1994 Research Report

SMBSC

1/1/1994
Southern Minnesota Beet Sugar Company
SMBSC

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VARIETY EVALUATION

Twenty-four varieties were approved for planting in the 1994 growing season. Three test market varieties Hilleshog Empire, Granite and Hector, and two special use varieties, ACH 205 and Hilleshog 7036 (Resist), were also approved.

The approved varieties for Southern Minnesota Sugar Cooperative since 1980 are listed in Table 1. Hilleshog 5135 has been on the list for the last eight years, Mitsui Monohikari for the last seven years, and ACH 198 for the last six years. Maribo 875, ACH 194, and ACH 196 have been approved for sale for the last five years. The remaining varieties have been approved for four years or less. Thus, the majority of the varieties are relatively new. The increase in selection of varieties for the grower has been quite significant over the past 14 years. This does not seem to be subsiding. The choice of varieties for a grower will probably continue and production continue to increase partially due to these choices.

A comparison of the average performance for all approved varieties is listed in Table 2. Table 3 - 6 list the three and two year performance of the 24 approved varieties plus test market varieties. Data with specialty use varieties are presented in Table 7. Coded trial results for all varieties evaluated for the past three years are listed in Tables 7-18.

The seed issued to Southern Minnesota Sugar Cooperative growers in 1992-1994 was as follows (calculated on bare seed equivalent).

SEED USAGE
SMSC, 1991 - 1994

YEAR	SMALL	MEDIUM	LARGE	X-LARGE	VISI-COAT	MINI	REGULAR	TOTAL
1991 LBS	20196	77116	32528	26564	---	4961	1939	163304
%	12.37	47.22	19.92	16.27	---	3.04	1.19	100.00
1992 LBS	27249	50143	41256	23720	---	13803	1584	157755
%	17.27	31.79	26.15	15.04	---	8.75	1.00	100.00
1993 LBS	34119	50748	36134	43010	---	25964	5068	195043
%	17.49	26.02	18.53	22.05	---	13.31	2.60	100.00
1994 LBS	27320	38423	22116	42111	2170	44910	6287	183337
%	14.90	20.96	12.06	22.97	1.18	24.50	3.43	100.00
AVE.	27221	54107.5	33008.5	33851.25	542.5	22409.5	3719.5	174859.8
%	15.51	31.50	19.17	19.08	0.30	12.40	2.06	100.00

* Mini and regular pellets were adjusted to bare seed equivalent basis.

SEED USEAGE
POUNDS PLANTED PER ACRE
SMSC, 1991 - 1994

YEAR	ACRES PLANTED	ACRES REPLANTED	TOTAL ACRES	TOTAL SEED USED, LBS.	AVE. SEED/ ACRE LBS.
1991	82284	7600	89884	163304	1.82
1992	87324	1000	88324	157755	1.79
1993	101781	8814	110595	195043	1.76
1994	111547	5048	116595	183337	1.57
AVERAGE	**95734**	**5616**	**101350**	**174860**	**1.73**

The most popular varieties grown in 1994 by SMSC growers were:

ACH 196	KW 1800	Hilleshog 5135
ACH 198	Beta 2010	
ACH 302	KW 2249	
	KW 2398	
	KW 3291	
	KW 6770	

Use of mini and regular pellets has increased from 16% in 1993 to 28% in 1994.

SOUTHERN MINNESOTA SUGAR COOPERATIVE

List of Approved Varieties since 1980

Table 1.

1980	1981	1982	1983	1984
ACH 12	ACH 14	ACH 14	ACH 14	ACH 145
ACH 14	ACH 151	ACH 145	ACH 30	ACH 154
ACH 17	ACH 30	ACH 17	Beta 1230	ACH 30
ACH 30	Beta 1230	Beta 1230	Beta 1237	Beta 1230
Beta 1237	Beta 1237	Beta 1237	BJ Monofort	BJ Monofort
Beta 1345	Beta 1345	BJ Monofort	Maribo Ultramono	KW 3394
Beta 1443	Beta 1443	Holly HH33	Mono-Hy M7	Maribo Ultramono
BJ Monofort	BJ Monofort	Mono-Hy E4	Mono-Hy M8	Mono-Hy M7
Holly HH33	Maribo Ultramono	Mono-Hy M7	Mono-Hy R1	Mono-Hy R1
Mono-Hy E4	Maribo Unica	Mono-Hy M8		
Mono-Hy R1	Mono-Hy M7	Mono-Hy R1		
	Mono-Hy M8			
	Mono-Hy R1			
	Mono-Hy X73			

