

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 growing in Iowa and the Midwest, and with this growth, organic growers are looking for University-based recommendations on organic varieties to use in Iowa. The Organic Agricultural Program at Iowa State University has been using organic seed at the Southeast Research Farm for 24 years with excellent results.

There were five soybean varieties selected for this year's organic variety trial. These included the following: Viking O.2418N and O.2702 (Albert Lea Seed) BR34A7, BR24DL3 and BR29DC5 (Blue River/Albert Lea Seed). Plots measuring 20 x 480 ft. were laid out in a randomized complete block design with five replications of each variety. Rye was planted November 9, 2021, following corn harvest, at a seeding rate of one bushel/acre.

On May 10 and 11, the rye was terminated with a Glencoe 4300 soil finisher. Soybean was planted at a seeding rate of 170,000 seeds/acre May 18. Plots were rotary hoed May 23 (five days after planting) and again June 3 and 13. Plots were cultivated June 14, 21, and 28. Soybean stands were counted June 24, and weeds were counted within square meter quadrats at three randomly selected areas within a plot. An insect damage rating was determined August 30 by estimating the percentage of damaged leaves on each of three randomly selected plants per plot.

Soybean was harvested by combine October 14. Two random 100-g samples of soybean were collected from the combine after harvest. The amount of stained soybean was determined in the laboratory from a random 25-g sample of harvested soybean. Grain quality analysis was conducted at the ISU Grain Quality Lab.

Results and Discussion

According to the SERF weather data, precipitation from March to October totaled 20.59 in., 8.5 in. below the 34-year average. May through July rainfall totaled 7.45 in. of precipitation, which was six in. below the average.

Soybean plant stands averaged 104,933 plants/acre among all varieties, with BR34A7 averaging the greatest plant populations at 112,333 plants/acre, which was significantly greater than the BR24DL3 variety, at 98,833 plants/acre (Table 1). The other varieties averaged 104,500 plants/acre. Broadleaf weeds averaged three broadleaf weeds/m² across all varieties, while grass weeds averaged two grass weeds/m², with no significant differences in weed populations among varieties (Table 1).

Overall insect damage ratings showed 12.7% of leaves damaged by insect feeding (Table 2). There was greater insect damage in the BR24DL3 variety, with an average damage rating of 20%, compared with the low rating of 7.5% in the Viking 2702.

Organic soybean yields were excellent, considering the drought this year. Yields averaged 52 bushels/acre across all varieties, with no significant differences between varieties (Table 3). The BR24DL3 variety averaged 57 bushels/acre compared with all the other varieties, which averaged 51 bushels/acre.

Soybean protein levels averaged 33.7%, carbohydrate levels averaged 24.1%, oil averaged 19.35%, and fiber averaged 4.85%.

Soybean stain counts averaged 2.6% stained soybean. This amount of staining is considered within industry standards for food-grade organic soybeans.

Acknowledgments

We would like to thank the Rodale Institute for their support of the Southeast Research and Demonstration Farm. Thanks also go to Bob Turnbull for his help in production, data collection, and analytical aspects of this project. We also thank Charles Hurburgh and Connie Hardy of the Iowa State Grain Quality Lab, Albert Lea Seed, and Blue River Hybrids for their support.

Table 1. Organic soybean stand and weed populations at the Southeast Research and Demonstration Farm, on June 24.

Variety	Population (plants/acre)	Broadleaf weeds (plants/m ²)	Grass weeds (plants/m ²)
Viking 0.2418N	104,500ab ^y	3.17a	1.50a
Viking 0.2702	104,500ab	2.67a	1.50a
Blue River 24DL3	98,833b	2.33a	1.67a
Blue River 29DC5	104,500ab	3.00a	1.83a
Blue River 34A7	112,333a	3.00a	2.00a
p value (a = 0.05)	0.0034	0.7213	0.8697

^yMeans followed by the same letter down the column are not significantly different at $P \leq 0.05$ or not significant (NS) (Fisher's Protected LSD Test).

Table 2. Organic soybean yields at the Southeast Research and Demonstration Farm.

Variety	Yield
Viking 0.2418N	48.67a ^y
Viking 0.2702	53.08a
Blue River 24DL3	47.92a
Blue River 29DC5	57.23a
Blue River 34A7	53.11a
p value (a=0.05)	0.0636

^yMeans followed by the same letter down the column are not significantly different at $P \leq 0.05$ or not significant (NS) (Fisher's Protected LSD Test).

Table 3. Insect damage rating on organic soybean at the Southeast Research and Demonstration Farm on August 30.

Variety	Leaf damage rating average (% of damaged leaf)
Viking 0.2418N	11.25ab ^y
Viking 0.2702	7.50b
Blue River 24DL3	20.00a
Blue River 29DC5	13.25ab
Blue River 34A7	11.50ab
p value (a=0.05)	0.0758

^yMeans followed by the same letter down the column are not significantly different at $P \leq 0.05$ or not significant (NS) (Fisher's Protected LSD Test).