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Effect of Cruiser Seed Treatment for Bean Leaf Beetle Management on Soybean Yield and on Incidence of Bean Pod Mottle Virus in Eastern Iowa

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Introduction

The bean leaf beetle (BLB) is a long-time pest of soybeans and other beans, but until 2000, it has seldom reached levels that warrant treatment on a large scale. Recently, 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 discolor soybeans, resulting in dockage when the soybeans are marketed. High overwintering BLB populations coupled with the mild winter of 2001–2002 suggested that BLB populations might have been quite high during the 2002 growing season. Although research has been done by Dr. Larry Pedigo, professor of entomology, and others to establish thresholds for BLB management at various developmental stages of the soybeans, the addition of BPMV to the overall equation suggested that additional research should be done regarding preventing the negative effects of the introduction of BPMV into the plants as well as the physiological injury caused by the BLB. Cruiser, an insecticidal seed treatment from Syngenta, is not labeled for use in soybeans. Research is being conducted by Dr. Marlin Rice, Dr. Reyda Krell, and Mr. Jeffrey Bradshaw to determine the efficacy of Cruiser (should it become labeled for use on soybeans) on BLB populations, and on the incidence of BPMV. Because the BLB must do some minimal feeding to ingest the toxin, the ability of Cruiser to prevent the introduction of BPMV is being questioned. This research compliments the efforts by Rice, Krell, and Bradshaw.

Materials and Methods

The experimental layout was a randomized complete block design with four replicates of four treatments – early planting check, early planting with Cruiser, late planting check, and late planting with Cruiser. The early plots were planted May 6, 2002, and the late plots were planted May 29, 2002, all with Pioneer

93B01RR at 178,000 seeds/acre in 30-inch rows planted 1.5 inches deep. Leaf samples were collected on September 10 to be analyzed for the presence of BPMV. The plots were machine harvested on October 10, and samples were collected from each plot. The samples were evaluated for seed discoloration and were divided into three categories – no discoloration, minor discoloration, and severe discoloration, with the difference between minor and severe discoloration being subjective.

Results and Discussion

The results of the 2002 study are summarized in Tables 1, 2, and 3. Although the Cruiser treated plots on the average out-yielded the check plots, Table 1 shows there were no significant differences in yield among any of the treatments at the 95% level of statistical confidence.

Table 2 shows the effect of the Cruiser treatment on frequency of BPMV. Because some BLB feeding is necessary for the BLB to ingest the toxin in Cruiser, and because BLB feeding is the vector by which the virus transmission occurs, it is surprising that no BPMV was found in the early-planted plots with the Cruiser treatment. Even though the observed differences were dramatic, none of the treatments were statistically different at the 95% level of statistical confidence.

Seed quality was in general disappointing. Very few seeds from any plot showed no discoloration emanating from the hylum. Table 3 shows there were no significant differences in seed quality among the treatments at the 95% level of statistical confidence.

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

Acknowledgments

We would like to thank Clifford Watrin of Syngenta for providing the Cruiser and making arrangements for the treatment of the seed used in this study and to Chad Hesselstine for his time

and labor during planting, growing, and harvesting.

Table 1. Effect of Cruiser bean leaf beetle management on soybean yield in 2002 at Crawfordsville.

Treatment	Yield
Early plant w/Cruiser	53.1
Early plant check	52.8
Late plant w/Cruiser	54.5
Late plant check	52.8
LSD _(P=0.05)	NS*

*Differences in yield means were not statistically significant.

Table 2. Effect of Cruiser bean leaf beetle management on incidence of BPMV in 2002 at Crawfordsville.

Treatment	% plots with BPMV
Early plant w/Cruiser	0
Early plant check	100
Late plant w/Cruiser	75
Late plant check	100
LSD _(P=0.05)	NS*

*Differences in disease incidence were not statistically significant.

Table 3. Effect of Cruiser bean leaf beetle management on soybean discoloration in 2002 at Crawfordsville.

Treatment	% no discoloration	% minor discoloration	% severe discoloration
Early plant w/Cruiser	7.50	82.25	10.25
Early plant check	4.25	87.75	8.00
Late plant w/Cruiser	2.25	88.00	9.75
Late plant check	1.00	92.00	7.00
LSD _(P=0.05)	NS*	NS*	NS*

* Differences in discoloration were not statistically significant.