

Evaluation of Organic Soybean Varieties

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Materials and Methods

According to the USDA National Organic Program, certified organic farmers must source organic seed (seed from organically raised crops). The organic seed industry is currently growing in Iowa and the Midwest. With this growth, organic growers are looking for university-based recommendations on organic varieties to use in Iowa. The Organic Agriculture Program at Iowa State University has been planting organic seed at the Southeast Research Farm for eight years with excellent results.

Varieties selected for the 2007 organic soybean variety trial included the following organic Blue River soybeans: BR30YP5, BR28YP5, BR34A7, and non-treated conventional Grass and Sons 2406, IA 3022, and MRK 0427 seeds. Plots measuring 20 × 170 ft were in a randomized complete block design with four replications of each variety. Soybeans were planted at a depth of 1.5 in. on May 23, 2007, at a rate of 160,000 seeds/acre. Weed control included rotary hoeing on June 8 and 13, cultivation on June 2 and 13, and walking plots on July 18–25, 2007. Plant stands were counted on June 13. Weed population data were taken on June 13 and 25. Insect sampling with an emphasis on bean leaf beetles occurred on June 13, July 18, and September 7, by sweeping across plants 20 times 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 25. 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. Harvest samples were collected from each plot for grain quality analysis, which was conducted at the ISU Grain Quality Laboratory, Ames, IA.

Results and Discussion

Weed populations were not different among varieties (Table 1) with grass weeds predominating in the plots. Soybean cyst nematodes remained at low levels and there were no differences in population number among varieties (Table 1). Bean leaf beetles averaged less than 2 beetles/20 sweeps with no differences among varieties (Table 1). Beneficial insects were also in abundance during the 2007 season (Figure 1). Plant populations were highest in Schillinger 316F.Y and Blue River 28YP5 on June 13, averaging 113,083 plants/acre (Table 2). Organic soybean yields were excellent in 2007, averaging 47.2 bushels/acre across all varieties (Table 2). Highest yielding varieties were Grass and Sons 2406 at 54.4 bushels/acre and Schillinger 316F.Y at 50.5 bushels/acre (Table 2). Organic soybean varieties yielded 44.9 bushels/acre. The percentage of stained soybeans across all varieties was 9.3%, which is considered an average damage rating in organic soybeans (Table 2). Although there were no statistically significant differences among varieties, Blue River 30YP5 had less than 6% stained soybeans.

Soybean grain quality was also excellent, with protein levels averaging 38% across all varieties (Table 3). Greater protein levels were found in Blue River 28YP5 and IA 3022 soybeans, averaging 40.4% (Table 3). Carbohydrate levels averaged 21.3%, with statistically significant greater levels in Blue River 30YP5, MRK0427, and Schillinger 316F.Y (Table 3). Oil content averaged 18.5% and was highest in MRK0427,

Blue River 30YP5, and Grass and Sons 2406 (Table 3). These results show great promise for organic seed. This experiment will be repeated in 2008 in Greenfield, IA with additional organic varieties.

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Table 1. Pest populations in organic soybean plots.

Treatment	Corn weeds/m ² June 13, 2007		Corn weeds/m ² June 25, 2007		Cyst nematode (nematodes/100 cc soil)	Seasonal bean leaf beetle population average Insects/20 sweeps
	Grasses	Broadleaves	Grasses	Broadleaves		
Blue River 28YP5	26.00	1.92	5.42	1.17	0.00	1.40
Blue River 30YP5	23.00	4.92	6.33	0.33	50.00	0.30
Grass and Sons 2406	34.25	4.58	5.17	1.50	162.50	0.50
IA 3022	20.92	2.75	1.92	0.75	25.00	1.20
MRK0427	23.75	6.08	1.58	0.58	25.00	0.20
Schillinger 316F.Y	17.75	3.17	4.08	0.75	12.50	0.80
LSD (0.05)	NS	NS	NS	NS	NS	NS

