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Elizabeth T. Maynard

Purdue University - Main Campus, emaynard@purdue.edu

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Sugar-enhanced Sweet Corn Cultivar Evaluation for Northern Indiana, 2004

Elizabeth T. Maynard, Purdue University, Westville, Indiana 46391

Thirty-one sweet corn cultivars including homozygous se and mixed se and sh2 genetics were evaluated at the Pinney-Purdue Ag Center, Wanatah, IN.

Materials and Methods. The trials were conducted on a Tracy Sandy Loam, fertilized in fall 2003 with 300 lb./A 8-32-16 and before planting in spring 2004 with 320 lb./A 19-19-19. In mid-June an additional 40 lb./A N was applied by injecting nitrogen solution between rows. 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 20, 2004. Force 3G was applied at planting to control corn rootworm larvae. On June 2 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). Weeds were controlled with a preplant application of Atrazine and Dual II Magnum, followed by a single cultivation and hand weeding. Irrigation was applied through overhead sprinklers as needed. To control caterpillars Pounce 3.2EC was applied on July 16, 23 and 31. Each plot was harvested when corn reached marketable stage and the number and weight of marketable ears were determined. Three ears from each plot were used to evaluate degree of husk cover, degree of tip fill, overall attractiveness, and average ear diameter and length after husking. On July 27 plants were rated for height, ear height, tillering, and plant vigor. Quantitative data were analyzed using ANOVA followed by mean separation using Fisher's protected least significant difference at $P \leq .05$. One plot of the cultivar Spring Treat had very poor emergence, believed in part to be due to predation by ground squirrels and for that reason that plot was not included for analysis of emergence or ears per acre. Two cultivars, Polka and Providence, produced the same number of ears in all replications and so they were omitted from the analysis of number of ears. 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 regression analysis. For other data means are presented.

Results and Discussion. Table 1 shows results. Emergence of sweet corn ranged from 98% to 69%, with a quarter of the cultivars exhibiting over 94% emergence and three-quarters over 88% emergence. Montauk seed obtained from Mesa Maize and Spring Treat had the lowest emergence.

Yield of sweet corn ranged from 100 to 198 cwt per acre and 1275 to 1694 dozen ears per acre. One quarter of the entries produced at least 175 cwt per acre and one quarter produced more than 1645 dozen ears per acre. Indiana average sweet corn yield was 73 cwt per acre in 2003 (Indiana Agricultural Statistics 2002-2003). Higher reported yield in the experimental plots is probably due to several factors. Unplanted headlands or roadways are not included in the conversion of plot yield to per acre yield, so the conversion gives an overestimate of yield compared to cases when those areas are included. Also, experimental plots are over-planted and then thinned to the desired stand, so most plots have 100% of the desired stand.

Yield (cwt) per acre, and to a lesser extent, dozens of ears per acre, were correlated with days to maturity. Later maturing varieties generally produced greater yield and ear numbers per acre.

The five yellow cultivars did not differ significantly in number of ears produced per acre. Tuxedo, Applause, and Bodacious produced greater yield (cwt) per acre than the early cultivars Head Start and Spring Treat.

Sixteen bicolor cultivars did not differ significantly from the top-producing entry Nauset-RU in number of ears produced per acre. Nauset-RU, Chippawa, and Polka produced more ears than would be expected based on maturity date. Nantasket-MM, Nanstasket-ST, Buccaneer and Charmed produced fewer ears than would be expected based on maturity date. Five bicolor cultivars did not differ significantly from the highest-yielding entry Montauk-RU in yield (cwt) per acre: Montauk-MM, Bon Appetit, Brocade, BC 0805 and Luscious. Montauk-RU, Brocade, Bon Appetit and Luscious yielded more than would be expected based on maturity date. Charmed, Nauset-MM and Buccaneer yielded less than would be expected based on maturity date. The lowest yielding bicolor was the early cultivar Envoy; Buccaneer, Ecstase II, Nauset-MM, Navajo and Polka were not statistically different from Envoy.

Ear size, measured as lb. per ear, husked ear length, and to a lesser extent, husked ear diameter, were correlated with days to maturity. Later maturing varieties tended to produce heavier, longer and wider ears.

The yellow entries Tuxedo, Applause and Bodacious did not differ in average weight per ear or ear diameter, but Tuxedo produced significantly longer ears: 8.5 in. compared to 7.8 for both Applause and Bodacious. Tuxedo ears were also longer than expected based on maturity date. Spring Treat and Head Start produced ears similar in weight, length, and diameter to one another – about 2/3 lb., 7.4 in. long, and 1-2/3 to 1-3/4 in. in diameter – and generally smaller than the other three yellow entries.

