

Evaluation of Soybean Varieties for Certified Organic Production—Allee Trial, 2000

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Introduction

In 1999, the Allee Farm was the first ISU farm to meet certified organic production standards and to certify acreage through the Organic Crop Improvement Association. In the first year organic trial at the Allee Farm in 1999, organic corn yields were 157 bushels/acre. In 2000, an organic soybean variety trial was planted on land formerly in alfalfa.

Materials and Methods

The 2000 Allee Farm Organic Soybean Variety Trial was laid out in a completely randomized block design with four varieties of soybean and four replications. Sixteen plots, measuring 30 x 200 ft. each were established. The treatments consisted of four varieties of soybeans: IA 2034, IA 2041, IA 2042, and NC+2FG62. Plots were prepared by plowing, disking, harrowing and field cultivating on May 1 and 2, 2000. The area was again cultivated and harrowed on May 15, 2000. Soybean varieties were planted on May 16, 2000, at a rate of 175,950 plants/acre. Plots were rotary hoed three times on May 16, 2000, and cultivated on June 21, 2000, and June 27, 2000. Plots were walked on July 7 and 19, 2000, to remove large weeds per routine practice in organic operations. Weeds are removed to prevent any staining, which would down-grade the quality of the clear-hilum tofu soybean crop. Crop stand counts and weed population sampling (three square meter quadrants per plot) took place on June 13, 2000 (28 days after planting). Plots were

swept with a 15 in. diameter sweep net for bean leaf beetles (BLB) on July 10, 2000 (15 sweeps per plot). Leaves were collected (three per plot) on July 19, 2000, for analysis of bean pod mottle virus (BPMV) via ELIZA testing. Because of limitations with weigh wagons, plots of the same variety were harvested and weighed together on October 7, 2000. Grain quality analysis was completed by Dr. Charles Hurburg, from the Center for Crop Utilization at ISU.

Results

Organic soybean yields were excellent overall. Yield was greatest for variety IA 2034 (Table 1). Tillage operations seemed to decrease plant populations, but there were no significant differences among varieties in crop stand at 28 (DAP) (Table 2). There were no significant differences in grass weed populations among the different varieties, but variety IA 2042 plots contained significantly more broadleaf weeds than IA 2034 and IA 2041 plots (Table 3).

Wet weather and high temperatures allowed for greater than normal BLB populations and disease. Staining, caused by BPMV, *Cercospora* and other fungi, occurred in all soybean varieties. IA 2034 had the lowest percentage of staining at 16.96% (Table 4). An average of 17.07% of the IA 2041 soybeans and 24.12% of the IA 2042 were stained, respectively. The NC+ variety contained the most stained beans, at 54.2%. This correlates with the presence of BPMV from ELIZA results of infected leaf tissue (Table 4). The virus was not detected in IA 2034 leaves. All varieties were comparable for moisture, protein, oil, fiber, and carbohydrates in the grain quality analysis (Table 5).

Table 1. Soybean yields.

<u>Variety</u>	<u>Bushels/Acre</u>
IA 2034	44.88
IA 2041	40.71
IA 2042	41.92
NC+ 2FG262	38.14

Table 2. Soybean stand counts at 28 DAP.

<u>Variety</u>	<u>Plant Population/Acre</u>	
	<u>Mean</u>	<u>SE</u>
IA 2034	102,570	556
IA 2041	94,110	390
IA 2042	93,710	679
NC+ 2FG262	98,000	867

Table 3. Grass and broadleaf weed populations at 28 DAP.

<u>Variety</u>	<u>Grasses</u>		<u>Broadleaves</u>	
	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>
	<u>No./Sq.</u>		<u>No./Sq.</u>	
	<u>Meter</u>		<u>Meter</u>	
IA 2034	0.71	0.29	4.57	1.63
IA 2041	4.75	2.07	5.50	2.20
IA 2042	2.88	1.75	14.3	2.59
NC+ 2FG262	1.75	0.53	10.1	2.00

Table 4. Percentage of stained soybeans and soybean leaves showing BPMV infection.

<u>Variety</u>	<u>% Infected</u>	<u>% Stained</u>
IA 2034	0	16.96
IA 2041	50	17.07
IA 2042	75	24.12
NC+ 2FG262	75	54.20

Table 5. Grain quality analysis.

<u>Variety</u>	<u>% Moisture</u>	<u>% Protein</u>	<u>% Oil</u>	<u>% Fiber</u>	<u>% Carbohydrate</u>
IA 2034	12.45	39.75	16.95	4.55	20.75
IA 2041	12.3	40.15	17.4	4.4	20.05
IA 2042	12.0	40.45	16.8	4.35	20.40
NC+ 2FG262	13.1	40.25	16.5	4.8	20.45