

Open-Pollinated Corn Variety Trial-2001

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Introduction

Based on requests from organic producers in the state of 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 is often 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 at the Neely-Kinyon Farm. The varieties in this trial were as follows: Pioneer 34W67 (hybrid) Greenfield open-pollinated (114-day maturity), BS11/BS10 (O-P) and BSSS/BSCB1 (O-P). Compost was applied on April 27 at a rate of 12 tons per acre (11-19-16 NPK lb/ton). The plots were disked on May 10 and field cultivated on May 17. Corn was planted on May 18 at a rate of 24,200 seeds per acre. Plots were harrowed on June 8 and cultivated on June 13 and July 5, 2001. Hoeing took place on July 9, 2001 (2 hours per acre). Stand counts were taken on June 20 and corn plants were sampled for the presence of corn borer on July 12. Severe winds in September resulted in lodging of plants. Degree of lodging was recorded on September 27, 2001, by rating 12 random plants from each plot. Plants were assigned a ranking based on the following scale: no sign of lodging, slight lodging (0 to 45° angle), and lodging at a <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 on October 26 and 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 to Greenfield OP and BSSS/BSCB1 plots (Table 1).

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

Corn yields ranged from 50.4 ± 1.8 bu/acre to 108.0 ± 2.4 bu/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

other two 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 and severe lodging categories.

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

Variety	No lodging (%)	Slight lodging (%)	Lodging at a severe (< 45 ⁰) angle (%)
P34W67	25	58	16
Greenfield	16	50	33
BS11/BS10	33	33	33
BSSS/BSCB1	25	50	25

Significant differences were found among varieties for all grain quality characteristics (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 to all varieties. Corn borer populations were extremely low in this trial, with only one corn borer found on the July 12 sample date in all sampled plants.

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

Treatment	2001 Corn Grain Quality			
	Density	% 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