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Sugar-enhanced Sweet Corn Cultivar Evaluation for Northern Indiana, 2005

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The Indiana Agricultural Statistics Service reported sweet corn for fresh market sales was harvested from 5,400 acres in Indiana in 2004 and had a total value of \$11 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 and appearance, and agronomic characteristics. This paper reports on twenty sweet corn cultivars with homozygous se or mixed se and sh2 genetics that were evaluated at the Pinney-Purdue Ag Center, Wanatah, IN.

Materials and Methods. The trials was conducted on a Tracy Sandy Loam. Fertilization, insect, and weed management followed standard recommendations for the area. The trial was arranged as a randomized complete block design with three replications. Cultivars were assigned to individual plots 1 row (36 in.) wide by 25 ft. long. Seventy seed per plot were seeded May 17, 2005. On May 31 emergence was recorded and the following week plots were thinned to achieve a population of 35 plants per 25 ft of row (20,328 plants/A). Irrigation was applied through overhead sprinklers as needed. Each plot was harvested when corn reached marketable stage. Seedling vigor was rated on June 10 using a 9-point scale. At harvest, 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 and length after husking, and shank length. One ear per plot was evaluated for flavor and pericarp toughness. Near the harvest date for each plot, plants were rated for height, ear height, tillering, and plant vigor. Ratings scales are described below and in footnotes to Table 1. Quantitative data were analyzed using ANOVA followed by mean separation using Fisher's protected least significant difference at $P \leq .05$. Emergence data were transformed prior to analysis to stabilize variances. The relationships between yield components, ear and plant characteristics, and average days to harvest were analyzed using linear regression.

Characteristic	Rating Scale				
Husk cover	5	4	3	2	1
	> 2 in. cover	1.25 – 2 in.	.75 – 1.25 in.	< .75 in.	ear exposed
Husk tightness around ear tip			3	2	1
			tight	firm	loose
Tip fill	5	4	3	2	1
	completely filled to tip of cob	filled nearly to tip (<.5 in. unfilled)	.5 to 1 in. unfilled	> 1 in. unfilled	> 2 in. unfilled
Flag leaf length			L	M	S
			8 to 12 in.	4 to 8 in.	< 4 in.

Results and Discussion. The 2005 growing season was unusually hot and dry. Irrigation did not entirely prevent drought stress. Results are presented in Table 1.

Emergence of sweet corn ranged from 95% to 75%, with a quarter of the cultivars exhibiting over 90% emergence and three-quarters over 82% emergence. Two varieties stood out for their early season plant vigor: Renaissance and Brocade.

Yield of sweet corn ranged from 4.8 to 8.7 tons per acre and 1113 to 1613 dozen ears per acre. One quarter of the entries produced at least 7.3 tons per acre and one quarter produced more than 1549 dozen

ears per acre. The ten varieties that produced the most ears did not differ significantly and included the bicolors BC0805, Montauk, Providence, Valor, Renaissance, Luscious, and BC1136, and all three yellow varieties: Honey Treat, Tuxedo and Applause. Bon Jour, Navajo, and Nantasket produced the fewest ears per acre. Yield in tons per acre and average weight per ear were correlated with days to maturity. Later maturing varieties generally produced greater yield and heavier ears.

Ear length ranged from 7.6 to 8.8 in. and ear diameter ranged from 1.72 to 2.03 in. Bon Jour and Valor had short, narrow ears. Luscious, Nantasket, and Accord had short, wide ears. Providence, BC0805, and Honey Treat had long, narrow ears. Montauk had long, wide ears. Varieties with short ears of average width included Revelation, Navajo, Kristine, Precious Gem and Applause. Varieties with ears of average length included Renaissance, Chippawa, BC1136, Brocade, and Cameo.

