RESEARCH REPORT - OREGON PROCESSED VEGETABLE COMMISSION

Title:

Evaluation of Sweet Corn Varieties for Production in the Columbia Basin

Project Leader:

George H. Clough, Horticulturist
Hermiston Agricultural Research and Extension Center

Status:

Completed.

Funding:

Approximately 80% of the $2,500.00 allotted to this project for 1991 was expended for labor, with the remainder utilized for services and supplies. Additional support was provided as part of a grant from the Oregon Department of Economic Development to the Umatilla-Morrow Counties Regional Strategy High Value/Value Added Research Program.

Objectives:

Determine yield and quality characteristics of sweet corn cultivars which may be appropriate for climate and cultural practices in the Columbia basin.

Progress Report:

Nine supersweet (sh_2), six regular (su), and three sugary-enhanced (se) sweet corn varieties were grown in replicated trials to evaluate their potential for processing in the Columbia Basin (Table 1). Fertilizer was broadcast (100N-100P_2O_5-160K_2O-40S-4Cu-3Zn-1½B) and rototilled. Herbicide (Confidence (alachlor) at 2 qts/acre + Atrazine 80W at 1.25 lbs/acre) was applied through the sprinkler irrigation system for weed control. Plots were seeded on Apr 26 (su, se) and Apr 29 (sh_2), 4-30' rows/plot, 30" between rows, and thinned to 9" (23,200 plants/acre) between plants. Additional nitrogen fertilizer was applied through the irrigation system; 90 lb/acre total in 3 equal weekly applications beginning 6 weeks after emergence. Plots were sprinkler-irrigated 3 times/week; 22.5" of water was applied during the season. One application of Asana XL at 8 oz/acre was made for earworm control.

Twenty feet of the interior 2 rows of each plot were harvested for data. Data recorded included days from planting to tassel, silk and harvest; yield (number and husked weight) of marketable and cull ears; per cent moisture at harvest; weight, length and diameter of ears; and depth and number of kernel rows.

Plots were harvested when sample ears tested at 72 and 76% moisture for su/se and sh_2 sweet corns, respectively. Only physiologically-mature ears of marketable size were taken in the once-over harvest operation. Atypically cool temperatures in May and June delayed maturity; days from planting to harvest ranged from 101 to 112 days for su and se sweet corns, and 100 to 109 days for the sh_2 types.

Table 1. Sweet corn varieties, Hermiston, Oregon, 1991.

Variety	Type	Source
Challenger	sh_2	Asgrow
Citadel	se	Rogers Bros.
Cornucopia	su	Ferry-Morse
Crisp 'n Sweet 710	sh_2	Crookham
Crisp 'n Sweet 711	sh_2	Crookham
Fanciful	sh_2	Crookham
FMX-284*	sh_2	Ferry-Morse
Incredible	se	Crookham
Jubilee	su	Rogers Bros.
Rely*	su	Crookham
StylePak	su	Ferry-Morse
Stylesweet	sh_2	Ferry-Morse
Supersweet Jubilee	sh_2	Rogers Bros.
Sweet Belle	sh_2	Asgrow
Terminator*	se	Crookham
Ultrasweet*	sh_2	Ferry-Morse
1703	su	Rogers Bros.
2439	su	Rogers Bros.

* Varieties not previously tested at HAREC.

Earliest maturing varieties were 1703, Incredible, and Ultrasweet (Table 2). Latest varieties included Citadel and Rely, although these and FMX-284 were past optimum maturity at harvest, and should have been harvested somewhat earlier.

Table 2. Sweet corn maturity, Hermiston, Oregon, 1991.

Variety	Type	Heat Units[z] to Tassel	Silk	Harvest	% Moisture
Citadel	se	1024	1135	1744	68.4
Incredible	se	1024	1283	1529	71.8
Terminator	se	1024	1091	1555	72.5
Cornucopia	su	1097	1204	1680	71.5
Jubilee	su	1024	1135	1605	72.4
Rely	su	1024	1101	1744	69.0
StylePak	su	1166	1204	1722	70.2
1703	su	885	1061	1505	71.4
2439	su	1135	1283	1701	72.9
Challenger	sh_2	981	1058	1535	76.3
Crisp 'n Sweet 710	sh_2	981	1017	1562	75.8
Crisp 'n Sweet 711	sh_2	981	1054	1535	75.9
Fanciful	sh_2	981	1027	1535	76.9
FMX-284	sh_2	981	1126	1657	71.9
Stylesweet	sh_2	1064	1215	1701	76.0
Supersweet Jubilee	sh_2	1027	1137	1679	75.5
Sweet Belle	sh_2	1037	1109	1701	73.3
Ultrasweet	sh_2	889	1017	1512	74.4

[z] Heat units calculated with 50°F base temperature.

