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Sugar-Enhanced Sweet Corn Cultivar Evaluation for Northern Indiana, 2007

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The Indiana Agricultural Statistics Service reported sweet corn for fresh market sales was harvested from 5,200 acres in Indiana in 2006 and had a total value of \$7.6 million. Sweet corn fields are located throughout the state. In northern Indiana, bicolor corn is most commonly grown. Varieties with improved eating quality are of interest to both producers and consumers. Producers are also interested in yield, ear size, appearance, and agronomic characteristics. This paper reports on 11 sugar enhanced and synergistic sweet corn cultivars that were evaluated at the Pinney-Purdue Agricultural Center in Wanatah, Indiana.

Materials and Methods

The trial was conducted on a Tracy sandy loam with 2.4% organic matter and 57 ppm phosphorus (P), 139 ppm potassium (K), 180 ppm magnesium (Mg), 750 ppm calcium (Ca), and pH 6.7. It was set up as a randomized complete block design with three replications. Cultivars were assigned to individual plots one row (30 inches) wide by 30 feet long. Corn was seeded May 2, 2007 with a finger pick-up planter set to drop 23,200 seeds per acre, and later thinned to 35 plants per 30-foot row (20,328 plants per acre). Nitrogen (N) (20.3 lbs./A) and P (18.2 lbs./A P₂O₅) were applied at planting from 19-17-0 (10 gal. /A) and an additional 70 lbs./A N from urea ammonium nitrate solution was injected in mid-June. Tefluthrin (Force 3G) was applied at planting to control corn rootworms. Permethrin (Pounce 3.2 EC, 4 oz./A) was applied on June 8 to control cutworms. Weeds were controlled with atrazine and s-metolachlor applied after seeding, cultivation, and hand weeding. Irrigation was applied to incorporate herbicides and during the growing season as needed. Emergence was recorded 14 and 21 days after planting (DAP), before thinning. Prior to harvest, height from the soil to the middle of the ear was measured for three ears per plot, and after harvest plant vigor and tillering were rated. Each plot was harvested when corn reached marketable stage. Weight and number of marketable ears were recorded. Three ears from each plot were used to evaluate degree of husk cover, husk tightness, degree of tip fill, overall attractiveness, average ear diameter, length after husking, and shank length. Two people rated the flavor of each entry. Rating scales are described below and in footnotes to Table 1. Quantitative data were analyzed using ANOVA followed by mean separation using Fishers protected least significant difference at $P \leq 0.05$. Relationships between yield components, ear and plant characteristics, and average days to harvest were analyzed using linear regression.

Characteristic	Rating Scale
Husk Cover	5: > 2-inch cover, 4: 1.25-2 inches, 3: 0.75-1.25 inches, 2: < 0.75 inch, 1: ear exposed
Husk Tightness	3: tight, 2: firm, 1: loose
Tip Fill	5: kernels filled to tip of cob, 4: < 0.5 inch unfilled, 3: 0.5-1 inch unfilled, 2: > 1 inch unfilled, 1: > 2 inches unfilled

Results and Discussion

Emergence 14 and 21 DAP averaged 91% and 93% of the seeding rate, respectively, but did not differ among varieties (data not shown). Results for yield and ear quality are presented in Table 1. Marketable yield averaged 6.6 tons per acre. BC 0808 and BC 0805 produced the highest yield of 8.5 tons and 8.0 tons per acre, respectively. Montauk and Navajo produced the next highest yields of 7.3 tons and 7.1 tons per acre, and were not significantly different from BC 0805, Cameo, or Revelation. Polka produced the lowest yield of 4.7 tons per acre, but did not differ significantly from Dasher at 5.2 tons per acre. The number of marketable ears ranged from 1,258 to 1,597 dozen per acre, and averaged 1,418. Five varieties produced more than 1,516 dozen per acre and did not differ significantly, including BC 0805, BC 0808, Navajo, Revelation, and Valor. Cameo produced the fewest ears per acre, 1,258 dozen, but did not differ significantly from five others including Montauk, Kristine, Dasher, Polka, and Gateway. Average weight per ear ranged from 0.95 pound (Montauk) to 0.59 pound (Polka) and was strongly correlated with days to harvest: later-maturing varieties tended to produce heavier ears. BC 0808 produced ears a little heavier than would be expected based on its harvest date.

Ear length ranged from 7.0 to 8.4 inches and diameter from 1.76 to 2.01 inches. The longest ears were produced by Cameo, BC 0808, Montauk, and Gateway (8.1 to 8.4 inches.); BC 0805 was 7.8 inches and not significantly shorter than any of those except Cameo. Navajo and Polka produced the shortest ears but were not significantly shorter than any of the remaining varieties except for Kristine. The widest ears included Cameo, Montauk, BC 0808 and Kristine, followed by Navajo and Revelation — all of these were more than 1.91 inches. The remaining varieties were between 1.76 and 1.79 inches and did not differ in diameter. Ear length was strongly positively correlated with days to harvest. BC 0808 produced longer ears than would be expected based on its harvest date. Shank length ranged from 3.1 inches for Revelation to 4.7 inches for Cameo, averaging 3.8 inches. Eight cultivars had shanks between 3.4 and 4.0 inches long and did not differ significantly (data not shown).