Husk cover and tip fill varied among varieties. All bicolors harvested within 80 days of planting had husks extending 3/4 in. or more beyond the tip of the cob (a rating of 3 or higher) except for Luscious and Chippawa. Of the bicolors harvested 81 days or more after planting, only Brocade and BC0805 had husk cover at least that good. Applause was the only yellow variety with husk cover greater than 3/4 in. Tip fill was good for most bicolors: many varieties had less than 1/2 in. of unfilled kernels at the cob tip (a rating of 4 or higher). The exceptions were Luscious, Chippawa and Brocade, all with more than 1 in. of unfilled kernels, and Kristine with between 1/2 and 1 in. Among the yellows, Tuxedo had very good tip fill, and Honey Treat and Accord had good to fair tip fill. Renaissance and BC0805 received the highest ratings for overall ear quality, and Tuxedo, Luscious and Honey Treat received the lowest ratings.

Plant height ranged from under 5 ft. to over 6 ft, and was variable within plots. Both plant height and late season plant vigor were correlated with maturity. Later-maturing varieties tended to be taller and receive higher vigor ratings. Revelation and Bon Jour were the shortest and least vigorous. Chippawa, Cameo, Precious Gem, Tuxedo and Applause were the tallest. Accord, Montauk, Providence and Tuxedo received the highest plant vigor ratings. Ear height, measured from the ground to mid-ear, ranged from 21 in. for Revelation to 29 in. for Chippawa and Montauk, but differences among varieties were not statistically significant. Later varieties tended to have higher ear placement. No varieties were rated as hard to pick. Shank length, measured from stalk attachment to base of the ear, varied from 3.8 in. for several varieties to 6.9 in. for Brocade. Tillers were nearly absent on eight varieties, and short tillers were produced by most other varieties. Only Honey Treat occasionally had tillers large enough that they might interfere with harvest.

Varieties that received flavor ratings of very good, or very good to good, included Revelation, Montauk, Providence, Renaissance, Kristine, and BC0805. All of these are synergistic or Triplesweet®. Ratings for Applause ranged from poor to very good; the poor rating coincided with a plot that was noted as possibly overmature at harvest.

Among the varieties in this trial, the following stand out in their maturity class and color. Revelation: although ears were small, it was the earliest bicolor, had great flavor, and a decent appearance. Renaissance: among the second maturity group, it had average-sized ears with very good husk cover, tip fill, appearance and flavor. Montauk: among the full season bicolors, it had large ears and good eating quality. BC0805: another full season bicolor, with very good husk cover, tip fill, appearance and flavor. BC0805 is an Attribute® insect protected variety. Providence is a similar variety without insect protection. Growers can use this information to inform their selection of varieties that are suited to their production system and markets.

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Table 1. Yield, ear size and quality, and plant characteristics of sugar-enhanced sweet corn in Northern Indiana, 2005.