Maturity data from the 1990 trials were combined with the 1991 data to provide a more accurate assessment of the development pattern of the different varieties over more than one season (Table 3). Incredible and 1703 were the fastest maturing of the se and su types, but 1703 was harvested prematurely in 1990; 2439 was the last to mature. Challenger and Crisp 'n Sweet 711 were earliest of the sh_2 sweet corns; Ultrasweet and FMX-284 exhibited similar early maturities, but were only tested in 1991. Sweet Belle and Supersweet Jubilee were the slowest-maturing sh_2 varieties over both years.

Table 3. Two-year average sweet corn maturity, Hermiston, Oregon, 1990-1991.

Variety	Type	Heat Units[z] to Tassel	Silk	Harvest	% Moisture
Citadel	se	944	1106	1688	70.6
HMX5393E[y]	se	864	1064	1554	73.3
Incredible	se	989	1161	1542	71.7
Terminator[x]	se	1024	1091	1555	72.5
Cornucopia	su	1058	1160	1687	71.8
Jubilee	su	955	1077	1580	72.8
Rely[x]	su	1024	1101	1744	69.0
StylePak	su	1060	1154	1708	70.5
1703	su	827	950	1393	76.2
2439	su	1072	1218	1720	73.0
Challenger	sh_2	1022	1155	1634	77.2
Crisp 'n Sweet 710	sh_2	1079	1201	1729	77.6
Crisp 'n Sweet 711	sh_2	1029	1153	1634	75.7
Fanciful	sh_2	1042	1143	1691	77.2
FMX-284[x]	sh_2	981	1126	1657	71.9
Stylesweet	sh_2	1064	1202	1717	75.5
Supersweet Jubilee	sh_2	1140	1275	1818	75.5
Sweet Belle	sh_2	1145	1261	1807	74.2
Ultrasweet[x]	sh_2	889	1017	1512	74.4
Zenith[y]	sh_2	1252	1413	1895	72.8

[z] Heat units calculated with 50°F base temperature.
[y] 1990 only.
[x] 1991 only.

Ultrasweet, Sweet Belle and Crisp 'n Sweet 710 yielded the greatest husked weights of marketable ears (Table 4). Thirteen of the 18 varieties tested produced statistically equal marketable yields, ranging from 3.31 to 5.11 tons/acre. Terminator, 2439, Challenger and Stylesweet had unacceptable low yields. Challenger had significant weight of cull ears due to poor tip fill. As in the 1990 trial, Crisp 'n Sweet 711 produced a good yield of marketable ears, but had a high proportion of cull ears due to poor tip fill, along with some short ears.

Table 4. Sweet corn yield, Hermiston, Oregon, 1991.

Variety	Type	Plant Stand	Yield (Husked)			
			No. Ears	Marketable	Cull	Total
		%	*1000's/acre*		*Tons/acre*	
Citadel	se	75cde	15.5	4.04bcd[z]	0.54cd	4.58bcde
Incredible	se	100a	15.2	3.39bcd	0.22cd	3.61cdef
Terminator	se	100a	13.2	2.87cde	0.45cd	3.32def
Cornucopia	su	100a	13.2	3.31bcde	0.24cd	3.55cdef
Jubilee	su	100a	17.1	3.65bcd	0.45cd	4.10bcde
Rely	su	83abcde	16.6	4.70bc	0.37cd	5.07bcde
StylePak	su	100a	16.3	3.96bcd	0.28cd	4.24bcde
1703	su	68e	14.2	3.79bcd	0.74bcd	4.53bcde
2439	su	78bcde	6.7	1.45e	0.07d	1.53f
Challenger	sh_2	100a	10.0	2.48de	2.52a	5.00bcde
Crisp 'n Sweet 710	sh_2	100a	17.9	5.07ab	0.85bc	5.92ab
Crisp 'n Sweet 711	sh_2	100a	16.5	4.21bcd	1.31b	5.52abcd
Fanciful	sh_2	89abcd	16.1	3.82bcd	0.90bc	4.72bcde
FMX-284	sh_2	72de	14.8	4.29bcd	0.32cd	4.63bcde
Stylesweet	sh_2	93abc	9.8	2.89cde	0.28cd	3.17ef
Supersweet Jubilee	sh_2	99ab	15.7	3.43bcd	0.70bcd	4.13bcde
Sweet Belle	sh_2	100a	20.6	5.11ab	0.73bcd	5.84abc
Ultrasweet	sh_2	92abcd	21.8	6.71a	0.71bcd	7.42a

