

Evaluation of Corn Varieties for Certified Organic Production - Allee Trial, 2001

Kathleen Delate, assistant professor,
Lyle Rossiter, superintendent, and
Heather Friedrich, research associate
Department of Horticulture

Introduction

The Allee Farm was the first ISU farm to meet certified organic production standards and certify acreage through the Organic Crop Improvement Association in 1999. In 2001, the State of Iowa (IDALS) certified the farm through their Organic Certification Program. In 2000, a soybean variety trial was planted to land formerly in alfalfa. Soybeans yields averaged 41 bu/acre. In 2001, soybean ground was rotated to a corn variety trail, using NC+ Organics (Lincoln, NE) corn varieties.

Materials and Methods

Sixteen plots, measuring 30 x 200 ft. each, were established in a completely randomized block design with 4 replications of 4 corn varieties. Varieties included NC+ 3448, NC+ 4880, NC+ 5338, and NC+ 3869. Plots were prepared by disking on May 14, applying 5 tons/acre of cattle manure on May 15, and disking again on May 16, 2001. Plots were harrowed on May 17 and planted on May 18 at a target population of 37,000 plants/acre. Corn plots were rotary hoed on May 25 and again on June 4, 2001. Row cultivation occurred on June 28 and July 6.

Corn plant population counts were taken on July 6, 2001 at 24 days after planting (DAP). Also on this date, the first of two weed counts was taken by quantifying all grasses and broadleaves in 3 randomly selected square meter quadrats per plot). The second weed count and corn borer sampling occurred on July 20. Stalk nitrate samples were collected on October 17 and each plot was harvested on November 2, 2001. Grain quality analysis was completed by Dr. Charles Hurburg, at the Center for Crop Utilization Research (CCUR) at Iowa State University.

Results and Discussion

Organic corn yields were excellent in 2001. NC+ 3448 yielded the highest at 154 bu/acre (Table 1). NC+ 5338 yielded significantly less than all other varieties at 129 bu/acre. Corn plant stands at 24 DAP revealed no significant differences among varieties (Table 2). There were also no significant differences in weed populations among the varieties in both early and late sampling dates (Table 3), with weed populations reduced three-fold between June and July. Corn borer damage was similar in all varieties (Table 4), with levels below economic thresholds. Stalk nitrate levels ranged from 3,112 to 4,020 ppm NO₃-N (Table 5), which represents an adequate level at the end of the season. All varieties were comparable for moisture, protein, starch, oil and density (Table 6), with high levels of protein (averaging 8.0%). This trial represents the third year of excellent organic crop yields at Allee Farm.

Table 1. Corn yields, Allee Research Farm, 2001.

Variety	Yield	se
NC+3448	153.758	4.868
NC+4880	144.377	7.224
NC+5338	120.405	3.289
NC+3869	144.94	2.331

Table 2. Corn plant population, Allee Research Farm, 2001.

Variety	Plant population/acre	SE
NC+3448	34,833	1,167
NC+4880	35,000	1,605
NC+5338	33,417	892
NC+3869	37,167	2,003

Table 3. Corn weed populations, Allee Research Farm, 2001.

Variety	Weeds 6/22/01		Weeds 7/27/01	
	Grasses \pm SE	Broadleaves \pm SE	Grasses \pm SE	Broadleaves \pm SE
NC+3448	10.08 \pm 1.72	24.18 \pm 2.93	6.17 \pm 1.52	7.67 \pm 1.92
NC+4880	15.42 \pm 3.86	23.25 \pm 4.44	5.58 \pm 1.25	6.75 \pm 1.93
NC+5338	20.17 \pm 5.52	27.58 \pm 3.30	5.08 \pm 1.83	4.42 \pm 0.82
NC+3869	12.5 \pm 2.45	23.33 \pm 4.66	6.42 \pm 0.99	5.50 \pm 1.77

Table 4. Corn borer damage, Allee Research Farm, 2001.

Variety	Corn borers/plant	SE
NC+3448	0.333	\pm 0.142
NC+4880	0.500	\pm 0.151
NC+5338	0.667	\pm 0.142
NC+3869	0.500	\pm 0.151

Table 5. Stalk nitrate, Allee Research Farm, 2001.

Variety	NO ₃ -N (ppm)	SE
NC+3448	3112.5	503.709
NC+3448	4020.0	405.442
NC+5338	3480.0	339.436
NC+3869	3955.0	711.577

Table 6. Corn grain quality, Allee Research Farm, 2001.

Variety	% Moisture	% Protein	% Oil	% Starch	% Density
NC+3448	16.60 \pm 0.08	8.10 \pm 0.04	3.70 \pm 0.04	60.28 \pm 0.09	1.27 \pm 0.0
NC+4880	18.63 \pm 0.26	7.83 \pm 0.05	3.82 \pm 0.06	60.23 \pm 0.09	1.28 \pm 0.0
NC+5338	18.10 \pm 0.25	8.33 \pm 0.05	3.85 \pm 0.03	59.93 \pm 0.12	1.28 \pm 0.0
NC+3869	16.68 \pm 0.27	7.63 \pm 0.08	3.78 \pm 0.03	60.80 \pm 0.07	1.29 \pm 0.0