

2012 COLUMBIA BASIN PROCESSING SWEET CORN CULTIVAR EVALUATIONS

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Introduction: This trial was conducted to provide information about the agronomic performance and processing qualities of sweet corn cultivars when produced under standard growing practices in the Columbia Basin.

Methods: The trial was established at Watts Brothers 100 Circles Farm, located west of Paterson, WA. Thirty-two sweet corn cultivars from six different seed companies were evaluated using 4 replicate plots in a randomized complete block design. A list of cultivars and information from the seed source regarding their genotype, color, and days to maturity are provided in Table 1. Seeds were sown on 14 May, 2012 using a 4-row Monosem vacuum planter. Each plot was 4 rows wide and 20 feet long. The seeding rate was 35,000 plants per acre (30-inch row width, 6-inch plant spacing). The cultivars were grown under center pivot irrigation on a Burbank loamy fine sand, using standard agronomic practices for fertility and pest control. Emergence dates were recorded for each plot in May, and then stand counts were recorded in each row of each plot on 4 June, 2012 to determine actual plant populations. These and other growth and development assessments are provided in Table 1. Ears were harvested on one of five dates: 7 Aug., 10 Aug., 14 Aug., 17 Aug., or 22 Aug. Maturity was determined in the field using a visual assessment of ears from the extra rows in each plot. Some cultivars were harvested on multiple dates, i.e. some replicate plots of the same cultivar were harvested on different dates. Ears were harvested, counted, and weighed from two entire rows in each plot (row length was measured to calculate yield per acre). Only the terminal ear was harvested. The harvest data is presented in Table 2. A subsample of five ears from each plot was retained to make ear and kernel assessments. Additionally, a composite sample of ears from each cultivar on each harvest date was sent to a commercial laboratory to measure the percent moisture. The post-harvest assessments are presented in Table 3. After the first harvest, we found that the laboratory measurements for percent moisture were higher than they should be for mature corn, indicating that our visual assessments for maturity were flawed and that the corn was being harvested too early. We decided to continue to harvest using our original criteria so that the data would be consistent. We realize this made all of the cultivars exhibit lower yields than they would if they were harvested at full maturity. In the future, we will use this experience to ensure that plots are harvested when mature according to commercial processing standards.

Acknowledgements: Thanks to Watts Brothers Farms/ConAgra Foods for hosting the trial. Special thanks to the 100 Circles Farm management team, especially Guy Madison, Mike Clouse, and Jason Jackson. Thank you to Kristin Oomen, Seminis Vegetable Seeds. Thanks also to Dale Johnson for planting the trial. The trial was sponsored by Abbott and Cobb, Crookham Company, Harris Moran Seed Company, Illinois Foundation Seed, Seminis Vegetable Seeds, and Syngenta Seeds.

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TABLE 1: Sweet Corn Processing Cultivar Information and Growth & Development Assessment Data

