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Effects of Cruiser Seed Treatment for Bean Leaf Beetle and Soybean Aphid Management on Soybean Yield and on Incidence of Viral Disease in Eastern Iowa

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Abstract
The bean leaf beetle (BLB) has been a long-time pest of soybeans and other beans, but it seldom reached levels that warrant treatment on a large scale until 2000. The BLB has also been identified as the vector for the transmission of a disease called bean pod mottle virus (BPMV), which can cause yield reduction and also discolored soybeans, resulting in dockage when the soybeans are marketed. The soybean aphid is a relatively new pest to North America; several eastern Iowa fields were sprayed for this pest in 2001 and many fields were sprayed in 2003. Established thresholds for BLB management at various developmental stages of the soybeans do not consider the negative effects of the introduction of BPMV into the plants. The soybean aphid is a vector for soybean mosaic virus (SMV), and, again, current thresholds do not consider the negative effects of the introduction of SMV into the plants. Cruiser, an insecticidal seed treatment from Syngenta, was labeled for use in soybean beginning in 2005. Research is being conducted by Dr. Marlin Rice, Dr. Matt O'Neal, and Mr. Jeffrey Bradshaw to determine the efficacy of seed treatments on BLB and soybean aphid populations and the incidence of viral diseases. This research complements the efforts by Rice, O'Neal, and Bradshaw.

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Agricultural Science | Agriculture

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Introduction

The bean leaf beetle (BLB) has been a long-time pest of soybeans and other beans, but it seldom reached levels that warrant treatment on a large scale until 2000. The BLB has also been identified as the vector for the transmission of a disease called bean pod mottle virus (BPMV), which can cause yield reduction and also discolored soybeans, resulting in dockage when the soybeans are marketed. The soybean aphid is a relatively new pest to North America; several eastern Iowa fields were sprayed for this pest in 2001 and many fields were sprayed in 2003. Established thresholds for BLB management at various developmental stages of the soybeans do not consider the negative effects of the introduction of BPMV into the plants. The soybean aphid is a vector for soybean mosaic virus (SMV), and, again, current thresholds do not consider the negative effects of the introduction of SMV into the plants. Cruiser, an insecticidal seed treatment from Syngenta, was labeled for use in soybean beginning in 2005. Research is being conducted by Dr. Marlin Rice, Dr. Matt O'Neal, and Mr. Jeffrey Bradshaw to determine the efficacy of seed treatments on BLB and soybean aphid populations and the incidence of viral diseases. This research complements the efforts by Rice, O'Neal, and Bradshaw.

Materials and Methods

The experimental layout was a randomized complete block design with four replicates of five treatments: 1) check, 2) Cruiser only, 3) Cruiser followed by an insecticide treatment (Warrior at 3.2 oz/acre) when the first generation of BLB appeared (July 7), 4) insecticide applied when the overwintering BLB generation first appeared in the field (May 25), and 5) insecticide applied when the overwintering BLB generation appeared in the field followed by insecticide when the first BLB generation appeared in the field. Treatment for soybean aphid would have been made if populations exceeded 250 aphids/plant, which they did not. The plots were planted April 20, 2005, with Northrup King 32G5 treated with Cruiser Max (Cruiser treatments) or Apron Maxx (Non-Cruiser treatments) at 160,000 seeds/acre in 30-inch rows 1.5 in. deep. The plots were scouted approximately once each week beginning on May 17 and ending on September 1. Leaf samples were collected on September 1, 2005, to be analyzed for the presence of bean pod mottle virus, soybean virus, and alfalfa mosaic virus. The plots were machine harvested on September 23, 2005.

Results and Discussion

Soybean aphid levels were very low, with aphids being observed at extremely low levels on the July 13, July 19, and July 28 inspections only. The bean leaf beetle populations are shown in Figure 1 and were also very low until the advent of the second generation in August.

All leaf samples tested negative for bean pod mottle virus, soybean mosaic virus, and alfalfa mosaic virus.

Table 1 shows there were no significant differences in yield among any of the treatments at the 95% level of statistical confidence. This is not surprising given the low levels of insect activity in the field until late in the season and the lack of disease in the field in 2005.

Summarized in Table 2 are the bean leaf beetle counts beginning on August 11. Beginning August 17, both the Cruiser followed by a July insecticide application and the seedling followed by the July insecticide application were significantly better than the check. Interestingly, by September 1, the Cruiser-only treatment was also significantly better than the check; both the Cruiser followed by a July insecticide application and the seedling followed by the July insecticide application were significantly better than the Cruiser-only treatment.

