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Abstract

Organic soybeans remain the most lucrative crop for organic producers in Iowa, but soybean staining can downgrade soybeans from premium food-grade to organic feed grade. In 2001, for the third year at the Neely-Kinyon Farm, soybean variety trials were conducted to assist producers with soybean selections for high protein, bean leaf beetle and staining tolerances, and high yields.

Keywords

Horticulture, Agronomy

Disciplines

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Evaluation of Soybean Varieties for Certified Organic Production—Neely-Kinyon Trial, 2001

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Introduction

Organic soybeans remain the most lucrative crop for organic producers in Iowa, but soybean staining can downgrade soybeans from premium food-grade to organic feed grade. In 2001, for the third year at the Neely-Kinyon Farm, soybean variety trials were conducted to assist producers with soybean selections for high protein, bean leaf beetle and staining tolerances, and high yields.

Materials and Methods

A randomized complete block design with five replications of each of six soybean varieties (IA 3012, Pioneer 9305, Schillenger 211F, Asgrow 2247, Schillenger 241F, US Soy 20145) was utilized for this experiment. The field plot was cultivated May 28, 2001, prior to planting May 29 at 190,000 seeds/acre. Plots were harrowed June 8, then cultivated June 18 and July 6, 2001. Rotary hoeing was carried out June 26, and plots were walked July 25 (at approximately 3 hours/acre).

The greatest number of plants (stand counts) were taken June 20. On July 26, plots were swept to determine bean leaf beetle populations, following the soybean-staining project protocol. Soybeans were harvested October 27. Grain was sampled to determine percentage of stained beans by counting the number of stained soybeans in a 200-gram sample. Grain quality analysis for moisture, protein, oil, fiber and

carbohydrates was conducted at the ISU Grain Quality Laboratory at Iowa State University. All data were subject to appropriate statistical analysis.

Results and Discussion

The greatest stand count occurred in the Schillenger 241 F variety, which was significantly greater than P9305, Asgrow 2247, or US Soy 20145 (Table 1). The lowest stand count occurred in the US Soy 20145 variety, significantly lower than in all other varieties except Asgrow 2247, with which it was statistically equivalent. Yields ranged from 36.03 ± 0.63 bushels/acre to 47.85 ± 1.07 bushels/acre (Table 1). IA 3012 yielded significantly higher than all other varieties. Schillenger 241F yielded significantly lower than all other varieties except Asgrow 2247, with which it was statistically equivalent. Bean leaf beetle populations were moderately high in 2001 and comparable among varieties (Table 1). Soybean staining was greatest in the US Soy 20145 variety.

In terms of grain quality, US Soy 20145 had the highest moisture at harvest (15.6%), significantly higher than all other varieties. P3905 had the lowest moisture content, significantly lower than Schillenger 211F, Schillenger 241F, or US Soy 20145.

Significant differences were found in the percentage of protein among varieties under trial. Schillenger 241F had the highest protein content, significantly more than all other varieties. The second highest protein levels were found in Schillenger 211F, significantly more than in IA 3012, Pioneer 9305, or US Soy 20145. The lowest protein content was found in IA 3012, significantly lower than in all other treatments.

Significant differences were found in the percentage of oil among varieties. The highest oil percentage was found in IA 3012, significantly greater than Schillenger 211F, Schillenger 241F, and US Soy 20145, and equivalent to Pioneer 9305 and Asgrow 2247. The lowest oil content was found in US Soy 20145, significantly lower than all other treatments.

No significant differences were found in fiber content between varieties tested; however, there were significant differences in carbohydrate content. The highest carbohydrate levels were found in US Soy 20145, significantly higher than all other varieties. The lowest carbohydrate content was found in Schillenger 241F, significantly lower than in all other varieties.

Table 1. Stand count, yield, bean leaf beetle population and percent of stained beans, Neely-Kinyon organic soybean variety trial, Greenfield, IA, 2001.

Variety	Stand count \pm SE	Yield (Bu/ac) \pm SE	Mean bean leaf beetle population \pm SE	Percent stained soybeans \pm SE
IA 3012	145,800 \pm 7,910	47.85 \pm 1.07	4.00 \pm 0.63	7.16 \pm 0.75
Pioneer 9305	113,470 \pm 6,300	43.40 \pm 1.22	2.00 \pm 1.05	9.52 \pm 1.63
Schillenger 211F	144,330 \pm 7,540	42.10 \pm 1.11	3.00 \pm 0.89	6.77 \pm 1.23
Asgrow 2247	103,130 \pm 4,990	37.66 \pm 0.75	2.60 \pm 0.68	8.35 \pm 2.02
Schillenger 241F	159,400 \pm 7,210	36.03 \pm 0.63	2.80 \pm 0.97	8.68 \pm 0.61
US Soy 20145	94,070 \pm 4,580	43.22 \pm 0.31	3.40 \pm 0.98	14.10 \pm 1.65
LSD	18,410	2.64	NSD	4.11

Table 2. Grain quality analysis, Neely-Kinyon organic soybean variety trial, Greenfield, IA, 2001.

Variety	Moisture (%) \pm SE	Protein (%) \pm SE	Oil (%) \pm SE	Fiber (%) \pm SE	Carbohydrates (%) \pm SE
IA 3012	13.36 \pm 0.12	31.62 \pm 0.11	21.08 \pm 0.04	4.50 \pm 0.04	24.80 \pm 0.06
Pioneer 9305	13.03 \pm 0.15	33.38 \pm 0.34	21.07 \pm 0.11	4.32 \pm 0.05	23.23 \pm 0.23
Schillenger 211F	13.58 \pm 0.19	35.02 \pm 0.14	20.18 \pm 0.25	4.44 \pm 0.05	22.36 \pm 0.18
Asgrow 2247	13.52 \pm 0.05	34.50 \pm 0.16	20.95 \pm 0.09	4.40 \pm 0.04	22.15 \pm 0.06
Schillenger 241F	13.92 \pm 0.06	36.60 \pm 0.06	19.30 \pm 0.11	4.48 \pm 0.04	21.62 \pm 0.10
US Soy 20145	15.60 \pm 0.29	33.80 \pm 0.26	18.20 \pm 0.06	4.44 \pm 0.05	25.56 \pm 0.16
LSD	0.48	0.61	0.37	NSD	0.45