Seed Company & Cultivar	Seed Source Information			Field Assessments			
	Genotype	Color	Maturity (Days)	Emergence ¹ (DAP)	Population ^{2*} Jun-4 (1000 pl/A)	Plant Height ³ Jul-12 (in)	Ear Height ⁴ Aug-7 (in)
Abbott & Cobb							
7300RY	sh2	yellow	73	9.3	24.5	48	22
SS7078Y	sh2	yellow	77	10.0	21.6	41	22
SS7403RY	sh2	yellow	75	9.5	27.8	45	23
610Y	sh2	yellow	81	10.3	25.4	49	29
Crookham							
Fortitude	sh2	yellow	85	9.8	25.3	48	24
Juggernaut	sh2	yellow	85	9.8	21.5	40	30
Marvel Edge	sh2	yellow	82	10.8	25.9	39	25
Rana	sh2	yellow	82	9.8	22.1	41	23
Samurai	sh2	yellow	88	10.5	23.6	38	29
Harris Moran							
Kokanee	su	yellow	78	11.3	18.7	33	28
Legacy	su	yellow	85	10.5	20.6	46	30
IL Foundation Seed							
3172	sh2	white	72	9.8	26.1	42	24
XTH1079	sh2	yellow	79	10.0	20.0	39	24
XTH1679	sh2	yellow	79	9.8	19.3	45	25
XTH1978 R	sh2	yellow	78	10.0	25.6	41	26
XTH3174	sh2	white	74	10.3	25.0	41	28
Seminis							
1041R	sh+sy	yellow	83	10.0	20.9	43	33
1365	sh2	yellow	79	9.3	21.8	46	29
5808	sh2	yellow	72	8.8	24.5	54	25
Basin	sh2	yellow	81	10.8	19.8	44	24
SC1263	su	yellow	73	10.0	28.4	56	22
Sheba	sh2	yellow	72	9.5	23.8	49	26
Syngenta							
BSS 5362	sh2	bicolor	83	11.8	16.8	41	30
Elite	su	yellow	85	10.0	22.4	39	27
GH 3333	su	Yellow	80	10.8	21.3	39	28
GH 4927	su	yellow	75	10.5	21.7	43	24
GH 6462	su	yellow	83	11.8	10.1	30	27
GSS 1453	sh2	yellow	84	10.0	26.2	45	29
GSS 1477	sh2	yellow	79	10.5	19.6	42	28
GSS 2259P	sh2	yellow	84	11.3	18.8	42	39
Protege	sh2	yellow	77	10.0	22.0	45	27
WSS 3681	sh2	white	83	11.5	16.9	37	28
GRAND MEAN				10.2	22.1	43	27

Explanations for TABLE 1.

¹ **Emergence** – The mean number of days to seedling emergence.

² **Plant Population** - was determined by stand counts on 4 June, 2012, and is recorded here as the mean number of plants per acre in the two harvested rows. * Plant population data for 7300RY, Juggernaut, Rana, Kokanee, Legacy, SC1263, Sheba, Elite, GH6462, and WSS3681 is reported here as the mean of three replicates, instead of four. Plant population data for GSS1453 is the mean of two replicates.

³ **Plant Height** - was measured from the base of the stalk to the top of the tassel on 12 July, 2012.

⁴ **Ear Height** – was measured from the base of the stalk to the base of the terminal ear on 4 Aug., 2012.

TABLE 2: Sweet Corn Processing Cultivar Harvest Assessments

Seed Company & Cultivar	Harvest Date ^{1A}	Harvest Days ^{1B}	Ear Weight ^{2*} (lbs)	Yield ^{3*} (T/A)
Abbott & Cobb				
7300RY	Aug. 7, 14	85-92	0.68	9.9
SS7078Y	Aug. 10, 14	88-92	0.73	10.1
SS7403RY	Aug. 7, 10, 14	85-92	0.74	10.1
610Y	Aug. 10, 14	88-92	0.94	12.0
Crookham				
Fortitude	Aug. 10, 14	88-92	0.95	11.2
Juggernaut	Aug. 14, 22	92-100	0.79	11.1
Marvel Edge	Aug. 10, 14, 22	88-100	0.74	10.9
Rana	Aug. 10, 14	88-92	0.85	12.8
Samurai	Aug. 22	100	0.70	8.4
Harris Moran				
Kokanee	Aug. 14, 22	92-100	0.86	9.0
Legacy	Aug. 14, 17, 22	92-100	0.80	10.2
IL Foundation Seed				
3172	Aug. 7, 10	85-88	0.78	11.8
XTH1079	Aug. 10, 14	88-92	0.88	11.2
XTH1679	Aug. 7, 10, 14	85-92	0.93	10.7
XTH1978 R	Aug. 7, 10, 17	85-95	0.78	11.4
XTH3174	Aug. 10, 14, 17	88-95	0.86	9.8
Seminis				
1041R	Aug. 14, 17, 22	92-100	0.92	12.4
1365	Aug. 10, 14, 17	88-95	0.92	11.3
5808	Aug. 7	85	0.74	10.8
Basin	Aug. 14, 22	92-100	0.79	10.1
SC1263	Aug. 7, 10	85-88	0.90	13.2
Sheba	Aug. 7	85	0.67	9.5
Syngenta				
BSS 5362	Aug. 14, 17	92-95	0.73	9.1
Elite	Aug. 22	100	0.75	8.6
GH 3333	Aug. 14, 17, 22	92-100	0.90	10.6
GH 4927	Aug. 7, 10, 14	85-92	0.76	10.2
GH 6462	Aug. 17, 22	95-100	0.70	7.8
GSS 1453	Aug. 17, 22	95-100	0.82	13.1
GSS 1477	Aug. 14, 17	92-95	0.75	10.1
GSS 2259P	Aug. 22	100	0.76	9.5
Protege	Aug. 14, 17, 22	92-100	0.88	12.0
WSS 3681	Aug. 14, 17, 22	92-100	0.75	6.8
GRAND MEAN			0.81	10.5

