

Issues with Early-Season Soybean Aphid *Aphis glycines* Matsumura (Homoptera: Aphididae) Management in Lucas County, Iowa

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Introduction

In Iowa, management of soybean aphids can be complicated by bean leaf beetle, *Cerotoma trifurcata*. A management strategy based on a June application of lambda-cyhalothrin (Warrior) can manage bean leaf beetles and may reduce the incident of bean pod mottle virus. It is possible that foliar- and seed-treatment insecticides applied to control bean leaf beetle may aid in reducing soybean aphid populations.

Materials and Methods

In 2005, we established experiments at three Iowa State University research farms to determine the effect of early-season bean leaf beetle management on soybean aphid populations. Only data from the McNay Research Farm in Lucas County will be presented here. Bean leaf beetle management tactics were targeted to the overwintering population and the first generation either using a seed treatment, imidacloprid or a foliar insecticide, lambda-cyhalothrin (Table 1). We applied the foliar insecticide at the full labeled rate, except when it was applied alone at a reduced rate against the overwintering population of bean leaf beetles. In this last case, we used a reduced rate. Foliar insecticides were applied based on the occurrence of the overwintering populations or the first generation of bean leaf beetles as determined by weekly sweep-net sampling. All treatments were replicated six times in a randomized complete block design. Plots measured 100 ft × 15 ft. Soybean variety NK S24-K4 RR was planted in 30-in. rows at 190,000 seeds/acre. Soybean aphids were counted once a week beginning

May 30 until plant senescence and cumulative aphid days were calculated and analyzed (Figure 1, Table 2). Cumulative aphid days were used to determine the plants total exposure to aphids. At harvest, yields were recorded and corrected to 13% moisture (Table 2).

In 2005, the bean leaf beetle management tactics we investigated had a measurable effect on soybean aphid populations but no detectable effect on soybean yields. Aphids did not arrive until July at our research sites during the 2005 season; therefore, it is unlikely that early- and late-June applications of insecticides had sufficient residual activity to control aphids. However, an interesting trend began to emerge late in the season, with higher aphid populations using the reduced rate (2.5 fl oz/acre) of lambda-cyhalothrin to target the overwintering population of bean leaf beetles. This is typical of what one would expect to find if natural enemies were having a suppressive effect on soybean aphid populations and the early application of a broad-spectrum insecticide was removing these natural enemies. There is much research that is needed to confirm this connection. Nick Schmidt, a graduate assistant in the Soybean Entomology Laboratory, measured the impact of natural enemies on soybean aphid populations in Iowa (Schmidt and O'Neal, unpublished data). In light of these findings, our data may be among the first to indicate that preventive insecticide applications may serve to increase aphid populations rather than reduce them.

Results and Discussion

Reductions in aphid populations were observed due to early-season bean leaf beetle treatments applied at the McNay Research Farm in 2005 (Table 2). Yield data from the 2005 season

indicate these tactics did not significantly protect yields (Table 2).

Acknowledgments

We thank the Iowa Soybean Association for financial support. We had exceptional technical

assistance from Scott Kostohryz, Amanda Nodelman, Pankaj Makhija, Greg VanNostrand, Michaela Payne, Limari Huertas, and graduate assistants Nick Schmidt and Wayne Ohnesorg. We would also like to acknowledge Syngenta Crop Protection for contributing products.

Table 1. Treatment list for bean leaf beetle experiments.

Treatment	Rate	Generation	Date
Untreated control	N/A	May 5	
thiamethoxam	50g/Kg seed	overwintering	May 5
thiamethoxam+	50g/Kg seed +	overwintering +	May 5
lambda-cyhalothrin	3.2 fl oz	first	June 21
lambda-cyhalothrin	2.5 fl oz	overwintering	June 2
lambda-cyhalothrin	3.2 fl oz	first	June 21
lambda-cyhalothrin +	3.2 fl oz +	overwintering +	June 2
lambda-cyhalothrin	3.2 fl oz	first	June 21

Table 2. Type III ANOVA tables for cumulative aphid days and yield.

	df	F value	P value
Plant exposure to aphids	5, 25	10.36	<0.0001
Yield	5, 25	0.61	0.69

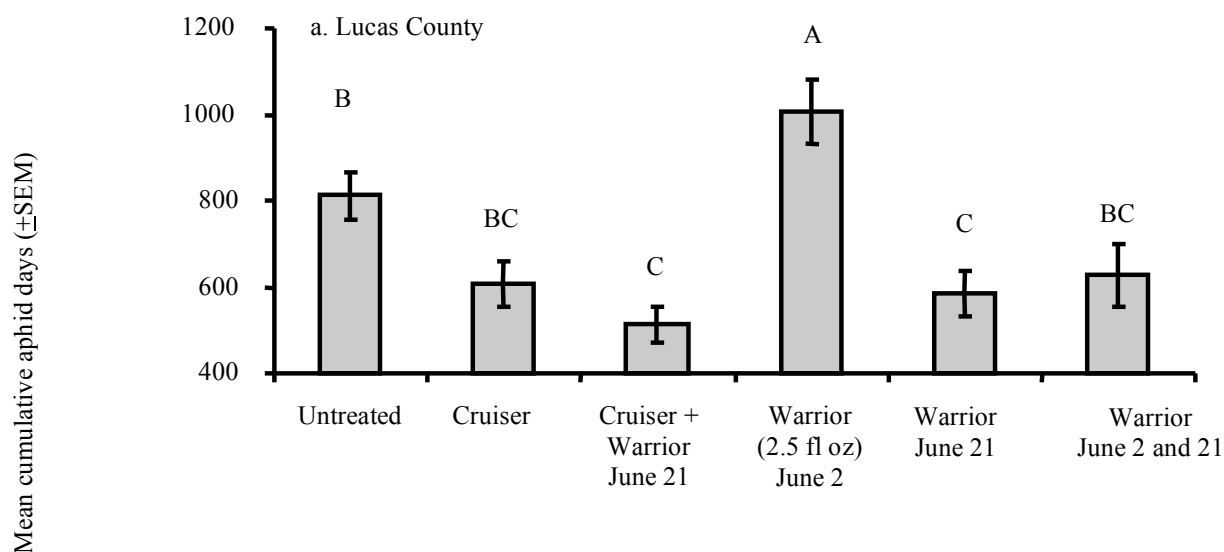


Figure 1. Impact of different bean leaf beetle management tactics on cumulative soybean aphid exposure. Note: Warrior was applied at a full labeled rate (3.2 fl oz/acre) except where noted in the figure. Means labeled with a unique letter were significantly different ($P = 0.05$).