

## SUGAR BEET VARIETY TESTING RESULTS, 1996

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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 over several years and locations, and restricts growers in Idaho and Malheur County of Oregon to planting only those varieties ranking above minimum industry requirements.

### Procedures

Sixteen commercial varieties and 45 semi-commercial lines of sugar beets were evaluated in trials conducted at the Malheur Experiment Station, Ontario, Oregon. Seed of varieties included was received from American Crystal, Betaseed, Hillebrand, 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 7.5 and soil organic matter was 1.7 percent. The field was plowed in the fall of 1995. March 3 soil test results in the first foot of extractable soil were  $\text{NO}_3\text{-N}$  8 lb/ac,  $\text{NH}_4\text{-N}$  7 lb/ac, and in the second foot were  $\text{NO}_3\text{-N}$  7 lb/ac,  $\text{NH}_4$  6 lb/ac. Phosphorus was 19 ppm and zinc was 0.9 ppm.

Nortron was broadcast for weed control and incorporated at 2 lb ai/ac 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 24 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 with a cone-seeder mounted on a John Deere model 71 flexi-planter equipped with disc openers. After planting, the trials were corrugated and Counter 15G was applied in a band over the row at 7 oz/1000 ft of row. The sugar beets trials were furrow-irrigated to furnish moisture for uniform seedling emergence April 12, and seedlings began emerging on April 22. On May 1 herbicides Progress at 0.25 lb ai/ac, Stinger at 0.05 lb ai/ac, and Poast at 0.10 lb ai/ac were applied. The sugar beets were hand-thinned May 14 to 22. Spacing between plants was approximately 7 inches. On May 29 Progress at 0.25 lb/ac and Poast at 0.1 lb ai/ac were applied, followed by sidedress of the crop with 200 lb of nitrogen per acre as urea on May 30.

Treflan at 1 pint/ac plus Eptam at 3 pint/ac were applied for weed control June 7. Beets were mechanically cultivated June 30. Six pints/ac flowable sulfur was applied

by aerial application July 30, and Bayleton at 1 lb/ac with 50 lbs powdered sulfur on August 7 to protect the sugar beet leaves from powdery mildew infection.

The sugar beets were harvested October 10-16. 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 24 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 by Amalgamated Sugar Company. The percent extraction was calculated using an empirical formula that used percent sucrose and conductivity readings as factors.

Variety differences were calculated using ANOVA and protected least significant differences at the 5 percent levels, LSD (0.05).

### Results

Variety performance (Table 1 and 2) was analyzed statistically for LSD value at the 5 percent level of significance and ranked by recoverable sugar within each company.

Yields of recoverable sugar from commercial varieties ranged from a high of 11,875 lbs of sugar/ac to a low of 9,693 lbs of sugar/ac, with a variety mean of 10,797 lbs of sugar/ac. Among the top yielding cultivars were HM Canyon, 4006R, HM WSPM9, and HM WS91 (Table 1).

Yield of recoverable sugar from semi-commercial lines ranged from 13,184 lbs of sugar/ac to a low of 9,756 lbs of sugar/ac, with an entry mean of 11,633 lbs of sugar/ac. Among the top yielding cultivars were HM2919, HM2929, ACH9622 (Table 2).

Table 1. Root yields, sugar yields and root quality data from sugar beet lines entered as commercial lines at the Malheur Experiment Station, Oregon State University, Ontario, 1996.

Company	Variety	Root yield ton/ac	Sugar content %	Gross sugar lb/ac	Conductivity mmhos	Root NO <sub>3</sub> -N ppm	Extraction %	Estimated recoverable sugar lb/ac	Estimated recoverable sugar lb/ton
Hilleshog Mono-Hy	HM CANYON	39.27	17.44	13,697	0.71	133	86.69	11,875	302.3
	HM WSPM9	39.54	16.73	13,230	0.73	130	86.36	11,426	288.94
	HM WS91	37.01	17.53	12,973	0.71	116	86.76	11,258	304.2
	HM R2	36.84	17.17	12,653	0.69	103	86.98	11,006	298.76
	HM WS88	36.75	17.1	12,570	0.72	135	86.57	10,885	296.04
	HM 9155	36.16	17.29	12,497	0.79	129	85.68	10,709	296.38
	HM WS62	36.34	16.86	12,252	0.72	128	86.54	10,604	291.87
American Crystal	ACH 203	35.78	17.14	12,256	0.73	140	86.36	10,585	296.06
	ACH 211	34.13	17.66	12,046	0.67	108	87.33	10,520	308.41
Beta Seed	4006R	39.27	17.17	13,490	0.69	158	86.9	11,725	298
	8450	36.9	17.48	12,899	0.78	153	85.8	11,068	299.99
	8422	36.04	17.16	12,361	0.82	156	85.17	10,527	292.3
Holly	RIVAL	35.87	16.88	12,108	0.77	153	85.88	10,402	290.03
	RHIZOGUARD	35.37	16.47	11,652	0.74	148	86.23	10,049	284.12
Holly (Spreckels)	SS 781 R	34.75	16.45	11,420	0.84	136	84.87	9,693	279.17
Seedex	SX 1505	34.63	17.23	11,939	0.67	123	87.26	10,419	300.74
	LSD (0.05)	2.02	0.35	728	0.05	34	0.73	668	7.7 0
	Mean	36.54	17.11	12,503	0.74	134	86.33	10,797	295.48

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, Oregon, 1996.

