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 using organic seed at the Southeast Research Farm for 11 years with excellent results.

Four varieties were selected for the 2010 organic soybean variety trial. These were from Blue River Hybrids (Kelley, IA) 3.0 to 3.5 relative maturity hybrid soybean varieties: conventional, untreated BR35A0 was planted for comparison with three organic varieties, BR30A7, BR32F0, and BR34A7.

Plots measuring 20 × 185 ft were laid out in a randomized complete block design with four replications of each variety. Winter rye was no-till drilled at a rate of 50 lb/acre on April 2. Soybeans were planted at 160,000 seeds/acre at a depth of 1.5 in. on July 1, 2010. Weed management included rotary hoeing on July 14 and row cultivation on July 22, August 2, and August 19, 2010. Soybeans were harvested on October 22, 2010.

Plant stands and weed numbers were counted on July 26. Soybean cyst nematode samples were collected on September 21, and nematode analysis was conducted at the ISU Plant Disease Clinic (Ames, IA). Grain samples were collected from each plot for grain quality analysis, which was conducted at the ISU Grain Quality Laboratory, Ames, IA.

Results and Discussion

Plant stands averaged 128,325 plants/acre in 2010, demonstrating a typical 20 percent reduction from planting rates after rotary hoeing and row cultivation operations. Plant populations were greater in BR30A7 and 32F0 compared with BR34A7 and 35A0, averaging 136,700 plants/acre (Table 1). Weeds were well managed in 2010, with no significant differences among varieties. Grass weed populations averaged 6 weeds/sq. meter, and broadleaf weeds averaged 4 weeds/sq. meter (Table 1). Soybean cyst nematode populations averaged 671.88 eggs/100 cc of soil, with no significant differences among varieties. Organic soybean yields were excellent in 2010, averaging 42.1 bushels/acre across all varieties, with a range of 37 to 45 bushels/acre (Table 1). This yield was unexpectedly high, given the late planting date and the wet conditions of 2010.

Soybean grain quality was good considering the excess levels of moisture during the growing season, with no differences in moisture, protein, and oil content among varieties (Table 2). Moisture content averaged 10.13 percent across all varieties (Table 2). Protein levels averaged 33.95 percent across all varieties (Table 2). Carbohydrate levels averaged 25.63 percent, with a lower level (24.4%) in BR30A7 (Table 2). Oil content averaged 17.5 percent across all varieties (Table 2). These results show promise for organic seed. Because there was no statistical difference in yield and protein content between conventional and organic varieties, organic producers can be confident that

organic seed can produce at the same level as conventional seed.

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Table 1. Organic soybean stands, yield, soybean cyst nematode and weed populations at Southeast Research Farm, 2010.

Variety	Soybean stands (plants/acre)	Soybean yield (bu/ac)	Soybean cyst nematodes (eggs/100 cc soil)	Grass weeds (weeds/sq. meter)	Broadleaf weeds (weeds/sq. meter)
BR 30A7	137,400a	42.3	312.5	7.2	4.5
BR 32F0	136,000a	38.6	1262.5	4.5	4.0
BR 34A7	114,000c	43.0	500.0	6.8	3.7
BR 35A0 Conv.	125,900b	44.6	612.5	6.5	3.1
LSD 0.05	9,100	NS	NS	NS	NS

Table 2. Soybean grain quality analysis–Southeast Research Farm, 2010.

Variety	Moisture (%)	Protein (%)	Oil (%)	Carbohydrates (%)
BR 30A7	9.6	35.3	17.4	24.4b
BR 32F0	9.5	34.8	17.1	25.1ab
BR 34A7	10.5	32.2	18.1	26.5a
BR 35A0 Conv.	10.9	33.5	17.4	26.5a
LSD 0.05	NS	NS	NS	1.99