1985	1986	1987	1988	1988 (cont.)
ACH 145	ACH 146	ACH 164	ACH 164	KW 6264
ACH 154	ACH 164	Beta 1230	ACH 178	Maribo 403
ACH 30	ACH 30	Beta 5494	ACH 180	Maribo 411
Beta 1230	Beta 1230	Beta 6264	ACH 181	Maribo Ultramono
BJ Monofort	Beta 6264	BJ 1310	Beta 1230	Mitsui Monohikari
KW 1132	BJ 1310	BJ Monofort	Beta 3614	Mono-Hy R103
KW 3394	BJ Monofort	Hilleshog 4046	Beta 6625	
Maribo 401	KW 1132	Hilleshog 5090	BJ 1310	
Maribo Ultramono	KW 3265	Hilleshog 5135	BJ Monofort	
Mono-Hy M7	KW 3394	KW 1132	Hilleshog 4046	
Mono-Hy R1	Maribo 401	KW 3265	Hilleshog 5090	
	Maribo 403	KW 3394	Hilleshog 5135	
	Maribo Ultramono	Maribo 403	Hilleshog 8277	
	Mono-Hy M7	Maribo Ultramono	KW 1014	
		Mitsui Monohikari	KW 1132	
		Mono-Hy M7	KW 3145	
		Mono-Hy R103	KW 3265	
		Mono-Hy R117	KW 3394	

SOUTHERN MINNESOTA SUGAR COOPERATIVE

List of Approved Varieties since 1980

Table 1. (cont.)

1989	1990	1991	1992	1993
ACH 164	ACH 180	ACH 194	ACH 194	ACH 194
ACH 180	ACH 181	ACH 196	ACH 196	ACH 196
ACH 181	ACH 194	ACH 198	ACH 198	ACH 198
ACH 198	ACH 196	Beta 1238	Beta 1238	Beta 2010
Beta 3614	ACH 198	Beta 2988	Beta 2010	Beta 2988
Beta 6269	Beta 3614	Beta 5657	Beta 2988	Hilleshog 5090
Beta 6625	Beta 6269	Beta 6269	Beta 5657	Hilleshog 5133
Hilleshog 4046	Beta 6625	Beta 6625	Beta 6269	HM 2401
Hilleshog 5090	Hilleshog 4046	Hilleshog 2401	Beta 6625	KW 1119
Hilleshog 5135	Hilleshog 5090	Hilleshog 5090	BJ 1330	KW 1800
KW 1014	Hilleshog 5135	Hilleshog 5135	Hilleshog 5090	KW 2249
KW 3145	HM 2410	KW 2398	Hilleshog 5135	KW 2398
KW 3265	KW 1014	KW 3145	HM 2401	KW 3145
KW 3394	KW 3145	KW 3265	KW 1119	KW 3580
Maribo 403	KW 3265	Maribo 403	KW 2398	KW 6770
Maribo 411	KW 3394	Maribo 875	KW 3145	Maribo 875
Maribo Ultramono	Maribo 403	Maribo Ultramono	KW 3265	Seedex Monohikari
Mitsui Monohikari	Maribo 411	Mitsui Monohikari	Maribo 875	VDH 66140
Mono-Hy R103	Maribo 875		Maribo Ultramono	
	Maribo Ultramono		Mitsui Monohikari	
	Mitsui Monohikari			

1994	1994 (cont.)	1995	1995 (cont.)
ACH 194	KW 3580	ACH 194	HM 2401
ACH 196	KW 6770	ACH 196	HM 7036 (Special)
ACH 198	Maribo 875	ACH 198	KW 1119
ACH 205 (Special)	Mitsui Monohikari	ACH 205 (Special)	KW 1800
ACH 302	Seedex SX1004	ACH 302	KW 2249
ACH 309	VDH H16640	ACH 309	KW 2398
ACH 311		ACH 311	KW 3291
Beta 2010		Beta 2010	KW 6770
Hilleshog 5135		Beta 1492	Maribo 875
Hill. 7505 (Niagara)		Beta 3712	Maribo 923
HM 2401		Hilleshog 5135	Mitsui Monohikari
KW 1119		Hilleshog 7034	Seedex Laser
KW 1800		Hilleshog 7514	VDH H66140
KW 2249 (Blend)		Hilleshog 2418	
KW 2398		Hilleshog Niagra	
KW 3291		Hilleshog Shasta	

Table 2. Comparison of Approved Varieties for Southern Minnesota over a fifteen year period.