Table 2. Organic soybean stands and yields.¹

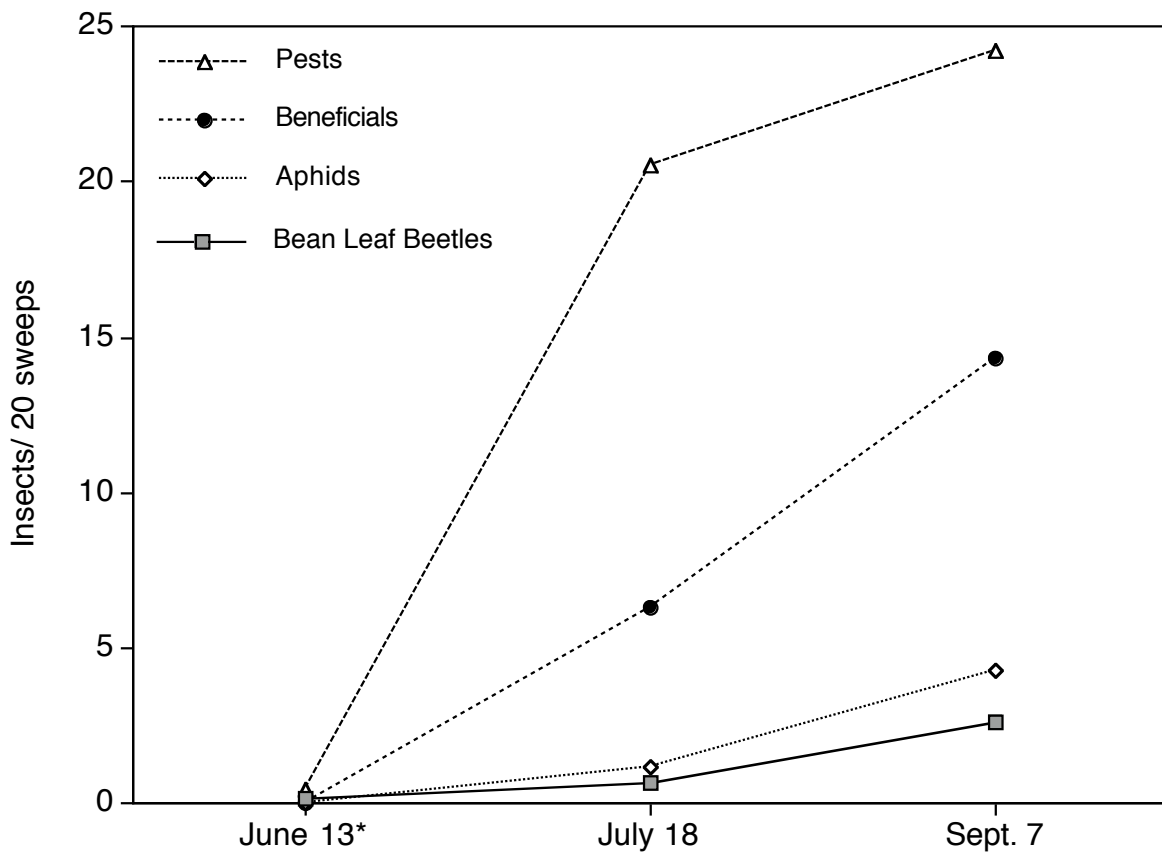
Treatment	Soybean stands (plants/ac)	Soybean yield (bu/ac)	Soybean staining (%)
Blue River 28YP5	111,750ab	44.99c	9.70
Blue River 30YP5	93,417d	44.74c	5.98
Grass and Sons 2406	84,500e	54.39a	9.80
IA 3022	106,000bc	43.00c	12.19
MRK0427	99,750cd	45.42bc	8.84
Schillinger 316F.Y	114,417a	50.48ab	9.18
LSD (0.05)	6,751	5.15	NS

¹Values in the same column with different letters differ ($P < 0.05$).

Table 3. Organic soybean grain quality.¹

Treatment	Grain quality (%)				
	Carbohydrates	Oil	Protein	Moisture	Fiber
Blue River 28YP5	19.73c	17.04c	40.85a	12.76	4.38c
Blue River 30YP5	22.08ab	19.36a	35.91b	13.04	4.65a
Grass and Sons 2406	21.59b	19.49a	36.29b	12.87	4.63a
IA 3022	20.32c	17.20c	40.00a	12.76	4.48b
MRK0427	21.81ab	19.06ab	36.53b	12.90	4.61a
Schillinger 316F.Y	22.21a	18.71b	36.43b	12.62	4.65a
LSD (0.05)	0.65	0.59	1.23	NS	0.06

¹Values in the same column with different letters differ ($P < 0.05$).



* Insect populations were censused on plants in 10 feet of row.

Figure 1. Insect populations across the 2007-growing season at the Southeast Research Farm.