[z] Means followed by different letters are significantly different at the 5% level.

Sweet Belle, Crisp 'n Sweet 710, Stylepak, Crisp 'n Sweet 711 and Fanciful produced the largest marketable yields over 2 years of evaluations. Poorest yields were obtained from 2439, Incredible, 1703 and Challenger.

Table 5. Sweet corn yield, Hermiston, Oregon, 1990 - 1991.

Variety	Type	No. Ears	Yield (Husked)		
			Marketable	Cull	Total
		1000's/acre		*Tons/acre*	
Citadel	se	16.0cdef[z]	3.82bcdef	0.59cde	4.41bcd
HMX5393E	se	17.9abcde	3.75bcdef	0.83bcde	4.58bcd
Incredible	se	10.1g	2.35fg	0.26de	2.59e
Terminator[x]	se	14.0defg	2.89efg	0.45de	3.34de
Cornucopia	su	15.4cdefg	3.49cdef	0.66bcde	4.14cde
Jubilee	su	19.1abcd	3.89bcde	0.69bcde	4.58bcd
Rely[x]	su	16.9bcde	4.70bcd	0.37de	5.08bc
StylePak	su	18.4abcde	4.63bcd	0.20e	4.84bcd
1703	su	18.4abcde	2.91efg	1.16abc	4.07cde
2439	su	11.1fg	1.82g	0.82bcde	2.64e
Challenger	sh_2	17.9abcde	3.22defg	1.68a	4.91bcd
Crisp 'n Sweet 710	sh_2	18.7abcd	4.62bcd	0.93bcd	5.55bc
Crisp 'n Sweet 711	sh_2	20.6abc	4.53bcd	1.34ab	5.87b
Fanciful	sh_2	19.3abcd	4.09bcde	0.91bcde	5.00bcd
FMX-284[x]	sh_2	14.9cdefg	4.29bcde	0.32de	4.61bcde
Stylesweet	sh_2	12.7efg	3.80bcdef	0.27de	4.07cde
Supersweet Jubilee	sh_2	19.6abcd	3.90bcde	0.70cde	4.60bcd
Sweet Belle	sh_2	22.8a	5.15b	0.78bcde	5.93b
Ultrasweet[x]	sh_2	22.4ab	6.71a	0.71bcde	7.42a
Zenith[y]	sh_2	23.6a	5.03bc	0.34de	5.37bc

[z] Means followed by different letters are significantly different at the 5% level.
[y] 1990 only.
[x] 1991 only.

Sweet Belle, Crisp 'n Sweet 710, Stylepak, Crisp 'n Sweet 711 and Fanciful produced the largest marketable yields over 2 years of evaluations. Poorest yields were obtained from 2439, Incredible, 1703 and Challenger.

Table 5. Sweet corn yield, Hermiston, Oregon, 1990 - 1991.