Year	No. of Approved	Recoverable Sugar/Acre Mean of Approved	Recoverable Sugar/Ton Mean of Approved	Tons/Acre Mean of Approved	% Sugar Mean of Approved	Leaf Spot Rating Mean of Approved	LTM Mean of Approved
1981 (78-79-80)	15	6724	264.5	25.7	15.40	4.43	2.18
1982 (79-80-81)	12	6282	262.6	23.9	15.50	4.31	2.17
1983 (80-81-82)	9	7053	261.9	26.9	15.60	4.84	2.37
1984 (81-82-83)	9	6823	253.1	26.9	15.30	4.80	2.50
1985 (82-83-84)	11	7682	269.7	28.6	15.90	4.87	2.64
1986 (83-84-85)	14	7837	280.9	27.9	16.10	4.80	2.41
1987 (84-85-86)	18	7764	300.4	25.9	16.70	4.68	1.68
1988 (85-86-87)	24	8884	308.7	28.7	16.95	4.93	1.51
1989 (86-87-88)	19	8689	318.6	27.2	17.40	4.70	1.47
1990 (87-88-89)	21	9078	307.8	29.4	17.10	4.87	1.71
1991 (88-89-90)	19	7554	294.1	25.7	16.39	4.56	1.59
1991 (89-90-91)	21	6831	276.6	24.8	15.50	4.60	1.60
1991 (90-91-92)	19	6943	296.2	23.5	16.30	4.83	1.49
1993 (91-92-93)	21	5961	308.8	19.6	16.90	4.80	1.40
1994 (92-93-94)	29	6783	323.0	20.9	17.48	5.02	1.32

SOUTHERN MN SUGAR COOPERATIVE
LIST OF APPROVED VARIETIES FOR 1995

Table 3. Three year performance summary from coded trials conducted at SMSC, 1992 - 1994

Variety	Rec./ S Ton	Rec./ S Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf Spot**	Seed Vig.**	% Field Emerg.
ACH 194	323.9	6687	20.65	17.54	1.34	5.25	1.32	64.7
ACH 196	323.2	6937	21.39	17.53	1.38	5.12	1.60	65.1
ACH 198	318.7	6461	20.26	17.35	1.42	4.50	1.44	66.7
ACH 205(Aphan.Spec.)	310.8	6662	21.43	16.78	1.24	4.33	1.64	70.4
ACH 302	326.5	6523	20.00	17.64	1.32	4.45	1.52	64.7
ACH 309	325.8	6550	20.10	17.61	1.32	4.49	1.33	
ACH 311	322.4	6393	19.82	17.54	1.42	4.18	1.63	
Beta 1492	322.9	7173	22.14	17.44	1.29	5.18	1.79	
Beta 2010	318.6	6871	21.59	17.24	1.31	5.26	1.71	66.1
Beta 3712	327.2	7070	21.58	17.61	1.25	5.49	1.80	
Hilleshog 5135	323.5	7020	21.74	17.55	1.37	5.23	1.42	64.6
Hilleshog Niagara(7505)	327.2	6740	20.57	17.67	1.31	4.79	2.01	
Hilleshog Shasta(2416)	333.8	6701	20.10	17.99	1.29	5.47	1.78	
HM 2401	320.0	6798	21.19	17.34	1.35	5.23	1.84	64.1
KW 1119	326.7	6518	19.84	17.65	1.31	5.40	1.95	59.7
KW 1800	316.8	7099	22.30	17.18	1.34	5.29	1.93	60.4
KW 2249(Blend)	318.8	6900	21.65	17.28	1.34	5.25	1.73	65.7
KW 2398	332.0	6733	20.20	17.88	1.28	5.30	1.81	64.1
KW 3291	327.3	6825	20.93	17.65	1.28	5.25	1.64	
KW 6770	327.1	7152	21.96	17.64	1.28	5.20	1.81	56.6
Maribo 875	322.7	6706	20.77	17.50	1.36	4.99	1.27	67.1
Maribo 923	323.0	6891	21.32	17.53	1.39	5.24	1.27	
Mitsui Monohikari	315.3	6659	21.06	17.01	1.24	4.99	2.40	61.9
Seedex Laser(1004)	323.9	6480	19.99	17.51	1.32	4.43	2.21	
Van der Have H66140	317.8	7035	22.12	17.22	1.33	5.30	1.79	64.9
Mean	**323.0**	**6783**	**20.99**	**17.48**	**1.32**	**5.02**	**1.71**	**64.2**

