Late-Season Management of Bean Leaf Beetles in Soybeans

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Introduction

The bean leaf beetle is an annual pest of soybean in Midwestern states. Adult beetles feed on all aboveground plant parts and are especially fond of soybean pods late in the growing season. In addition to the physical injury that bean leaf beetle adults cause to soybean plants, this insect also transmits bean pod mottle virus—a potentially yield-robbing plant disease—which makes proper management of this insect even more critical. This report focuses on managing second-generation beetles with insecticides to control late-season pod injury.

There are three population cycles of bean leaf beetles in Iowa. Bean leaf beetle adults are commonly found on alfalfa after emerging from overwintering habitats. These overwintered populations move quickly into soybean, sometimes as soon as the plants crack the ground. This colonization of soybean is typical in Iowa, but because the overwintering bean leaf beetle population is usually small, adults often are not obvious on young soybean plants. The first generation follows the overwintered population and typically occurs on late-vegetative- and early-reproductive-stage soybeans. The second generation in late summer occurs mostly on soybean in all stages of pod development. It is common for adults from the end of the first generation and the beginning of the second generation to occur at the same time in a field, thereby making the two populations indistinguishable from each other.

Materials and Methods

Soybeans were planted on May 10 in 30-inch rows. On August 10, a large population of bean leaf beetles was found in R5 (beginning seed)-stage soybean; the beetle population averaged 132.8 beetles per 20 sweeps. Five treatments were established in the field: 1) Warrior T (3.2 oz/acre), 2) Lorsban 4E (2 pints/acre), 3) Sevin XLR (2 pints/acre), 4) Furadan 4F (0.5 pint/acre), and 5) an untreated check. All insecticide treatments were applied in 20 gallons of water per acre broadcast over the row. Plots were eight rows in width and 60 feet in length. Treatments were applied on August 10 and each was replicated four times in a randomized complete block design. Twenty sweeps were taken in each plot on August 16, 24, 31, and September 7 (approximately 1, 2, 3, and 4 weeks, respectively) after application to test the long-term efficacy against second generation bean leaf beetles. Beetles were counted at the end of each 20-sweep sample and released back into the plot from which they were collected. Soybeans were machine harvested on September 30.

Results and Discussion

A variety of insecticides are labeled for management of bean leaf beetles in soybeans, although there is little published information on the performance of these insecticides. Insect control is always a prime consideration when selecting a product, but another consideration in choosing an insecticide near the end of the growing season is the length of the preharvest interval. Commonly available insecticides and their preharvest intervals are Ambush 2EC (60 days); Asana XL (21 days); Lorsban 4E (28 days); Penncap-M (20 days); Pounce 3.2EC (60 days); Sevin XLR Plus (Rhone-Poulenc label states “5 days,” whereas the Aventis label states “within 21 days of harvest of dried beans or peas, seed, or hay”); and Warrior T (45 days). A 60-day preharvest interval may exclude some chemicals from being used, especially for late-season insect management.

A 12-year population study conducted at Iowa State University shows that the bean leaf beetle

population has steadily increased during the past 4 years (Fig. 1). It is believed that the relatively mild winters of the past three years have allowed above-average survival of overwintering beetles. This situation, coupled with an increase in the acres of early-planted (April) soybean, has contributed to damaging populations of bean leaf beetles throughout most of Iowa.

One week after application, the bean leaf beetle density was reduced significantly in all insecticide treatments with Warrior and Lorsban providing the best level of control (Table 1). Two weeks after application, bean leaf beetle densities increased in all plots but were substantially smaller in the Warrior and Lorsban treatments compared with Sevin and Furadan treatments. Three and 4 weeks after the initial insecticide application, there was a natural decline in the insect population, but the Warrior and Lorsban treatments continued to suppress the beetle population to levels significantly lower than the other insecticides. The performance of Lorsban in our study was nearly identical to that of Warrior. In spite of the performance of the insecticides in reducing insect densities, a significant yield benefit was detected only in the Warrior treatment.

Table 1. Average insect densities (± standard error) and soybean yields from insecticide-plots treated for second-generation bean leaf beetles, Nashua, Iowa, 2000.

		Bean leaf beetles/20 sweeps (mean ± S.E.)[1,2]				
Treatment	Rate/acre	Week 1	Week 2	Week 3	Week 4	Bushels/A
Warrior T	3.2 oz.	0.5 ± 0.3c	24.5 ± 4.8d	40.5 ± 5.5b	3.3 ± 0.3b	61.8 ± 0.7a
Lorsban 4E	2 pints	5.3 ± 2.0c	45.3 ± 2.7d	22.8 ± 3.6c	11.5 ± 1.3b	58.3 ± 0.7b
Sevin XLR	2 pints	9.3 ± 2.5bc	127.3 ± 6.6c	63.5 ± 5.4a	40.0 ± 3.9a	59.4 ± 1.2b
Furadan 4F	0.5 pint	30.5 ± 3.6b	168.8 ± 13.1b	59.8 ± 10.1a	40.8 ± 10.0a	59.1 ± 0.8b
Check	—	94.8 ± 14.3a	206.3 ± 14.7a	61.3 ± 3.2a	44.5 ± 6.8a	58.8 ± 0.9b

[1]Week 1, 2, 3, and 4 are August 16, 24, 30, and September 7, respectively.
[2]Numbers in the same column and followed by the same letter are not significantly different ($P > 0.05$, LSD).

Fig 1. A 12-year population trend for second-generation bean leaf beetles in central Iowa soybean.