Variety	Type	No. Ears	Yield (Husked) Marketable	Cull	Total
		1000's/acre		*Tons/acre*	
Citadel	se	15.5	3.71bcde[z]	0.57cd	4.83bcde
HMX5393E	se	19.5	3.29cde	0.77abc	4.02abc
Incredible	se	15.2	2.35ef	0.24cd	3.81cdef
Terminator[x]	se	13.2	3.04cdef	0.48cd	3.52def
Cornucopia	su	13.2	3.35cde	0.25cd	3.74cdef
Jubilee	su	17.1	3.74bcde	0.48cd	4.33bcde
Rely[x]	su	16.6	4.96b	0.39cd	5.35bcde
StylePak	su	16.3	4.37bcd	0.29cd	4.46bcde
1703	su	14.2	2.89def	0.78bcd	4.77bcde
2439	su	6.7	1.73f	0.08d	1.61f
Challenger	sh_2	10.0	3.05cdef	2.66a	5.27bcde
Crisp 'n Sweet 710	sh_2	17.9	4.50bc	0.90bc	6.24ab
Crisp 'n Sweet 711	sh_2	16.5	4.35bcd	1.38b	5.81abcd
Fanciful	sh_2	16.1	3.93bcd	0.94bc	4.98bcde
FMX-284[x]	sh_2	14.8	4.52bc	0.34cd	4.86bcde
Stylesweet	sh_2	9.8	3.59bcde	0.29cd	3.34ef
Supersweet Jubilee	sh_2	15.7	3.73bcde	0.74bcd	4.35bcde
Sweet Belle	sh_2	20.6	4.97b	0.77bcd	6.15abc
Ultrasweet[x]	sh_2	21.8	7.07a	0.75bcd	7.82a
Zenith[y]	sh_2	26.0	4.41bcd	0.30de	4.71bcde

[z] Means followed by different letters are significantly different at the 5% level.
[y] 1990 only.
[x] 1991 only.

In the 1991 trial Jubilee, Terminator and 2349 produced the lightest ears, and Rely and Ultrasweet produced the heaviest ears (Table 6). FMX-284 and Stylesweet produced the longest ears, followed by Rely, Cornucopia and Crisp 'n Sweet 710. Fanciful and Incredible produced the shortest ears. Ear diameter ranged from 1.76" with 2439 to 2.21" with Rely.

Table 6. Sweet corn ear characteristics, Hermiston, Oregon, 1991.

		Ear[z]			Kernel	
Variety	Type	Weight	Length	Diameter	Depth	Rows
		Lbs		*Inches*		*No.*
Citadel	se	0.65cde[y]	8.19efg	2.00cd	0.43cdefg	20.1ab
Incredible	se	0.54ijk	7.72ij	1.88f	0.39fg	18.7cd
Terminator	se	0.53jkl	7.95h	1.94ef	0.39g	18.5cd
Cornucopia	su	0.61efg	8.55bc	1.93ef	0.40efg	20.2ab
Jubilee	su	0.51kl	8.07fgh	1.81g	0.40fg	16.7ef
Rely	su	0.74a	8.62b	2.21a	0.57a	20.2ab
StylePak	su	0.61efg	8.26def	1.93ef	0.50bc	19.5bc
1703	su	0.63def	7.91hi	2.03c	0.55ab	16.4ef
2439	su	0.501	8.10fgh	1.76g	0.40fg	21.1a
Challenger	sh_2	0.56hij	7.93h	1.88f	0.41efg	17.1e
Crisp 'n Sweet 710	sh_2	0.67bcd	8.47bcd	2.00cd	0.42defg	17.3e
Crisp 'n Sweet 711	sh_2	0.60fgh	8.27def	1.92ef	0.43defg	17.2e
Fanciful	sh_2	0.57ghi	7.62j	1.91ef	0.49cd	15.8f
FMX-284	sh_2	0.69bc	9.10a	1.95de	0.46cdef	16.8e
Stylesweet	sh_2	0.70b	9.21a	1.94ef	0.45cdefg	18.4d
Supersweet Jubilee	sh_2	0.64def	8.06fgh	2.01cd	0.47cde	16.6ef
Sweet Belle	sh_2	0.63ef	8.02gh	2.06bc	0.46cdef	18.9cd
Ultrasweet	sh_2	0.75a	8.39cde	2.11b	0.42defg	17.1e

[z] Average of 8 marketable ears/replication, 4 replications/variety.
[y] Means followed by different letters are significantly different at the 5% level (DMRT).

Summary:

Measured characteristics varied significantly among the cultivars evaluated (see Tables 2-6). Three of the 4 varieties which produced the largest yields were sh_2 types; 2 of the 4 were evaluated in 1991 only, and probably should be tested again.

Signatures:

Redacted for Privacy

Project Leader

Date

Redacted for Privacy

Department Head

Date