We encourage further study of the effect of Cruiser seed treatment on average yield and average seed quality when used on a yearly basis.

Acknowledgments

We would like to thank Mark Boshart of Syngenta for providing the seed with and without the Cruiser plus Apron Maxx treatments, Sweetland Ag Tech for supplying the Apron Maxx treatment for the seed not treated with Cruiser, and also Chad Hesseltine and Myron Rees for their time and labor during planting, growing, and harvesting.

Table 1. Effect of Cruiser bean leaf beetle management on soybean yield in 2005 at Crawfordsville, IA.

Treatment	Yield
Cruiser only	61.4
Cruiser f/b early insecticide	64.3
Insecticide at seedling stage	60.7
Insecticide at seedling stage and in early July	63.9
Check	63.0
$LSD_{(P=0.05)}$	NS*

*Differences in yield means were not statistically significant.

Table 2. Effect of Cruiser bean leaf beetle management on BLB per 3 row-ft in 2005, Crawfordsville, IA.

Treatment	August 11	August 17	August 25	September 1
Cruiser only	3.25	6.75	13.75	38.50
Cruiser f/b insecticide	3.75	4.25	8.00	15.00
Insecticide at seedling stage	3.25	11.25	16.25	46.25
Insecticide at seedling stage and in early July	3.25	3.25	7.50	13.75
Check	3.75	12.25	23.75	53.25
$LSD_{(P=0.05)}$	NS*	6.08	9.19	12.90

*Differences in beetle count means were not statistically significant.

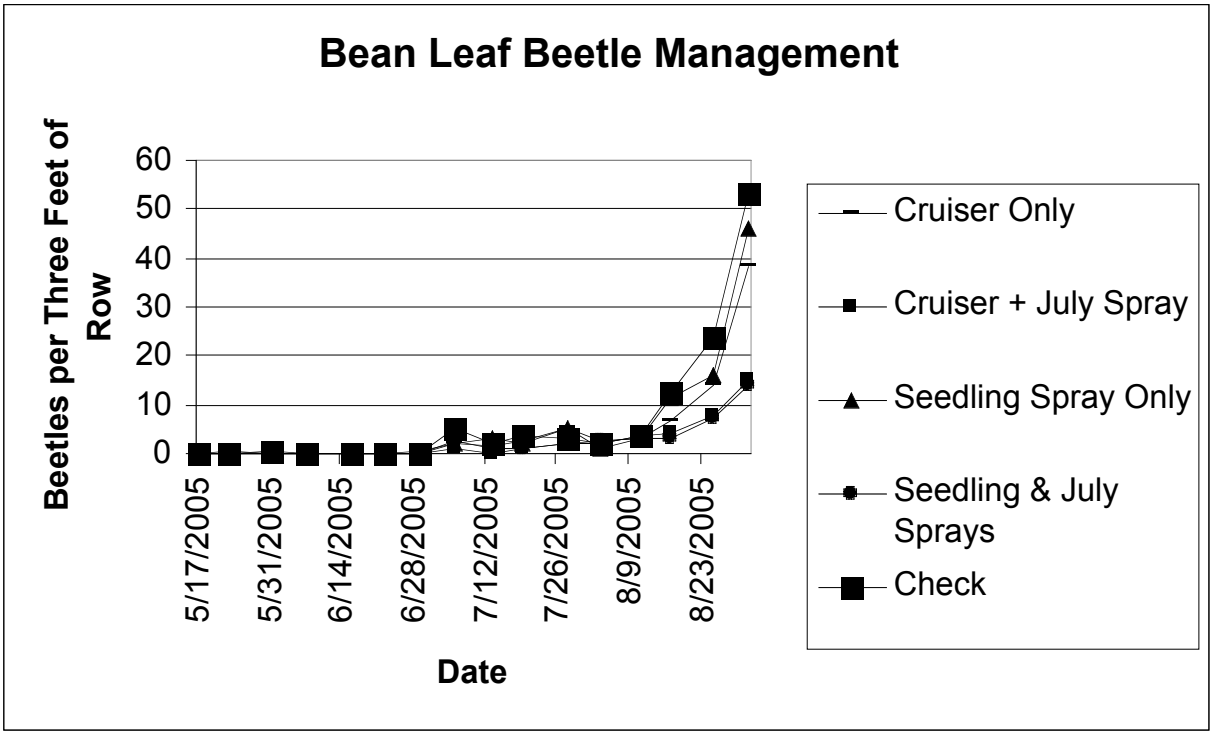

Figure 1. Effect of bean leaf beetle management on bean leaf beetle populations in 2005 at Crawfordsville, IA.