^{1A} **Harvest Date** – The dates that plots were harvested. ^{1B} **Harvest Days** - The number of days from planting to harvest.

² **Ear Weight** – The mean weight of unhusked ears.

³ **Yield** – The extrapolated mean yield in tons per acre from two harvested rows.

* Ear Weight and Yield for Juggernaut, Kokanee, SC1263, and GH6462 are reported as the mean of three replicates, instead of four.

TABLE 3: Sweet Corn Processing Cultivar Ear and Kernel Quality Assessments.

Seed Company & Cultivar	Husking^{1*} (1-5)	Shank^{2*} (1-5)	Ear Tip Fill^{3*} (1-5)	Ear Length^{4*} (in)	Ear Diameter^{5*} (in)	Kernel Uniformity^{6*} (1-5)	Kernel Depth^{7*} (in)	Texture^{8*} (1-5)	Pericarp Firmness^{9*} (kg/cm ²)	Moisture¹⁰ (%)
Abbott & Cobb										
7300RY	3.1	3.6	3.8	7.90	1.75	4.1	0.45	3.9	0.70	81-79
SS7078Y	3.5	3.4	4.0	8.95	1.75	3.3	0.38	3.3	0.65	80-78
SS7403RY	3.6	3.5	3.8	8.28	1.65	3.6	0.33	3.6	0.63	82-80-77
610Y	3.3	3.4	3.6	8.78	1.83	4.0	0.43	3.4	0.93	84-79
Crookham										
Fortitude	3.9	3.8	4.0	8.48	1.93	4.1	0.43	3.6	0.67	82-78
Juggernaut	3.5	3.5	4.0	8.69	1.97	4.0	0.50	2.8	0.85	80-75
Marvel Edge	3.6	2.5	3.8	8.13	1.85	3.1	0.45	3.6	0.72	81-81-79
Rana	3.3	3.4	4.0	8.19	1.77	4.1	0.40	2.8	0.87	79-75
Samurai	3.5	3.9	4.0	7.73	1.85	3.4	0.48	3.1	0.92	77
Harris Moran										
Kokanee	3.3	3.3	3.5	8.34	1.79	2.5	0.43	2.0	0.77	74-70
Legacy	3.5	3.9	3.8	8.28	1.75	2.9	0.48	2.9	0.89	79-73-71
IL Foundation Seed										
3172	2.8	3.3	3.0	8.45	1.78	3.4	0.40	3.6	0.78	81-73
XTH1079	4.0	3.5	4.0	8.05	1.85	3.5	0.45	3.9	0.67	78-74
XTH1679	3.4	3.4	4.3	8.35	1.85	3.8	0.45	3.1	0.77	78-76
XTH1978 R	3.3	3.3	3.8	8.30	1.90	3.68	0.45	3.5	0.77	78-80-79
XTH3174	3.8	3.0	4.0	8.23	1.83	3.9	0.40	4.1	0.61	81-79-80
Seminis										
1041R	4.3	3.5	3.8	8.93	1.85	3.1	0.40	3.9	0.71	79-81-75
1365	3.5	3.8	3.6	7.83	1.93	3.3	0.48	4.0	0.65	83-82-80
5808	3.6	3.1	3.0	7.88	1.80	2.8	0.50	3.1	0.71	76
Basin	3.9	2.6	4.0	8.78	1.63	2.8	0.38	3.3	0.77	75-73
SC1263	3.6	3.5	3.9	7.89	2.01	4.0	0.50	2.5	0.67	75-79
Sheba	2.7	3.2	2.2	8.20	1.78	2.9	0.40	2.4	0.76	75