Husk cover ratings averaged 3.4. BC 0805 and Navajo averaged 4.9, indicating more than 2 inches of husk cover. Valor, Dasher, Kristine, Montauk, and Revelation averaged between 3.2 and 3.8, indicating 0.75 to 1.25 inches of cover. Polka, Cameo, BC 0808, and Gateway ranged from 2.1 to 2.9, indicating less than 0.75 inch of cover. The husks of BC 0805, Montauk, and Navajo were fairly tight around the ear tip. The husks of Polka, BC 0808, and Gateway were loose around the ear tip. Tip fill was generally good: all varieties except Cameo received ratings of 4 or more, indicating less than 0.5 inch of the tip was not filled. Navajo, Dasher, BC 0808, and Montauk received ratings above the average of 4.3. For overall ear quality in terms of appearance, Montauk and Valor received the highest ratings. Other varieties above the average of 5.8 included Kristine, Revelation, Navajo, and BC 0805. Polka received the lowest rating for overall ear appearance.

Ear height, measured from the ground to mid-ear, ranged from 20.7 inches for Revelation to 32.7 inches for Cameo and was strongly correlated with harvest date — later varieties had higher ears. Ears of Navajo were higher than expected based on its harvest date. Most varieties produced some tillers (data not shown). BC 0805 and BC 0808 both produced tillers long enough that they might get in the way during harvest. Polka produced very few tillers. The later varieties BC 0805, Montauk, and Cameo received the highest ratings for plant vigor (data not shown). Polka and Dasher received the lowest vigor ratings, followed by Navajo and Valor.

Varieties that received flavor ratings of very good to good, or better, included Polka, Revelation, Dasher, Gateway, and Montauk.

Many varieties in this trial performed well. Careful evaluation of results presented in Table 1, combined with results from other locations and years should aid producers in selecting varieties best suited to their operations.

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Table 1. Yield, ear size, and quality of synergistic and sugar-enhanced sweet corn in Northern Indiana, 2007.

Cultivar	Co ^z	Color	Days to Harvest ^y		GDD to Harvest ^x	Yield of Marketable Ears		Avg. Ear Weight (lbs.)	Ear Length (in.)	Ear Dia. (in.)	Husk Cover ^w	Husk Tightness ^w	Tip Fill ^w	Overall ^w	Ear Ht. (in.)	Flavor ^v
			Pred.	Actual		doz/A	ton/A									
Polka	CR	BI	70	79	1,422	1,339	4.7	0.59	7.0	1.76	2.9	1.1	4.3	3.7	21.4	VG-G
Revelation	HM	BI	68	79	1,422	1,533	6.3	0.68	7.3	1.92	3.1	1.9	4.2	6.5	20.7	VG-G
Navajo	ST	BI	67	79	1,422	1,533	7.1	0.77	7.0	1.92	4.9	2.3	4.9	6.3	25.9	M
Valor	CR	BI	72	79	1,422	1,517	6.0	0.66	7.0	1.78	3.8	1.7	4.1	7.0	22.9	M-VG
Dasher	CR	W	71	82	1,463	1,323	5.2	0.66	7.0	1.78	3.7	1.6	4.6	5.3	24.4	VG
BC 0808	SY	BI	75	84	1,499	1,581	8.5	0.89	8.2	2.00	2.6	1.2	4.9	5.3	24.0	M-G
Kristine	CR	BI	80	86	1,544	1,291	6.2	0.81	7.4	1.94	3.2	1.7	4.2	6.7	24.1	G-VG
Gateway	SY	BI	77	86	1,544	1,339	6.2	0.77	8.0	1.78	2.1	1.1	4.2	4.7	26.8	VG-E
BC 0805	SY	BI	82	90	1,628	1,597	8.0	0.83	7.8	1.79	4.9	2.6	4.0	6.0	30.0	G
Montauk	ST	BI	78	90	1,628	1,291	7.3	0.95	8.2	2.01	3.2	2.4	4.7	7.7	30.8	VG-E
Cameo	CR	BI	84	90	1,628	1,258	6.6	0.88	8.4	2.01	2.6	1.7	3.6	5.0	32.7	M-VG
Grand mean						1,418	6.6	0.77	7.6	1.88	3.4	1.7	4.3	5.8	25.8	-
LSD .05 ^u						217	1.02	0.06	0.4	0.07	1.2	-	-	-	-	-
r ²						ns	ns	0.64	0.69	ns	ns	-	-	-	0.75	-

^zSeed Source: CR=Crookham, HM=Harris Moran, ST=Stokes, SY=Syngenta.

^yDays from planting to harvest. Predicted number is from seed supplier.

^xGDD: corn growing degree days.

^wHusk cover, tip fill: 1 (worst) to 5 (best). Husk tightness: 1 (loose) to 3 (very tight). Overall: 1 (worst) to 9 (best).

^vFlavor: M=medium, G=good, VG=very good, E=excellent.

^uMeans differing by more than this amount are significantly different at P≤.05. – AOV not performed.

r² for regression vs. actual days to harvest is the proportion of variability explained by days to harvest. ns=regression not significant at P<.05.