SUGAR BEET VARIETY TESTING RESULTS, 1995

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Purpose

Commercial varieties and experimental lines of sugar beets were evaluated to identify lines with high sugar yields and root quality. A joint seed advisory committee evaluates the accumulated performance data for the varieties, and restricts growers in Idaho and Malheur County of Oregon to planting only those varieties ranking above minimum industry requirements.

Procedures

Nineteen commercial and 43 semi-commercial varieties of sugar beets were evaluated in a trial conducted by Oregon State University at the Malheur Experiment Station. Seed for evaluation was received from American Crystal, Betaseed, Hilleshog Mono-Hy Inc., Holly, Seedex, and Spreckels beet seed companies. The sugar beets were planted in Owyhee silt loam soil where winter wheat was grown the previous year. Soil pH was 7.3 at the site on the Experiment Station. The soil organic matter was 1.2 percent. The field was plowed in the fall of 1994. One hundred lb/ac of phosphate and 60 lb/ac of N were applied as a broadcast treatment before plowing. An additional 150 lb/ac of nitrogen was added by sidedressing ammonium sulfate after thinning. Two lb ai/ac of Nortron was broadcast for weed control and incorporated using a spike-tooth bed harrow before planting.

The commercial and semi-commercial varieties were planted in separate trials. Each entry was replicated eight times using a randomized complete block experimental design. Each plot was four rows wide and 23 feet long with 3-foot alleys separating plots. Approximately 12 viable seeds per foot of row were planted in each plot row. The seed was planted on April 10 and 11 with a cone-seeder mounted on a John Deere model 71 flexi-planter equipped with disc openers. After planting, the sugar beets were corrugated and furrow-irrigated to furnish moisture for uniform seed germination and seedling emergence.

The sugar beets were hand-thinned during the first week of May. Spacing between plants was approximately 7 inches. In mid-July, and again on August 10, 80 lb/ac powdered sulfur was spread by aerial application and by hand over the foliage to protect the sugar beet leaves from powdery mildew infection.

The sugar beets were harvested during the third week of October. The foliage was removed by a flail beater and the crowns clipped with rotating scalping knives. The roots from the two center rows of each four-row plot were dug with a single-row wheel-type lifter harvester, and all roots in each 23 feet of row were weighed to calculate root yields. A sample of eight beets was taken from each of the harvested rows and analyzed for percent sucrose, pulp nitrate nitrogen, and conductivity. The percent extraction was calculated using a formula which required percent sucrose and conductivity readings as factors.

Results

Variety performance has been grouped by seed company (Table 1 and 2). Each variety was ranked (designing order) within each company's variety by yield of recoverable sugar per acre. The data was analyzed statistically for LSD value at the 5 percent level of significance, and coefficient of variation for each variable is reported.

Yields of recoverable sugar from commercial varieties ranged from a high of 14,300 pounds of sugar/ac to a low of 11,250 pounds of sugar/ac, with a variety mean of 12,550 pounds of sugar/ac.

Yield of recoverable sugar from semi- commercial lines ranged from 14,270 pounds of sugar/ac to a low of 11,120 pounds of sugar/ac, with an entry mean of 12,560 pounds of sugar/ac.

Table 1. Root yields, sugar yields and root quality data from sugar beet lines entered as commercial varieties at the Malheur Experiment Station, Oregon State University, Ontario, Oregon 1995.

Entry		Sugar beet yield and quality							
Company	Variety	Root yield	Sugar content	Gross sugar	Conduct-ivity	Root-NO3-N	Extraction	Estimated recoverable sugar	
		tons/ac	%	lbs/ac	mmho	ppm	%	lb/ac	lb/ton
American Crystal	ACH 203	44.9 2	17.12	15370	.802	207	84.32	12960	288.8
	ACH 211	42.7 0	17.56	14990	.751	169	85.09	12750	298.9
	ACH 203 Goucho	43.87	17.22	15110	.820	187	84.11	12710	289.7
	ACH 322	40.29	17.82	14360	.766	170	84.94	12200	302.8
Betaseed	Beta 8422	43.81	17.47	15300	.842	188	83.86	12830	293. 0
	Beta 8422 Goucho	44.37	17.35	15390	.887	219	83.23	12810	288.8
	Beta 8450	42.7 0	17.34	14810	.797	218	84.44	12500	292.8
	Beta 8545	43.19	16.48	14220	.891	173	83.01	11810	273.7
	Beta 4689	38.3 0	17.3 0	13260	.759	156	84.93	11260	293.8
Hilleshog Mono-Hy	Canyon	49.07	17.25	16920	.790	197	84.51	14300	291.6
	WS 62	46.9 0	16.9 0	15850	.769	162	84.72	13430	286.5
	WS 88	47.28	16.88	15950	.827	200	83.95	13390	283.4
	WS 91	45.48	17.16	15610	.785	200	84.56	13200	290.2
	HM 9155	44.06	17.31	15250	.808	190	84.29	12850	291.8
	WS PM9	44.8 0	16.82	15060	.743	159	85.05	12810	286.1
	HM R2	42.32	16.45	13930	.852	187	83.52	11640	274.9
	WS 21	39.67	16.92	13420	.835	208	83.85	11250	283.7
Holly	HH 67	42.2 0	16.77	14150	.815	205	84.09	11900	282.1
Seedex	Monohikari	39.6 0	17.41	13810	.635	165	86.57	11950	301.4
LSD (0.05)		1.6 0	0.42	586	.047	49	0.67	512	8.6
CV (%)		3.8 0	2.4 0	3.9	5.9	26.4	0.8	4.1	3. 0
Mean		43.4 0	17.13	14880	.798	188	84.37	12550	289.2

Table 2. Root yields, sugar yields and root quality data from sugar beet lines entered as semicommercial lines at the Malheur Experiment Station, Oregon State University, Ontario, 1995.