**** Lower numbers indicate better resistance and vigor.**

SOUTHERN MN SUGAR COOPERATIVE
LIST OF APPROVED VARIETIES FOR 1995
PERCENT OF MEAN OF APPROVED

Table 4. Mean of three year performance summary of SMSC Commercial Coded Entries, 1992 - 1994

Variety	Rec./ S Ton	Rec./ S Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf Spot**	Seed Vig.**	% Field Emerg.
ACH 194	100.3	98.4	98.1	100.4	101.5	104.2	78.0	100.9
ACH 196	100.0	102.3	101.9	100.3	104.1	101.8	94.0	101.4
ACH 198	98.7	95.2	96.5	99.3	107.1	89.5	84.2	103.9
ACH 205(Aphan.Spec.)	96.2	98.2	102.1	96.0	93.7	86.1	96.3	109.7
ACH 302	101.1	96.2	95.3	101.0	99.5	88.5	88.9	100.9
ACH 309	100.9	96.6	95.8	100.8	99.8	89.3	78.0	
ACH 311	99.8	94.2	94.4	100.4	107.1	83.3	95.5	
Beta 1492	100.0	105.7	105.5	99.8	97.5	103.2	105.1	
Beta 2010	98.6	101.3	102.9	98.6	98.8	104.8	100.0	103.0
Beta 3712	101.3	104.2	102.8	100.8	94.5	109.3	105.7	
Hilleshog 5135	100.2	103.5	103.6	100.4	103.6	104.0	83.4	100.6
Hilleshog Niagara(7505)	101.3	99.4	98.0	101.1	98.8	95.4	117.6	
Hilleshog Shasta(2416)	103.3	98.8	95.8	102.9	97.5	108.8	104.5	
HM 2401	99.1	100.2	101.0	99.2	101.8	104.0	107.8	99.9
KW 1119	101.2	96.1	94.5	101.0	99.3	107.5	114.5	93.1
KW 1800	98.1	104.7	106.3	98.3	101.3	105.4	113.1	94.2
KW 2249(Blend)	98.7	101.7	103.2	98.9	101.6	104.6	101.6	102.4
KW 2398	102.8	99.3	96.2	102.3	96.8	105.6	105.9	99.9
KW 3291	101.3	100.6	99.7	101.0	96.8	104.4	96.3	
KW 6770	101.3	105.4	104.6	100.9	97.0	103.5	106.1	88.2
Maribo 875	99.9	98.9	99.0	100.1	103.1	99.3	74.4	104.5
Maribo 923	100.0	101.6	101.6	100.3	104.8	104.2	74.2	
Mitsui Monohikari	97.6	98.2	100.4	97.3	93.7	99.3	140.9	96.4
Seedex Laser(1004)	100.3	95.5	95.2	100.2	99.5	88.2	129.5	
Van der Have H66140	98.4	103.7	105.4	98.5	100.6	105.5	104.9	101.1
Mean	**323.0**	**6783**	**20.99**	**17.48**	**1.32**	**5.02**	**1.71**	**64.2**

** **Lower numbers indicate better resistance and vigor.**

SOUTHERN MN SUGAR COOPERATIVE
TEST MARKET VARIETIES FOR 1995

Table 5. Two year performance summary from coded trials conducted at SMSC, 1993 - 1994

