

Open-pollinated Corn Variety Trial, 2001

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Introduction

Based on requests from organic producers in Iowa for information on yields and grain quality of open-pollinated corn, a variety trial was developed at the Neely-Kinyon Farm in 2000 and 2001. Open-pollinated (O-P) corn often is preferred by organic farmers, and several O-P corn breeders are operating in Iowa and the Midwest to meet this demand.

Materials and Methods

The open-pollinated corn variety trial was established in a randomized complete block design with four varieties and six replications. The varieties in this trial were Pioneer 34W67 (hybrid), Greenfield open-pollinated (114-day maturity), BS11/BS10 (O-P), and BSSS/BSCB1 (O-P). Compost was applied April 27, 2001, at a rate of 12 tons/acre (11-19-16 NPK lb/ton). Plots were disked May 10 and field cultivated May 17. Corn was planted May 18, at 24,200 seeds/acre. Plots were harrowed June 8 and cultivated June 13 and July 5. Hoeing took place July 9 (at 2 hours/acre). Stand counts were taken June 20. July 12, corn plants were sampled for the presence of corn borer.

Severe winds in September 2001 resulted in lodging of plants. Degree of lodging was recorded September 27 by rating 12 random plants/plot. Plants were ranked on the following scale: no sign of lodging, slight lodging (0–45°

angle), and lodging (more than 45° angle). The results were calculated as a percentage of lodging in the total number of plants sampled. The middle four rows of each plot were harvested October 26. Grain quality was assessed by the ISU Grain Quality Lab.

Results and Discussion

There was a significantly greater plant population in the Pioneer 34W67 and BS11/BS10 plots, compared with Greenfield OP and BSSS/BSCB1 plots (Table 1).

Corn yields ranged from 50.4 ± 1.8 bushels/acre to 108.0 ± 2.4 bushels/acre (Table 1).

Statistically significant yield differences were found among all varieties. The hybrid variety P34W67 yielded highest overall, with yields significantly greater than the open-pollinated varieties. The highest yielding open-pollinated variety was BSSS/BSCB1, which yielded significantly greater than the two other open-pollinated varieties. The Greenfield open-pollinated variety suffered the greatest lodging, with 83% of sampled plants falling in the slight-to-severe lodging categories (Table 2). The percentage of plants in the slight-to-severe lodging categories was lowest (66%) in the BS11/BS10 open-pollinated variety, compared with P34W67, which had 74% of sampled plants falling in the slight-to-severe lodging categories.

Significant differences for all grain quality characteristics were found among varieties (Table 3). Protein was significantly lower in P34W67 grain, along with significantly greater density and starch content. The highest protein levels were found in the open-pollinated varieties BS11/BS10 and Greenfield. Protein levels were similar in P34W67 and BSSS/BSCB1. The open-pollinated variety BS11/BS10 also had the highest percentage of

oil compared with all other varieties. Corn borer populations were extremely low in this trial. In the July 12 sample, only one corn borer was found in all sampled plants.

Table 1. Plant population and yields in open-pollinated corn trial, 2001.

Treatment	Corn Stand (plants/acre)	Corn Yield (bu/acre)
P34W67	19833 ± 430	108.01 ± 2.38
Greenfield	16056 ± 873	50.39 ± 1.84
BS11/BS10	18278 ± 441	74.45 ± 2.19
BSSS/BSCB1	16667 ± 518	86.04 ± 2.59
LSD (0.05)	1675	6.68

Table 2. Lodging after severe weather in open-pollinated corn trial, 2001.

Variety	No lodging (%)	Slight lodging (%)	Lodging at a severe (< 45°) angle (%)
P34W67	25	58	16
Greenfield	16	50	33
BS11/BS10	33	33	33
BSSS/BSCB1	25	50	25

Table 3. Corn grain quality analysis in open-pollinated trials, 2001.

Treatment	Density	2001 Corn Grain Quality		
		% Starch	% Oil	% Protein
Pioneer 34W67	1.30 ± 0.00	60.45 ± 0.12	3.78 ± 0.03	7.93 ± 0.10
Greenfield	1.28 ± 0.01	59.65 ± 0.10	3.63 ± 0.06	8.42 ± 0.12
BS11/BS10	1.30 ± 0.00	59.18 ± 0.07	4.27 ± 0.04	8.62 ± 0.07
BSSS/BSCB1	1.29 ± 0.00	59.6 ± 0.07	4.12 ± 0.04	8.25 ± 0.06
LSD (0.05)	0.01	0.27	0.13	0.27