Company	Variety	Root yield	Sugar content	Gross sugar	Conductivity	Root NO3-N	Extraction	Estimated recoverable sugar	Estimated recoverable sugar
		ton/ac	%	lb/ac	mmho	ppm	%	lb/ac	lb/ton
Hilleshog Mono-Hy	HM 2919	41.83	17.94	14,990	0.62	101	88.00	13,184	315.58
	HM 2929	42.95	17.46	15,002	0.63	107	87.84	13,178	306.77
	HM 2921	41.10	17.91	14,723	0.63	93	87.86	12,936	314.81
	HM2925	40.00	17.75	14,375	0.66	123	87.49	12,575	310.65
	HM 2916	39.54	17.74	14,028	0.67	122	87.34	12,252	309.95
	HM 2923	39.10	17.77	13,894	0.60	98	88.16	12,251	313.35
	HM 2922	38.39	18.02	13,836	0.58	97	88.54	12,251	319.13
	HM 2928	39.01	17.57	13,702	0.60	119	88.19	12,085	309.83
	HM2924	38.78	17.65	13,681	0.70	139	86.86	11,883	306.69
	WS PM9	39.89	17.10	13,635	0.69	122	86.94	11,853	297.41
	HM 2927	37.78	17.78	13,417	0.62	95	87.97	11,799	312.81
	HM 2926	37.63	17.75	13,359	0.61	82	88.06	11,764	312.66
	HM RZ72	36.72	17.0	12,478	0.75	125	86.08	10,740	292.65
	HM Pillar	33.02	17.99	11,882	0.62	87	87.99	10,455	316.58
HM RZ20	34.66	17.41	12,069	0.75	116	86.20	10,404	300.20	
Beta Seed	5CG7004	43.01	16.78	14,411	0.75	175	86.15	12,415	289.13
	3BG6110	39.74	17.94	14,255	0.73	126	86.57	12,339	310.64
	3BG6111	40.92	17.52	14,322	0.79	140	85.73	12,277	300.46
	2BG6303	39.66	17.87	14,165	0.73	122	86.53	12,252	309.22
	4KG5983	37.04	18.59	13,773	0.70	87	87.01	11,986	323.57
	4546	40.66	17.13	13,925	0.76	203	86.03	11,980	294.82
	4CG6070	40.04	17.28	13,834	0.72	100	86.51	11,968	299.04
	4CG6430	38.57	17.91	13,800	0.73	90	86.49	11,934	309.73
	4035R	40.74	16.68	13,576	0.81	206	85.34	11,585	284.67
	4CG6460	38.86	17.40	13,513	0.82	131	85.30	11,524	296.88
	4CG6088	38.16	17.25	13,164	0.69	95	86.92	11,443	299.93
	4CG6486	37.78	17.28	13,058	0.77	96	85.89	11,218	296.92
	8422	36.69	17.35	12,736	0.80	159	85.48	10,889	296.73
	4CG6429	35.13	16.99	11,934	0.73	112	86.40	10,307	293.68
4CG6456	34.60	17.0	11,760	0.73	94	86.35	10,155	293.56	
3BG6956	33.84	16.83	11,375	0.77	112	85.79	9,756	288.78	
American Crystal	ACH 9622	41.71	17.59	14,670	0.70	93	86.83	12,738	305.43
	ACH 9612	39.45	17.30	13,634	0.70	151	86.81	11,835	300.36
	ACH 9624	38.33	17.50	13,418	0.70	132	86.90	11,660	304.23
	ACH 203	37.04	17.62	13,052	0.65	124	87.54	11,428	308.45
	ACH 9614	35.25	17.07	12,038	0.75	187	86.15	10,378	294.24
Seedex	SX1509	39.57	17.63	13,942	0.70	125	86.91	12,109	306.52
	SX1510	39.63	17.41	13,777	0.68	162	87.08	11,992	303.26
	SX1511	35.81	17.51	12,526	0.71	101	86.79	10,870	304.04
Holly (Spreckels)	SS 93805	39.45	16.92	13,335	0.79	128	85.57	11,410	289.55
	SS 694	37.57	16.67	12,516	0.74	121	86.17	10,783	287.34
	SS 93424	37.42	16.87	12,620	0.80	139	85.42	10,781	288.24
	SS 943203	36.81	17.04	12,489	0.78	134	85.73	10,705	292.31
Holly	96 HX 405	43.62	16.20	14,125	0.87	162	84.44	11,927	273.67
	96 HX 406	41.10	16.22	13,322	0.88	167	84.35	11,234	273.58
	LSD (O.05)	2.06	0.36	720	0.05	46	0.67	627	7.77
	Mean	38.65	17.38	13,425	0.72	124	86.64	11,633	301.29