TABLE 3: Sweet Corn Processing Cultivar Ear and Kernel Quality Assessments continued.										
Seed Company & Cultivar	Husking ^{1*} (1-5)	Shank ^{2*} (1-5)	Ear Tip Fill ^{3*} (1-5)	Ear Length ^{4*} (in)	Ear Diameter ^{5*} (in)	Kernel Uniformity ^{6*} (1-5)	Kernel Depth ^{7*} (in)	Texture ^{8*} (1-5)	Pericarp Firmness ^{9*} (kg/cm ²)	Moisture ¹⁰ (%)
Syngenta										
BSS 5362	3.4	3.5	4.1	8.13	1.80	4.0	0.45	4.1	0.66	79-78
Elite	3.5	3.0	3.0	8.54	1.79	2.9	0.43	2.3	0.68	72
GH 3333	3.4	3.6	3.9	8.10	1.98	3.4	0.48	2.4	0.67	77-75-70
GH 4927	3.4	3.9	3.6	7.95	1.75	3.1	0.43	2.3	0.70	78-72-70
GH 6462	3.6	3.3	4.0	7.89	1.87	3.3	0.50	2.3	0.58	78-75
GSS 1453	3.8	3.8	3.9	8.53	1.97	3.5	0.50	2.9	0.85	80-76
GSS 1477	4.0	2.8	3.9	8.28	1.88	4.1	0.45	3.8	0.72	79-79
GSS 2259P	3.5	3.1	3.9	8.63	1.93	3.0	0.48	3.3	0.88	80
Protege	3.6	3.5	3.6	8.10	1.85	3.3	0.48	3.0	0.75	78-76-73
WSS 3681	3.8	3.4	4.0	8.29	1.73	3.5	0.47	3.9	0.74	79-79-75
GRAND MEAN	3.5	3.4	3.7	8.28	1.83	3.4	0.44	3.2	0.73	

¹ **Husking** – A subjective rating on the ease of husking ears, reported on a scale of 1-5 (1 = difficult to 5 = easy).

² **Shank** – A subjective rating on the ease of breaking the shank, reported on a scale of 1-5 (1 = difficult to 5 = easy).

³ **Ear Tip Fill** – A subjective rating on ear tip fill, reported on a scale of 1-5 (1 = poor fill to 5= completely filled).

⁴ **Ear Length** – The measurement in inches of the husked ear from the butt-end to the tip.

⁵ **Ear Diameter** – The measurement in inches of the diameter of the husked ear.

⁶ **Kernel Uniformity** – A subjective rating on the uniformity of kernels on the ear, reported on a scale of 1-5 (1 = very non-uniform to 5 = very uniform).

⁷ **Kernel Depth** – A measurement in inches of the size of kernels from the base to the top.

⁸ **Texture** – A subjective rating on the texture of kernels, reported on a scale of 1-5 (1 = poor texture to 5 = very good texture)

⁹ **Pericarp Firmness** – A measurement of pericarp firmness, i.e. toughness. Measured using a penetrometer with readings in kg.

* Assessments for Juggernaut, Kokanee, SC1263, and GH6462 are reported as the mean of three replicates, instead of four.

¹⁰ **Moisture** – The percent moisture of ears. The data is based on a composite sample of cultivars on each harvest date and was not replicated.