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Management of Bean Pod Mottle Virus Through Reduction of Bean Leaf Beetles

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Management of Bean Pod Mottle Virus Through Reduction of Bean Leaf Beetles

Abstract

Since the late 1990s there have been increased reports of bean pod mottle virus (BPMV) in Iowa soybeans. Before that time, BPMV was thought to be a problem only in southern soybean growing regions. The increase in the virus is thought to be related to large increases in populations of the vector, the bean leaf beetle. The bean leaf beetle is a common soybean-feeding insect in Iowa. Growers are concerned about BPMV because it can cause reductions in yield and seed quality as well as brown-to-black mottling on the seed coat. The objective of this study was to determine whether the virus could be managed through reducing populations of the insect vector with insecticides.

Keywords

Entomology, Plant Pathology

Disciplines

Agricultural Science | Agriculture | Entomology | Plant Pathology

Management of Bean Pod Mottle Virus Through Reduction of Bean Leaf Beetles

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Introduction

Since the late 1990s there have been increased reports of bean pod mottle virus (BPMV) in Iowa soybeans. Before that time, BPMV was thought to be a problem only in southern soybean growing regions. The increase in the virus is thought to be related to large increases in populations of the vector, the bean leaf beetle. The bean leaf beetle is a common soybean-feeding insect in Iowa.

Growers are concerned about BPMV because it can cause reductions in yield and seed quality as well as brown-to-black mottling on the seed coat. The objective of this study was to determine whether the virus could be managed through reducing populations of the insect vector with insecticides.

Materials and Methods

This experiment was conducted in northwest Iowa in 2000 and 2001. In 2000, the experiment was conducted on land owned by a cooperating farmer, and in 2001, it was conducted at the Iowa State University Allee Research Farm. The experiment was arranged in a randomized complete block design with four replications of five treatments. Each treatment area was 54 30-inch rows x 500 feet.

The four insecticide treatments were: 1) spray once with 2.56 oz./acre Warrior T shortly after soybean emergence (VC stage); 2) spray once with 2.56 oz./acre Warrior T shortly after

emergence (VC stage) and spray again 10 days later; 3) spray once with 2.56 oz./acre Warrior T shortly after soybean emergence (VC stage) and spray again in mid-July with 3.2 oz./acre Warrior T when first, first-generation bean leaf beetles begin to emerge; 4) apply 8.82 lb/acre Di-Syston at planting; 5) unsprayed control area.

At the end of the season, the middle 16 rows of each treatment were harvested, and yield was determined. Seed samples were taken from each plot to determine seed quality.

Results and Discussion

In 2001, there were no significant differences in yield between any of the insecticide-treated plots and the unsprayed control (Table 1). However, there were differences in seed quality (Table 1). Spraying once early and once at mid-season produced seed with the least percentage of mottling, while seed from the unsprayed control and the plots treated with the granular insecticide had the greatest percentage of mottling. Even though there were no statistically significant differences in yield, spraying once early and once at mid-season did have the highest mean yield overall. Work from this study suggests that managing beetles early and at mid-season might be an effective tactic for reducing BPMV incidence. Further work will combine data from both northwest Iowa field sites to examine data for differences.

Acknowledgments

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Table 1. 2001 Allee Research Farm soybean yield and seed quality by treatment. Means followed by different letters were statistically different at P<0.05.

Treatment	Yield mean	Percentage mottled seeds
spray once early	46.74a	11.67ab
spray twice early	48.44a	9.17bc
spray once early, once mid-season	51.28a	7.67c
granular insecticide applied at planting	44.88a	14.50a
unsprayed control	44.07a	14.75a