Variety	Rec./ S Ton	Rec./ S Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf Spot**	Seed Vig.**	% Field Emerg.
ACH 194	321.8	6222	19.36	17.50	1.41	5.05	1.29	63.6
ACH 196	320.2	6472	20.14	17.45	1.44	4.99	1.51	65.6
ACH 205(Aphan.Spec.)	310.0	6322	20.38	16.77	1.27	4.26	1.55	71.2
ACH 302	326.0	6194	19.04	17.66	1.37	4.21	1.46	64.6
ACH 309	324.0	6222	19.21	17.57	1.37	4.42	1.34	
Beta 1492	319.0	6606	20.64	17.30	1.35	5.07	1.78	
Beta 2010	315.9	6653	21.10	17.16	1.37	5.13	1.40	66.9
Beta 3712	323.2	6450	19.96	17.44	1.28	5.26	1.90	
Hilleshog 5135	323.5	6584	20.40	17.58	1.40	5.15	1.37	65.8
Hilleshog Niagara(7505)	327.2	6491	19.80	17.70	1.34	4.61	2.26	
Hilleshog Shasta(2416)	332.0	6266	18.93	17.94	1.33	5.33	1.87	
HM 2401	316.8	6345	19.98	17.24	1.41	5.24	1.85	64.2
KW 1119	323.0	5983	18.40	17.53	1.38	5.16	1.85	60.5
KW 1800	311.0	6514	20.87	16.96	1.41	5.03	2.08	61.9
KW 2249(Blend)	313.2	6459	20.68	17.08	1.42	5.01	1.58	67.4
KW 2398	328.8	6279	19.00	17.77	1.33	5.06	1.86	64.2
KW 3291	322.7	6353	19.84	17.47	1.33	5.06	1.73	
KW 6770	325.6	6736	20.85	17.63	1.35	5.14	1.84	57.2
Maribo 875	321.1	6278	19.54	17.48	1.42	4.90	1.28	67.6
Maribo 923	321.1	6507	20.26	17.48	1.43	5.13	1.28	
Mitsui Monohikari	313.3	6172	19.64	16.96	1.30	4.71	2.23	62.1
Seedex Laser(1004)	321.3	6206	19.32	17.43	1.37	4.36	2.05	
Van der Have H66140	315.3	6690	21.21	17.15	1.39	5.33	1.67	66.5
Mean	**320.7**	**6391**	**19.93**	**17.40**	**1.37**	**4.94**	**1.69**	**64.6**

**** Lower numbers indicate better resistance and vigor.**

TEST MARKET

Variety	Rec./ S Ton	Rec./ S Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf Spot**
Hilleshog 7034 (Empire)	321.9	6458	20.20	17.49	1.39	5.39
Hilleshog 7514 (Granite)	324.4	6611	20.43	17.59	1.37	5.11
Hilleshog 2418 (Hector)	322.0	6628	20.57	17.44	1.34	5.01

SOUTHERN MN SUGAR COOPERATIVE
TEST MARKET VARIETIES FOR 1995
PERCENT OF MEAN OF APPROVED

Table 6. Mean of two year performance summary of SMSC Commercial Coded Entries, 1993-1994

Variety	Rec./ S Ton	Rec./ S Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf Spot**	Seed Vig.**	% Field Emerg.
ACH 194	100.4	97.4	97.1	100.5	102.8	102.2	76.1	98.4
ACH 196	99.8	101.3	101.0	100.3	105.4	101.0	89.1	101.5
ACH 205(Aphan.Spec.)	96.7	98.9	102.2	96.4	93.0	86.3	91.5	110.1
ACH 302	101.6	96.9	95.5	101.5	99.9	85.3	86.2	100.0
ACH 309	101.0	97.4	96.3	101.0	100.3	89.4	78.8	
Beta 1492	99.5	103.4	103.5	99.4	98.8	102.6	104.7	
Beta 2010	98.5	104.1	105.8	98.6	99.9	103.8	82.3	103.6
Beta 3712	100.8	100.9	100.1	100.2	93.7	106.5	112.1	
Hilleshog 5135	100.9	103.0	102.3	101.0	102.5	104.3	80.6	101.8
Hilleshog Niagara(7505)	102.0	101.6	99.3	101.7	97.7	93.3	133.1	
Hilleshog Shasta(2416)	103.5	98.0	94.9	103.1	97.3	107.9	110.4	
HM 2401	98.8	99.3	100.2	99.1	102.8	106.1	108.9	99.4
KW 1119	100.7	93.6	92.3	100.7	101.0	104.5	108.9	93.6
KW 1800	97.0	101.9	104.7	97.5	103.2	101.8	122.7	95.8
KW 2249(Blend)	97.7	101.1	103.7	98.2	103.9	101.4	93.2	104.3
KW 2398	102.5	98.2	95.3	102.1	97.0	102.5	109.5	99.4
KW 3291	100.6	99.4	99.5	100.4	97.3	102.4	102.1	
KW 6770	101.5	105.4	104.6	101.3	98.4	104.0	108.6	88.5
Maribo 875	100.1	98.2	98.0	100.4	103.9	99.3	75.5	104.6
Maribo 923	100.1	101.8	101.6	100.5	104.7	103.8	75.2	
Mitsui Monohikari	97.7	96.6	98.5	97.5	94.8	95.4	131.6	96.0
Seedex Laser(1004)	100.2	97.1	96.9	100.2	100.3	88.2	120.7	
Van der Have H66140	98.3	104.7	106.4	98.6	101.4	107.9	98.3	102.9
Mean	**320.7**	**6391**	**19.93**	**17.40**	**1.37**	**4.94**	**1.69**	**64.6**

