

2013

Evaluation of Organic Corn Varieties

Kathleen Delate

Iowa State University, kdelate@iastate.edu

Ryan C. Rice

Iowa State University, rrice29@iastate.edu

Ning Wang

Iowa State University, wangning@iastate.edu

Myron C. Rees

Iowa State university, mrees@iastate.edu

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Recommended Citation

Delate, Kathleen; Rice, Ryan C.; Wang, Ning; and Rees, Myron C., "Evaluation of Organic Corn Varieties" (2013). *Iowa State Research Farm Progress Reports*. 1980.

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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, and 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 using organic seed at the ISU Southeast Research Farm for ten years with excellent results.

Keywords

Horticulture, Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Horticulture

Evaluation of Organic Corn Varieties

RFR-A1288

Kathleen Delate, associate professor
Ryan Rice, undergraduate research assistant
Ning Wang, graduate research assistant
Departments of Horticulture and Agronomy
Myron Rees, farm superintendent

Materials and Methods

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, and 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 using organic seed at the ISU Southeast Research Farm for ten years with excellent results.

There were four varieties selected for the 2012 organic corn variety trial. These included the following Blue River (Kelley, IA) 104- to 111-day maturity hybrid corn varieties. The four organic varieties consisted of BR53R57, BR56M30, BR57H36, and BR63H30.

Plots measuring 20 × 380 ft were laid out in a randomized complete block design with four replications of each variety. Corn was planted at 35,600 seeds/acre at a depth of 2 in. on May 16, 2012. Swine manure was injected on March 19, 2012 at 4,300 gallons/acre, prior to plowing of the plots. Weed management included rotary hoeing on May 24 and June 5 and row cultivation on June 8 and 18 of 2012. Corn was harvested on October 16, 2012.

Plant and weed stands were counted on July 13, 2012. Stalk nitrate samples were taken on

October 8. Harvest samples were collected from each plot for grain quality analysis, which was conducted at the ISU Grain Quality Laboratory, Ames, Iowa.

Results and Discussion

A severe drought impacted growth and yield of crops throughout Iowa in 2012, with rainfall 6.4 in. below normal. Despite the drought, organic corn performance was excellent in southeast Iowa. Plant stands were excellent in 2012, averaging 26,604 plants/acre (Table 1). Organic corn yields were also excellent in 2012, averaging 156.3 bushels/acre (Table 3). There was a statistical difference in yields among varieties, with organic BR53R57 yielding 143 bushels/acre compared with the other varieties yielding 156 bushels/acre. Corn stalk nitrate averaged 3,178 ppm nitrate-N, with no differences among varieties (Table 2).

Corn grain quality was good considering the drought (Table 4). Protein levels averaged 8.85 percent across all varieties, with differences among varieties: BR57H36 and BR53R57 had lower protein levels of 8.45 percent compared with the other varieties (Table 4). Carbohydrate levels averaged 60.2 percent, with BR57H36 and BR53R57 having higher levels than the other varieties (Table 4). Oil content averaged 3.75 percent across all varieties with BR63H30 having the highest oil content at 4.15 percent and BR53H57 having the lowest at 3.26 percent (Table 4). These results show great promise for organic seed.

Acknowledgements

We would like to thank the Leopold Center for Sustainable Agriculture and the North Central USDA-SARE program for their support of this project. Thanks also go to Chad Hesseltine,

Evan Duyvejonck, Neo Mazur, Jordan Garvey, Justin Kuzila, and Bob Turnbull, for their help in production, data collection, and analytical aspects of this project. We also thank Charles Hurburgh and Glen Rippke of the ISU Grain

Quality Lab, Kerry Culp of the ISU Soil and Plant Analysis Lab, and Blue River Hybrids for their support.

Table 1. Stand and weed populations in organic corn trial.

Variety	Stand (plants/acre)	Grass weeds (plants/acre)	Broadleaf weeds (plants/acre)
BR53R57	27,083	28,340	28,340
BR56M30	28,250	60,405	60,405
BR57H36	26,083	31,700	31,700
BR63H30	25,000	32,065	32,065
LSD _{0.05}	NS	NS	NS

Table 2. Stalk nitrate in organic corn trial.

Variety	NO ₃ -N (mg/kg)
BR53R57	4,153
BR56M30	2,305
BR57H36	4,160
BR63H30	2,093
LSD _{0.05}	NS

Table 3. Yields in organic corn trial.

Variety	Yield (bu/acre)
BR53R57	142.9
BR56M30	156.9
BR57H36	158.1
BR63H30	153.9
LSD _{0.05}	10.8

Table 4. Corn grain quality in organic corn trial.¹

Variety	Moisture (%)	Protein (%)	Oil (%)	Starch (%)	Density (g/cc)	Yield (gal/bu)
BR63H30	19.73a	9.65a	4.15a	59.10c	1.29a	2.63c
BR56M30	19.20a	8.86b	3.84b	60.19b	1.27b	2.69b
BR57H36	18.63ab	8.39c	3.76b	60.58ab	1.27b	2.72a
BR53R57	17.21b	8.51c	3.26c	61.00a	1.27b	2.74a
LSD _{0.05}	1.57	0.35	0.18	0.44	0.01	0.03

¹Means within a column followed by the same letter do not differ ($P \leq .05$).