2002

Management of Late-Season Bean Leaf Beetles in Iowa Soybean

Kenneth T. Pecinovsky
Iowa State University, kennethp@iastate.edu

Marlin E. Rice
Iowa State University, merice@iastate.edu

Management of Late-Season Bean Leaf Beetles in Iowa Soybean

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 that occurs at plant emergence, the first generation that occurs during late June and July, and the second generation that occurs during August and September. The second generation can cause significant damage to soybean pods. In central Iowa, this insect reached historically high numbers during the summer of 2000. Populations during 2001 were slightly smaller but still sufficiently large to cause economic damage. Recently, it was found that this insect also transmits bean pod mottle virus, a yield-reducing plant pathogen.

Keywords
Entomology

Disciplines
Agricultural Science | Agriculture | Entomology

Management of Late-Season Bean Leaf Beetles in Iowa Soybean

Ken Pecinovsky, farm superintendent
Marlin E. Rice, professor
Department of Entomology

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 that occurs at plant emergence, the first generation that occurs during late June and July, and the second generation that occurs during August and September. The second generation can cause significant damage to soybean pods. In central Iowa, this insect reached historically high numbers during the summer of 2000. Populations during 2001 were slightly smaller but still sufficiently large to cause economic damage. 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 (Novartis S24-K4, Roundup Ready) at the Northeast Research and Demonstration Farm, Nashua, Iowa. The field was planted May 19, 2001, in 30 inch rows. The average plant population was 196,000/acre. On August 3, the field was scouted for adult bean leaf beetles, and 20 sweeps were taken at six locations across the field. The average density was 27.5 beetles/20 sweeps. The field was in the R5 (beginning seed) stage.

Ten treatments were established in the field: 1) Asana (5.8 oz./acre), 2) F0570 (2.72 oz./acre) [zeta-cypermethrin], 3) Furadan 4F (0.5 pint/acre), 4) Lorsban 4E (2 pints/acre), 5) Penncap M (2 pints/acre), 6) Pounce 3.2EC (4.0 oz./acre), 7) Warrior T (1.9 oz./acre), 8) Warrior T (3.2 oz./acre), 9) Untreated check #1, and 10) Untreated check #2.

On August 3, all insecticides were applied in 20 gallons of water/acre broadcast over the row. Plots were 24 rows wide × 45 feet long. Each treatment was replicated four times in a randomized complete block design.

From August 3 to September 28, beetle counts were taken weekly. Twenty sweeps were taken from the middle four rows of each plot. Beetles were counted after each set of 20 sweeps. Beetles were released back into the plot from which they were collected. Pod injury was calculated mid-September by randomly selecting eight plants from each plot and counting the number of beetle-scarred pods. Injury was expressed as percent of injured pods.

Yields were harvested from rows 6–10 and 15–19 in each plot. This provided eight yield replications per treatment. On October 2, yields were machine harvested 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, 2, and 3.

Results and Discussion

The beetle population was very low in the check plots for three weeks after the insecticides were applied. This suggests that when the insecticides were applied on August 3, the first generation was at the very end of its cycle. Second generation beetles did not begin emerging until the last week of August. In one check plot on September 21, the second generation peaked at nearly 277 beetles/20 sweeps.

All insecticides knocked the beetle population down one week after application. Four weeks after application (August 31) several insecticides began to lose residual control

(Table 1). The best control throughout the eight-week test period was provided by Asana, F0570 (zeta-cypermethrin), Pounce, and Warrior (high rate). These four insecticides also had the least amount of pod injury at the end of the season (Table 2).

Yields in some insecticide plots were significantly better than in the untreated check plots (Table 3). The top three yields were in the Asana and Warrior (both high and low rates) plots. The yields from the Asana treated plots were 5.5 and 8.8 bushels better than the two untreated check plots.

These data suggest that late-season application of insecticides for management of bean leaf beetles can protect against yield loss and provide economic gains, especially when populations are large. Economic thresholds can be useful tools for predicting when damaging beetle populations will occur and when, or if, to apply an insecticide. However, selection of a late-season insecticide for use in soybeans depends not only on performance against a pest but also on the pre-harvest interval. These intervals range from 60 days (Pounce) to 45 days (Warrior) to 21 days (Asana).

Economic thresholds and other helpful information on management of insect pests can be found in the *Integrated Crop Management* newsletter, published by Iowa State University, or on the World Wide Web at: www.ipm.iastate.edu/ipm/icm/.

Table 1. Bean leaf beetle counts in soybeans treated with insecticides, Northeast Research and Demonstration Farm, Nashua, IA, 2001.

		Beetles per 20 sweeps							
Treatment	**Rate/acre**	**8/10**	**8/17**	**8/24**	**8/31**	**9/7**	**9/14**	**9/21**	**9/28**
Asana	5.8 oz	0.5	1.5	0.3	15.5	43.3	1.8	80.8	20.8
F0570	2.72 c	0.3	0.8	0.0	9.3	41.8	3.8	65.0	19.0
Furadan	0.5 pt	2.0	1.3	0.8	11.8	97.3	128.3	184.8	33.0
Lorsban	2 pt	0.8	1.0	0.0	12.8	67.3	87.8	157.0	33.5
Penncap M	2 pt	0.3	1.0	1.3	25.3	121.8	160.0	205.3	38.3
Pounce	4.0 oz	0.0	0.3	0.5	3.3	26.3	2.5	25.3	16.3
Warrior T	1.9 oz	1.0	2.3	0.8	15.3	82.5	15.5	186.0	36.3
Warrior T	3.2 oz	0.0	0.0	0.0	13.5	54.5	2.8	67.0	13.0
Check 1	---	11.3	7.8	0.5	27.5	163.0	210.8	276.8	69.8
Check 2	---	12.5	3.3	1.0	26.0	214.0	172.8	245.0	52.3
LSD 0.05		*3.39*	*3.13*	*1.02*	*9.17*	*88.48*	*45.52*	*69.64*	*17.80*

Table 2. Soybean injured pods in plots treated with insecticides for bean leaf beetle control, Northeast Research and Demonstration Farm, Nashua, IA, 2001.

		Percent injured pods	
Treatment	**Rate/acre**	**Mean %**	**S.E.***
Lorsban	2 pt	30.5	2.8
Penncap M	2 pt	23.3	2.9
Check 2	---	23.3	2.9
Furadan	0.5 pt	22.4	2.6
Check 1	---	21.3	0.7
Warrior T	1.9 oz	11.5	0.3
Warrior T	3.2 oz	7.1	0.9
Asana	5.8 oz	6.9	0.8
F0570	2.72 oz	6.7	2.1
Pounce	4.0 oz	3.3	0.8
LSD 0.05		*5.69*	

Table 3. Soybean yields in plots treated with insecticides for bean leaf beetle control, Northeast Research and Demonstration Farm, Nashua, IA, 2001.

		Bushels/acre	
Treatment	**Rate/acre**	**Mean**	**S.E.***
Asana	5.8 oz	60.3	0.8
Warrior T	3.2 oz	59.8	0.6
Warrior T	1.9 oz	58.7	1.1
F0570	2.72 oz	58.5	1.2
Furadan	0.5 pt	57.6	0.4
Pounce	4.0 oz	57.1	0.7
Lorsban	2 pt	56.8	0.6
Penncap M	2 pt	55.0	1.0
Check 1	---	54.8	1.1
Check 2	---	51.5	1.4
LSD 0.05		*2.67*	

* Standard error