Cultivar	Co. *	Color	Days to Harvest (predicted)	Days to Harvest (actual)	GDD to Harvest**	Yield of Marketable Ears	Average Ear		Ear		Husk			Emergence (%)	Early Vigor	Late Vigor	Plant Ht.	Ear Ht.	Ease of Pick	Shank Length	Flag Leaves	Tillers	Flavor	
							Weight	Length	Diameter	Cover	Tightness	Tip Fill	Overall											(10z/A)
Revelation	HM	BI	66	71	1453	1404	5.9	0.69	7.6	1.82	3.0	1.7	4.3	5.7	84	5.0	3.7	1.5	21	M	3.8	M	1.3	VG
Bon Jour	MM	BI	70	73	1483	1210	4.8	0.67	7.7	1.73	3.3	1.4	3.9	4.7	90	5.0	4.0	1.5	23	M	3.9	M	1.3	M-VG
Navajo	ST	BI	67	73	1483	1113	5.3	0.79	7.9	1.82	4.6	2.0	4.2	5.3	85	4.3	5.0	2.0	23	M	5.0	M	1.7	M-VG
Luscious	MM	BI	75	76	1542	1468	7.3	0.83	7.9	2.03	2.4	1.0	2.1	2.0	94	6.0	5.7	2.0	23	E-M	3.8	S-M	1.0	M-G
Valor	CR	BI	72	76	1542	1549	6.0	0.64	7.6	1.72	3.6	1.6	4.2	4.3	92	5.0	5.7	2.0	22	E-M	4.0	S	1.0	G
Renaissance	HM	BI	70	77	1565	1517	7.2	0.79	8.1	1.81	4.4	1.8	4.8	7.0	86	7.3	5.3	2.3	24	E-M	4.9	S	2.7	VG-G
Chippawa	ST	BI	70	78	1589	1387	6.4	0.77	8.2	1.85	1.4	1.0	2.3	2.0	86	5.3	5.7	3.0	29	E-M	5.5	M-L	1.0	M-G
Nantasket	MM	BI	73	78	1589	1258	6.7	0.89	7.8	1.99	3.4	1.7	3.9	3.7	75	5.7	5.7	2.0	25	E	4.3	M	1.7	P-G
BC 1136	SY	BI	75	80	1643	1420	6.1	0.72	8.2	1.76	3.1	1.3	3.9	4.0	83	4.3	6.3	2.0	25	E-M	3.8	S	1.7	M-VG
Accord	MM	BI	78	81	1660	1323	6.3	0.80	7.6	1.94	2.7	1.3	4.2	4.0	82	4.0	7.7	2.8	26	E-M	4.7	M	1.0	G-M
Brocade	ST	BI	82	81	1660	1387	7.5	0.91	8.1	1.98	3.7	1.0	2.0	3.3	78	6.0	5.0	2.0	28	M	6.9	M-L	2.3	M-G
Kristine	CR	BI	80	81	1660	1371	6.3	0.76	7.6	1.88	2.2	1.1	3.7	4.0	86	5.0	6.0	2.0	22	M	4.1	M	2.3	VG-G
Montauk	MM	BI	79	81	1660	1565	8.7	0.93	8.6	1.99	2.1	1.7	4.2	4.3	80	5.0	7.7	2.7	29	M	5.4	M	2.7	VG
BC 0805	SY	BI	82	82	1682	1613	8.1	0.84	8.6	1.78	4.1	1.9	4.2	7.3	88	4.7	7.0	2.7	25	E-M	5.8	S	2.3	VG-G
Camo	CR	BI	84	82	1682	1387	6.8	0.82	8.2	1.99	1.9	1.0	3.9	3.7	89	4.7	7.3	3.0	27	E-M	6.0	S-M	1.0	VG-M
Precious Gem	MM	BI	80	82	1682	1323	5.9	0.75	7.8	1.89	2.0	1.3	3.6	3.0	95	4.3	7.0	3.0	27	M	3.8	M	1.0	M-G
Providence	SY	BI	82	84	1728	1549	8.1	0.87	8.8	1.83	1.4	1.0	3.9	3.7	86	4.0	7.7	2.2	28	E-M	4.9	S	1.3	VG
Honey Treat	SY	Y	76	76	1542	1420	6.5	0.76	8.8	1.79	1.3	1.0	3.6	2.3	76	4.3	5.0	2.3	23	E-M	4.2	S	3.3	M-VG
Tuxedo	MM	Y	81	78	1589	1533	6.8	0.74	8.4	1.74	1.2	1.0	4.3	1.7	85	5.0	7.7	3.0	25	E	3.9	S	1.0	P-M
Grand mean	CR	Y	75	80	1643	1565	7.2	0.77	7.7	1.90	3.7	1.3	3.0	3.0	90	5.3	6.0	3.0	23	E	3.9	S	1.0	P-VG
LSD .05†																								
r ² for regression vs DAP††							ns	0.39	0.28	ns	ns	ns	ns	ns	ns	ns	0.65	0.33	0.43					

*Seed Source: CR=Crookham, HM=Harris Moran, MM=Mesa Matze, ST=Stokes, SY=Syngenta.

**DAP: days after planting. Predicted maturity is from seed supplier.

***GDD: corn growing degree days.

#Husk cover, tip fill: 1 (worst) to 5 (best). Husk tightness: 1 (loose) to 3 (very tight). Overall and plant vigor: 1 to 9; 2=poor (weak), 5=acceptable, 8=good (vigorous). Plant height: 1 = <5 ft., 2=5-6 ft., 3= > 6 ft. Tillers: 1=no tillers to 5=many large tillers.

†Means differing by more than this amount are significantly different at P<.05. - AOV not performed. For emergence, P value for cultivar effect presented.

††r² is the proportion of variability explained by harvest date. NS=regression not significant at P<.05.