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Evaluation of Organic Corn Varieties

Kathleen Delate

Iowa State University, kdelate@iastate.edu

Andrea McKern

Iowa State University

Kevin Van Dee

Iowa State University

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Evaluation of Organic Corn Varieties

Abstract

According to the USDA National Organic Program, certified organic farmers must source organic seed (seed from organically raised crops). The organic seed industry is currently growing in Iowa and the Midwest. With this growth, organic growers are looking for university-based recommendations on organic varieties to use in Iowa. The Organic Agriculture Program at Iowa State University has been planting organic seed at the Southeast Research Farm for seven years with excellent results.

Keywords

Horticulture, Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Horticulture

Evaluation of Organic Corn Varieties

Kathleen Delate, associate professor
Andrea McKern, research assistant
Departments of Horticulture and Agronomy
Kevin Van Dee, ag specialist

Introduction

According to the USDA National Organic Program, certified organic farmers must source organic seed (seed from organically raised crops). The organic seed industry is currently growing in Iowa and the Midwest. With this growth, organic growers are looking for university-based recommendations on organic varieties to use in Iowa. The Organic Agriculture Program at Iowa State University has been planting organic seed at the Southeast Research Farm for seven years with excellent results.

Materials and Methods

In 2006, six varieties of organic corn seed were planted on April 28 at 35,600 seeds/acre at a depth of 2 in. in a randomized complete block plot design consisting of four replications of the following varieties: Prairie Hybrids 2431 (Prairie Hybrids, Deerfield, IL), Prairie Hybrids 3081, Prairie Hybrids 6221, Prairie Hybrids 7861, Blue River 4771 (Blue River Hybrids, Kelley, IA), and Blue River 67M07. Each plot size was 10 ft × 185 ft. Swine manure was injected on March 3 at 3,850 gallons/acre to provide adequate nitrogen for the crop. Weed management included rotary hoeing on May 6, 12, and 22, and cultivations on May 31 and June 8, 2006. Corn was harvested on October 20, 2006.

Corn stands were counted on June 6, weed counts enumerated on June 6 and 20 using square meter quadrats at three randomly selected areas within a plot. Corn borer populations were monitored on July 7. Corn stalk samples were taken from the field on

September 19 and analyzed for nitrate content at the Iowa State University Soil and Plant Analysis Laboratory, Ames, IA. Harvest samples were collected from each plot for grain quality analysis, which was conducted at the ISU Grain Quality Laboratory, Ames, IA.

Results and Discussion

Organic corn yields were excellent in 2006, averaging 171 bushels/acre across all varieties (Table 2). Highest yielding varieties were Prairie Hybrids 7861, Blue River 4771, and Blue River 67M07 (averaging 175 bu/acre), followed by Prairie Hybrids 2431 and Prairie Hybrids 6221 (averaging 169 bu/acre) and Prairie Hybrids 3081 yielding 160 bushels/acre. Weed populations were not different among varieties (Table 1) with grass weeds predominating in the plots. Corn borer-damaged stalks were greater in 2006 than in previous years (Table 1), but despite damaged stalks, yields were not affected. Corn stalk nitrate levels did not differ among varieties at the end of the season, showing sufficient nitrogen status in all varieties (Table 2). Corn grain quality was excellent, with protein levels averaging 8.15% across all varieties. Greater protein levels were found in Blue River 4771, Prairie Hybrids 3081, Blue River 67M07, and Prairie Hybrids 7861 (Table 3). Carbohydrate levels were greatest in Prairie Hybrids 2431 at 61.6% (Table 3) and oil content was highest in Blue River 4771 at 3.68% (Table 3). This experiment will be repeated in 2007 in Greenfield, IA with additional organic varieties.

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Table 1. Pest populations in organic corn plots at the Southeast Research Farm, 2006.

Treatment	Corn weeds/m ² June 6, 2006		Corn weeds/m ² June 20, 2006		Corn borer damage (%)
	Grasses	Broadleaves	Grasses	Broadleaves	
Prairie Hybrids 2431	7.08	1.50	18.25	1.33	33.3
Prairie Hybrids 3081	3.92	1.00	19.33	2.00	8.3
Prairie Hybrids 6221	8.50	0.67	13.92	1.17	16.7
Prairie Hybrids 7861	5.75	1.42	12.83	2.75	50.0
Blue River 4771	5.00	0.75	18.08	1.25	33.3
Blue River 67M07	6.50	1.00	14.25	1.33	33.3
LSD (0.05)	NS	NS	NS	NS	NS

Table 2. Organic corn stands, yields, and stalk nitrate at Southeast Research Farm, 2006.

Treatment	Corn stands (plants/acre)	Corn yield (bu/ac)	Corn stalk Nitrate (ppm NO ₃ -N)
Prairie Hybrids 2431	25,167	170.15ab	3,157.5
Prairie Hybrids 3081	26,250	161.05b	5,970.0
Prairie Hybrids 6221	25,417	168.49ab	3,572.5
Prairie Hybrids 7861	26,833	178.11a	4,695.0
Blue River 4771	25,667	173.39a	3,809.5
Blue River 67M07	24,917	176.05a	4,787.3
LSD (0.05)	NS	10.39	NS

Means within columns followed by the same letter are not different.

Table 3. Organic corn grain quality at Southeast Research Farm, 2006.

Treatment	Grain quality (%)			
	Carbohydrates	Oil	Protein	Moisture
Prairie Hybrids 2431	61.6a	3.23c	7.58d	15.10a
Prairie Hybrids 3081	60.4bc	3.38b	8.51a	15.44b
Prairie Hybrids 6221	60.8b	3.44b	7.89cd	15.55b
Prairie Hybrids 7861	60.5bc	3.40b	8.15bc	17.45c
Blue River 4771	60.0cd	3.68a	8.51a	15.38ab
Blue River 67M07	60.0d	3.48b	8.23ab	17.70c
LSD (0.05)	0.4	0.14	0.33	0.32

Means within columns followed by the same letter are not different.