across the field. On July 31 the average density was 175.25 beetles per 20 sweeps, and on August 6 the average density was 193.25 beetles per 20 sweeps. The plant stages on August 6 and August 20 were R5 (beginning seed) and R6 (full seed), respectively.

Two different experiments were established. Experiment 1 was Pounce 3.2EC (4 oz/acre), Warrior T (1.9 and 3.2 oz/acre), and an untreated check. These treatments were applied on August 6. Experiment 2 was Asana XL (5.8 oz/acre), Mustang (3.0 and 4.3 oz/acre), Lorsban 4E (2 pt/acre), and an untreated check. These treatments were applied on August 20. All insecticides were applied with a hand-held sprayer at a rate of 20 gallons of water/acre and broadcast over the rows. Plots were 14 rows wide (35 feet) and 60 feet long. Each treatment was replicated four times in a randomized complete block design.

Beetle counts were taken weekly after the insecticide application on September 24. Twenty sweeps were taken from the middle four rows of each plot. Beetles were counted after each set of 20 sweeps, and were released back into the plot from which they were collected.

Yields were machine-harvested from the middle 10 rows in each plot on October 15 and adjusted to 13% moisture. Data were analyzed by analysis of variance using Fisher's protected LSD at P=0.05. Results are shown in Tables 1 and 2.

Results and Discussion

The 2002 beetle population dropped significantly in size after the last week of July. Beetle populations were very low throughout late August and September. This is in stark contrast to 2001 when beetle populations reached a peak abundance of 276.8 beetles per 20 sweeps on September 21.

Insecticides in both experiments significantly knocked the beetle population down one week after application relative to the untreated check. Also, all insecticides in both experiments performed equally well in providing a level of residual control that held the beetle population down through mid-September.

Yields in both experiments were not significantly different from the untreated check. This is probably because the second generation beetle population was relatively small during August and September. During 2001 when the second generation bean leaf beetle population was very large, the yield difference between the best chemical treatment and the check was 8.8 bushels. These data show that when second generation beetle populations are large, an economic benefit can be gained from an insecticide application.

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Table 1. Bean leaf beetle counts and grain yields from soybeans sprayed with insecticides on August 6, 2002, Nashua.

		Beetles per 20 sweeps							
Treatment	Rate/acre	8/14	8/20	8/27	9/3	9/10	9/17	9/24	Yield bu/acre
Warrior	1.9 oz.	3.0	1.5	35	56.5	16.0	14.0	3.0	54.2
Warrior	3.2 oz.	1.5	0.8	19	23.3	6.0	3.3	0.5	53.8
Pounce	4 oz.	4.8	4.3	11	10.0	1.8	1.0	0.3	53.3
Check	---	109.8	36.5	50.3	92.0	20.3	28.5	4.0	51.9
LSD 0.05		*17.7*	*2.7*	*20.5*	*26.3*	*8.6*	*9.6*	*2.3*	*n.s.*

Table 2. Bean leaf beetle counts and grain yields from soybeans sprayed with insecticides on August 20, 2002, Nashua.

		Beetles per 20 sweeps					
Treatment	Rate/acre	8/27	9/3	9/10	9/17	9/24	Yield bu/acre
Asana	5.8 oz.	8.3	5.3	2.0	0.3	1.0	49.5
Mustang	3.0 oz.	3.0	3.3	0.3	0.5	0.3	49.8
Mustang	4.3 oz.	1.8	1.3	0.0	0.8	0.5	51.8
Lorsban	2.0 pt.	6.5	7.5	8.5	3.8	2.0	49.8
Check	---	36.3	77.0	40.3	34.8	8.5	49.6
LSD 0.05		*14.6*	*16.6*	*13.0*	*7.1*	*2.1*	*n.s.*