

Evaluation of Organic Pest Management Treatments for Bean Leaf Beetle □ Neely-Kinyon Trial, 2002

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Soybeans were harvested on October 19, 2002. The percentage of stained soybeans was determined by counting the number of stained soybeans in a 200-gram sample that was randomly collected from the harvest of each plot.

Introduction

Bean leaf beetles (BLB) have continued to be a problem for organic tofu soybean producers throughout the Midwest because of the resulting seed staining, which can downgrade the quality of the soybeans at market. Beginning in 2000, we evaluated organically approved treatments for bean leaf beetle and fungal control.

Materials and Methods

Pioneer 9305 soybeans were planted at the Neely-Kinyon Farm on June 3, 2002, at 220,000 seeds/acre. Plots were laid out in a completely randomized block design with each plot measuring 20 □ 30 ft. The following treatments were applied: Surround™ (Engelhard Corp., Iselin, NJ) and Garlic Barrier™ (Garlic Research Labs, Inc., Glendale, CA) as insect repellants. Neemix™ (Thermo Triliogy Corp., Columbia, MD) was selected for insecticidal properties. Baking soda and 3% hydrogen peroxide were selected on the basis of their anti-fungal properties and were applied together. The last treatment, molasses, was selected for reported effects on improving plant vigor and resistance to BLB. Garlic Barrier™, with fish oil, was used in conjunction with molasses. All treatments were compared with a control. Treatments were applied every 2 weeks from June 21 to August 11. Bean leaf beetle sampling occurred on alternating weeks from June 28 to August 17, by sweeping across plants in each plot with a 15-in.-diameter sweep net. Insects were placed in zip-lock bags and transported in coolers to Iowa State University. Insects were frozen until they were counted in the laboratory.

Results and Discussion

Treatments did not significantly affect soybean yields or percentage of stained soybeans (Table 1). Over the entire experiment, an excellent average yield of 54.5 bushels/acre with 8.8% staining was obtained (Table 1). Bean leaf beetle populations remained low until the emergence of the first generation of beetles in mid-July (Figure 1). At the population peak on July 29, 2002, there were no significant differences among the treatments. There were also no significant differences in beetle populations among treatments over the entire season, although beetle populations and staining in the hydrogen peroxide and baking soda (sodium bicarbonate) treatment tended to be less than in the control. Although the percentage of stained soybeans in this experiment averaged below the 15% that would downgrade tofu soybeans to feed grade (Heartland Organic Marketing Cooperative, Stuart, IA), we will continue to evaluate the effects of genotype (through variety trials) and environment (through organic treatment trials) in mitigating the bean leaf beetle problem in the Midwest.

Acknowledgments

We would like to thank the Leopold Center for Sustainable Agriculture, the Wallace Foundation, Noreen Wantate, Andrea McKern, Jorge Alvaro, Katie Schroeder and Wade Boehm for their support and help on production and analytical aspects of this project. We also thank Heartland Organic Marketing Cooperative, Schillinger Seeds, Pioneer Hi-

Bred, and NC+ Organics for their support and seed trade. Appreciation is expressed to Charles

Hurburgh and the ISU Grain Quality Lab for grain analysis.

Table 1. Yield and staining for bean leaf beetle treatments, 2002.

	Yield (bu/acre)	Staining (%)	Beetle population per 20 sweeps, July 29	Avg. beetle population per 20 sweeps
Control	55.06 ± 1.40	7.64 ± 0.76	14.50 ± 2.06	5.15 ± 1.00
Suround™	56.28 ± 1.40	10.14 ± 1.32	20.75 ± 2.46	5.95 ± 1.27
Garlic Barrier™ + Molasses	53.00 ± 0.78	9.88 ± 0.64	19.00 ± 4.02	5.05 ± 1.14
Peroxide + Baking Soda	51.78 ± 1.02	7.46 ± 0.23	15.25 ± 2.14	4.15 ± 0.90
Neemix 4.5™	56.24 ± 1.94	8.61 ± 0.89	18.25 ± 2.46	4.60 ± 1.00
LSD 0.05	NSD	NSD	NSD	NSD

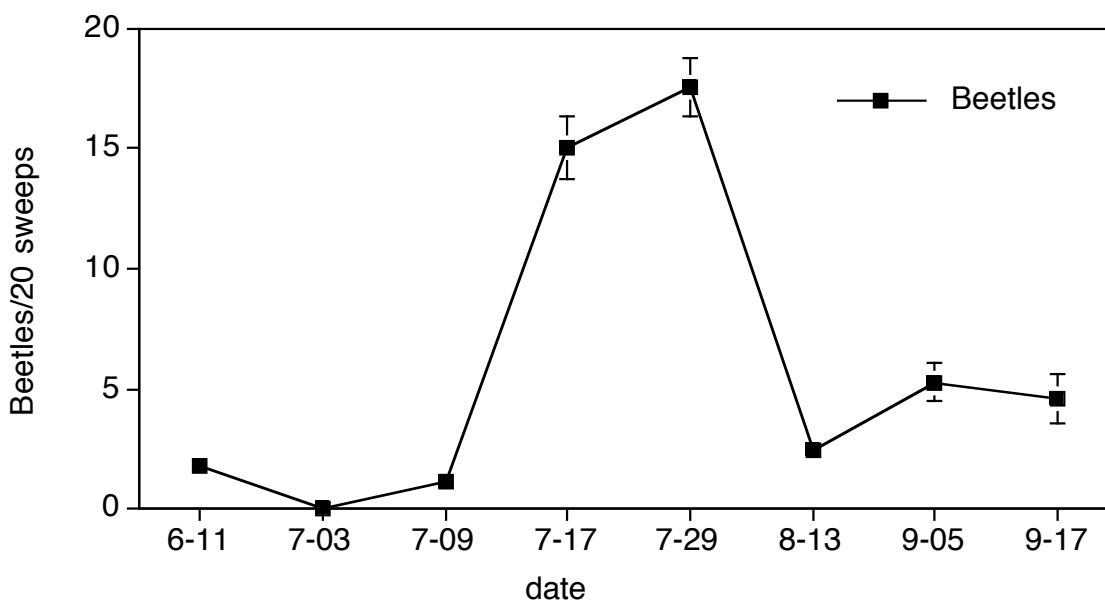


Figure 1. Average beetle population over the 2002 season.