Among the bicolor entries, Montauk-RU produced the heaviest ears, and five entries did not differ significantly from it: Montauk-MM, Bon Appetit, Nantasket-RU, Nantasket-MM and Luscious. Ears of Envoy were lighter than all other entries. Bon Appetit, Luscious, Montauk (both sources), and Nantasket (all sources) produced heavier ears than expected based on maturity date. Envoy, Polka, Buccaneer, Nauset (both sources) and Charmed (both sources) produced lighter ears than expected based on maturity date. Providence produced the longest ears among the bicolors at 8.6 in., but Precious Gem, BC 0805 and Colonial were not significantly shorter. Ecstase II had the shortest bicolor ears at 6.8 in. Colonial had longer ears than expected based on maturity date. Ecstase II, Nantasket-MM, and Charmed (both sources) produced ears shorter than expected based on maturity date. Bon Appetit produced the widest ears at 2.1 in., with Brocade, Luscious, Montauk-RU, Cameo and Precious Gem almost as wide and not significantly different. Bon Appetit, Brocade and Luscious were wider than expected based on their maturity dates. The narrowest bicolor ears were produced by Nauset-MM, with Nauset-

RU, Envoy, Ecstase II and Buccaneer just slightly wider and not significantly different. Nauset, Envoy, Buccaneer and Colonial were narrower than expected based on their maturity dates.

Husk cover tended to be better on later-maturing cultivars; about 1/3 of the variation could be explained by maturity date. Tip fill tended to be worse on later maturing cultivars, but the relationship was not strong: only about 11% of the variation could be explained by maturity date. Among the yellow cultivars, Bodacious and Applause had excellent husk cover and fair tip fill. Tuxedo had very good husk cover and tip fill. The early cultivars Head Start and Spring Treat had excellent tip fill and fair husk cover.

Eleven of the bicolor entries consistently had excellent husk cover. Envoy was the only line which had a husk cover rated less than 6 (on a 10-point scale). Navajo, Ecstase II, Montauk-RU, BC 0805, and Bon Appetit consistently produced ears with kernels filled all the way or nearly all the way to the tip. Nauset-MM, Charmed (both sources), Colonial and Cameo frequently produced ears with 1/2 in. or more of the tip unfilled.

Overall quality rankings are very subjective. The appearance and uniformity of the unhusked and husked ears weighed heavily in the ratings reported here. Among the yellow cultivars, Spring Treat, Tuxedo and Head Start were rated above average, with Spring Treat rated very good. Applause and Bodacious were rated below average. Among the bicolors, Chippawa, Montauk (both sources), Ecstase II, Bon Appetit, and Nantasket-ST were rated as good and Colonial, Charmed (both sources), Cameo and Buccaneer were rated as below average.

Varieties that stood out in terms of yield, ear size (for a given maturity), husk cover, tip fill, emergence, and overall appearance were the bicolors Luscious, Chippawa, Nantasket, Montauk-RU, Providence and BC 0805, and the yellows Head Start and Tuxedo.

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Table 1. Yield, ear size and quality, and plant characteristics of sugar-enhanced sweet corn in Northern Indiana, 2004.

