

Evaluation of Organic Pest Management Treatments for Bean Leaf Beetle—Neely-Kinyon Trial, 2003

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Introduction

Bean leaf beetles 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 have evaluated organically approved treatments for bean leaf beetle and fungal control.

Materials and Methods

In 2003, Pioneer 9305 soybeans were planted at the Neely-Kinyon Farm on May 28, at 200,000 seeds/acre. Plots measuring 20 × 30 ft. with a 30 ft. cultivated border around each plot were laid out in a completely randomized design. There were four replications of the following treatments: Garlic Barrier® (Garlic Research Labs, Inc., Glendale, CA) at 11 gal/acre with Crocker's fish oil as a sticker plus molasses at 2.25 gal/acre, Neemix® (Thermo Triliogy Corp., Columbia, MD) at 1 pt/acre, Pyganic® (McLaughlin Gormely King Corp, Minneapolis, MN) at 1 pt/acre, baking soda at 4.45 lb/acre combined with 3% hydrogen peroxide at 18 gal/acre. All treatments were compared with a control. Treatments were applied every 2 weeks from June 19 to September 9. Bean leaf beetle sampling occurred on alternate weeks from June 24 to September 3, 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 enumeration in the laboratory. Soybeans were harvested on October 9, 2003. 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.

Results and Discussion

Very few beetles or signs of feeding were apparent until mid-July (Fig. 1). Populations were significantly less than in 2002, with peak populations averaging 10 beetles/8 sweeps, compared with 20 in 2002. As a result of low beetle numbers, seed staining was also reduced in 2003, averaging 2.7%, with no significant difference among treatments (Table 1). Yields were not affected by beetle management techniques, with control plots averaging 26 bushels/acre, compared with a 27 bushel/acre average over all other treatments. Grain quality was equal across all treatments, with protein content averaging 35.7% (Table 2).

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Table 1. Yield and soybean staining in bean leaf beetle treatments trial, Neely-Kinyon, 2003.

	Yield (bu/acre)	Staining (%)	Peak beetle population/8 sweeps	Seasonal average beetle population/8 sweeps
Control	25.64	2.6	12.50	1.45
Garlic Barrier® + Molasses	26.90	2.7	13.50	1.64
Neemix 4.5®	28.48	3.0	8.67	1.66
Pyganic®	26.29	2.4	8.80	1.57
Peroxide + Baking Soda	25.62	2.7	8.50	1.93
LSD 0.05	NS	NS	NS	NS

Table 2. Grain quality in the organic bean leaf beetle treatments trial, Neely-Kinyon, 2003.

Treatment	Protein	Oil	Fiber	Carbohydrates	Moisture
Control	35.53	19.35	4.68	22.45	8.33
Garlic Barrier® + Molasses	35.63	19.55	4.63	22.20	8.18
Neemix 4.5®	35.33	19.68	4.65	22.35	8.18
Pyganic®	35.38	19.58	4.63	22.43	8.21
Peroxide + Baking Soda	35.51	19.49	4.65	22.35	8.26
LSD 0.05	NS	NS	NS	NS	NS

Figure 1. Average beetle population over the 2003 season.