Entry		Sugar beet yield and quality							
Company	Variety	Root yield	Sugar content	Gross sugar	Conduct-ivity	Root-NO3-N	Extraction	Estimated recoverable sugar	
		tons/ac	%	lbs/ac	mmho	ppm	%	lb/ac	lb/ton
American Crystal	ACH 203	44.31	17.14	15350	.776	170	84.68	12860	290.3
	ACH 212	42.69	17.21	14860	.763	175	84.85	12470	292.1
	9450217	37.69	17.27	13160	.721	135	85.43	11120	295.1
Betaseed	2BG6303	48.02	17.16	16660	.820	189	84.09	13860	288.6
	3BG6110	46.84	17.16	16250	.829	190	83.98	13500	288.2
	3BG6111	47.15	16.85	16060	.866	210	83.42	13250	281. 0
	4CG6486	46.84	16.58	15710	.873	184	83.27	12940	276.2
	2BG6282	47.83	16.26	15730	.931	220	82.43	12820	268.1
	Beta 4006	42.88	17.03	14760	.637	141	86.47	12620	294.4
	2BG6314	43.25	17.29	15110	.806	239	84.31	12600	291.5
	Beta 8450	43.25	16.89	14780	.814	227	84.12	12290	284.3
	3BG6350	44.18	16.6 0	14830	.853	191	83.55	12260	277.5
	3BG6348	44.61	16.21	14620	.924	212	82.51	11930	267.5
	Beta 4581	43.25	16.29	14250	.885	263	83.05	11700	270.6
Hilleshog	HM- 2919	48.76	17.19	16940	.739	189	85.17	14270	292.8
	HM-2925	47.83	17.43	16860	.718	152	85.5 0	14260	298.1
	HM-2922	45.67	17.7 0	16350	.639	123	86.57	13990	306.4
	HM-2923	46.04	17.56	16340	.669	142	86.16	13920	302.6
	HM-2921	47.15	17.25	16440	.708	136	85.59	13910	295.3
	HM -2924	47.34	17.3 0	16560	.757	151	84.95	13910	294. 0
	WS-91	46.9 0	17.05	16170	.746	182	85.04	13610	290. 0
	HM-2916	46.59	17.14	16150	.774	184	84.7	13530	290.3
	HM-2975	46.78	16.52	15620	.747	189	84.94	13120	280.5
	WS-PM9	45.6 0	16.61	15320	.754	176	84.86	12860	281.9
	HM-2971	45.42	16.7 0	15330	.797	203	84.32	12790	281.6
	HM-2972	44.43	16.45	14780	.842	205	83.66	12230	275.3
	HM-2974	41.95	16.9 0	14340	.761	196	84.83	12030	286.7
	HM-55	42.94	16.54	14360	.823	174	83.93	11920	277.6
	HM-2920	41.83	16.7 0	14130	.869	197	83.36	11650	278.4
Holly	HH101R	46.47	15.86	14910	.901	203	82.74	12200	262.6
	Rival	43.13	16.64	14500	.782	201	84.49	12120	281.1
	HH97R	44.18	16.18	14450	.880	220	83.1 0	11880	268.9
	Rhizosen	43.62	16.15	14240	.788	243	84.3 0	11870	272.3
	Rhizoguard	43.62	16.05	14160	.849	184	83.48	11690	268. 0
	93HX18	42.26	16.3 0	13930	.767	206	84.6 0	11650	275.9
	95HX22	40.47	16.81	13750	.787	209	84.46	11490	283.9
Seedex	SX1506	44.49	17.03	15320	.801	186	84.33	12780	287.2
	SX1507	43.5 0	16.39	14420	.846	160	83.6 0	11920	274.1
	SX1505	41.33	17.03	14230	.814	208	84.15	11840	286.6
	SX1508	43.32	16.25	14230	.891	225	82.96	11680	269.6
Spreckels	SS 92338	44. 00	16.2 0	14420	.883	218	83.06	11840	269.2
	SS 93424	43.63	15.86	13990	.936	206	82.27	11380	261. 0
	SS 781R	43.25	15.92	13920	.927	218	82.41	11340	262.5
LSD (0.05)		1.5 0	0.29	525	.051	35	0.69	459	6.3
CV (%)		3.4 0	1.78	3.5	6.3	18.5	0.83	3.7	2.2
Mean		44.5 0	16.74	15080	.807	192	84.18	12560	281.9