Cultivar	Co. *	Color	Days to Harvest	GDD to Harvest**	Yield of Marketable Ears (doz/A)	Average Ear Weight (lb)	Ear Length (in)	Ear Diameter (in)	Husk Cover (1-9)#	Tip Fill (1-9)#	Overall gence (1-9)#	Emer-Plant Ht. (1-3)#	Ear Ht. (1-6)#	Tillers (1-5)#	Vigor (1-9)#		
																(DAP)**	(cwt/A)
Envoy (MXH 10527)	RU	BI	74	1287	1549	112	0.60	7.5	1.69	5.6	7.6	5.3	91	2.0	2.0	2.3	5.0
	SW	BI	74	1287	1533	122	0.66	6.8	1.76	7.6	8.9	7.7	95	1.7	1.7	2.0	4.3
Navajo	ST	BI	75	1311	1323	129	0.82	7.2	1.90	9.0	9.0	5.7	86	2.7	2.0	2.3	5.0
	MM	BI	78	1362	1597	182	0.95	7.7	2.03	8.8	6.1	5.7	97	3.0	2.5	1.7	6.7
Luscious	RU	BI	78	1362	1646	132	0.67	7.5	1.82	7.9	8.0	5.0	94	2.0	1.7	1.0	5.3
	MM	BI	79	1373	1629	188	0.96	7.4	2.10	9.0	8.1	7.0	89	3.0	2.0	2.3	6.0
Bon Appetit	CR	BI	81	1405	1629	157	0.80	7.7	1.86	9.0	6.9	5.7	98	2.3	1.7	3.3	5.7
	MM	BI	81	1405	1452	122	0.70	7.7	1.79	8.1	6.7	3.3	93	3.0	2.7	3.0	5.7
Buccaneer (MXH 11337)	MM	BI	81	1405	1678	156	0.77	8.3	1.92	7.6	7.7	8.0	90	3.0	2.3	1.3	6.0
	ST	BI	81	1405	1613	160	0.83	8.4	1.80	9.0	5.4	4.3	95	2.7	2.0	3.3	6.7
Colonial	SY	BI	82	1425	1500	168	0.93	7.3	1.89	8.7	7.4	6.3	80	3.0	3.0	2.0	6.0
	MM	BI	82	1425	1629	169	0.85	8.3	1.94	9.0	6.4	5.7	89	3.0	2.7	4.0	6.3
Brocade	ST	BI	82	1425	1533	175	0.95	7.7	1.90	8.1	7.7	6.3	95	3.0	2.7	2.0	5.7
	RU	BI	82	1425	1468	158	0.90	7.8	1.92	9.0	7.8	7.0	92	3.0	3.0	1.7	5.7
Nantasket	ST	BI	82	1425	1646	183	0.93	8.1	2.03	8.6	7.0	5.0	83	3.0	2.7	3.7	6.7
	MM	BI	82	1425	1533	128	0.69	8.1	1.68	8.2	5.7	5.3	89	3.0	3.0	3.7	7.7
Nauset (1009)	MM	BI	83	1435	1694	148	0.73	8.1	1.72	8.4	7.1	6.3	91	3.0	2.7	4.2	7.0
	RU	BI	83	1435	1443	1581	163	0.86	8.0	1.90	8.1	6.2	5.3	89	3.0	2.7	1.0
Accord (MXH 10031)	MM	BI	84	1443	1500	147	0.82	7.5	1.85	9.0	5.3	4.3	97	2.0	2.0	1.7	6.0
	CR	BI	85	1449	1565	169	0.90	8.2	1.99	7.9	4.9	4.3	96	3.0	3.3	3.7	7.0
Cameo	CR	BI	85	1449	1662	175	0.88	8.5	1.99	9.0	6.4	6.0	85	3.0	2.7	4.3	6.7
	MM	BI	85	1449	1662	198	0.99	8.3	2.00	9.0	8.4	7.7	93	3.0	2.7	2.7	6.7
Montauk	RU	BI	85	1449	1597	177	0.92	8.6	1.85	9.0	8.0	5.7	91	3.0	2.3	3.3	6.3
	SY	BI	86	1458	1629	193	0.98	8.2	1.97	8.2	7.6	7.7	69	3.0	3.3	2.3	6.0
Montauk (1014)	MM	BI	86	1458	1597	156	0.81	7.7	1.86	8.4	5.6	4.0	90	3.0	2.3	2.3	6.3
	SW	BI	87	1469	1662	182	0.91	8.5	1.89	9.0	8.2	6.3	93	3.0	2.7	2.7	6.7
BC 0805	SY	BI	88	1481	1275	100	0.67	7.4	1.74	5.4	8.4	8.0	70	1.0	1.3	1.7	3.0
	MM	Y	71	1232	1533	120	0.65	7.4	1.67	6.9	8.8	6.7	93	2.0	2.0	1.7	5.0
Head Start (MXH 30489)	MM	Y	75	1311	1613	154	0.80	7.8	1.82	9.0	5.1	4.0	93	3.0	2.7	1.3	7.0
	CR	Y	78	1362	1597	150	0.79	7.8	1.89	9.0	5.6	3.7	85	3.0	2.7	1.3	6.3
Bodacious	CR	Y	80	1387	1646	157	0.79	8.5	1.86	8.1	8.4	6.7	94	3.0	2.3	2.0	6.7
	MM	Y	81	1405	1573	156	0.82	7.9	1.87	8.3	7.1	5.8	90	2.7	2.4	2.4	6.1
Grand mean	MM	Y	81	1401	1573	156	0.82	7.9	1.87	8.3	7.1	5.8	90	2.7	2.4	2.4	6.1
	LSD .05†		-	-	144	20	0.06	0.3	0.11	-	-	-	-	-	-	-	-
r ² for regression vs DAP††					0.13	0.39	0.36	0.49	0.15	0.36	0.14	NS	-	0.46	0.39	0.16	0.52

**Seed Source: CR=Crookham, MM=Mesa Maize, RU=Rupp Seeds, ST=Stokes, SW=Seedway, SY=Syngenta.

**DAP: days after planting.

***GDD: corn growing degree days.

#Husk cover, tip fill, overall, plant vigor: 1 to 9 scale; 2=poor (weak), 5=acceptable, 8=good (vigorous). Height: 1 =<5 ft., 2=5-6 ft., 3=> 6 ft., Ear Ht. 1 =< 12 in. to 6=>36 in., 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.