**** Lower numbers indicate better resistance and vigor.**

TEST MARKET

Variety	Rec./ S Ton	Rec./ S Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf Spot**
Hilleshog 7034 (Empire)	100.4	101.0	101.3	100.5	101.7	109.2
Hilleshog 7514 (Granite)	101.2	103.4	102.5	101.1	100.3	103.5
Hilleshog 2418 (Hector)	100.4	103.7	103.2	100.2	98.1	101.5

SOUTHERN MN SUGAR COOPERATIVE
SPECIAL VARIETIES FOR 1995

Table 7. Comparison of special varieties to commercial varieties, 1994

Variety	Rec./ S Ton	Rec./ S Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf Spot**	Seed Vig.**	% Field Emerg.
ACH 194	321.5	8734	27.21	17.56	1.48	5.12	1.38	54.6
ACH 196	323.2	9082	28.12	17.66	1.51	5.00	1.63	54.6
ACH 198	318.4	8540	26.85	17.48	1.56	4.47	1.50	56.5
ACH 302	325.2	8494	26.15	17.73	1.47	4.10	1.63	56.2
ACH 309	324.8	8779	27.07	17.70	1.46	4.43	1.21	62.1
ACH 311	324.0	8503	26.28	17.73	1.53	3.92	1.58	57.1
Beta 1492	321.8	9222	28.71	17.50	1.41	5.18	2.00	51.1
Beta 2010	314.7	9224	29.33	17.19	1.45	5.22	1.50	58.1
Beta 3712	323.0	8977	27.81	17.57	1.42	5.53	2.25	48.7
Hilleshog 5135	322.2	8925	27.73	17.59	1.48	5.25	1.63	55.6
Hilleshog Niagara(7505)	329.4	8861	26.93	17.86	1.39	4.53	2.21	51.3
Hilleshog Shasta(2416)	330.7	8759	26.55	17.94	1.40	5.38	1.63	58.5
HM 2401	319.2	8815	27.63	17.42	1.46	5.50	1.75	54.7
KW 1119	328.7	8517	25.95	17.89	1.46	5.22	1.75	52.7
KW 1800	315.1	9112	28.97	17.24	1.48	5.07	1.67	54.7
KW 2249(Blend)	311.8	9043	29.05	17.11	1.52	5.03	1.71	58.8
KW 2398	333.1	8868	26.66	18.04	1.38	5.10	1.75	55.6
KW 3291	318.1	8876	27.97	17.34	1.43	5.18	1.92	53.2
KW 6770	320.1	9273	29.02	17.42	1.41	5.22	2.13	49.9
Maribo 875	322.1	8646	26.87	17.60	1.49	4.97	1.46	56.5
Maribo 923	322.6	8879	27.58	17.62	1.49	5.28	1.42	49.9
Mitsui Monohikari	316.3	8641	27.35	17.15	1.33	4.62	2.04	54.7
Seedex Laser(1004)	321.9	8444	26.26	17.55	1.46	4.18	1.67	53.9
Van der Have H66140	315.8	9201	29.18	17.24	1.45	5.50	1.75	59.9
Mean	**321.8**	**8850.6**	**27.6**	**17.5**	**1.5**	**5.0**	**1.7**	**55.0**

**** Lower numbers indicate better resistance and vigor.**

SPECIAL

Variety	Rec./ S Ton	Rec./ S Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf Spot**
ACH 205	310.7	8718	28.08	16.87	1.33	4.37
Hilleshog 7036 (Resist)	321.6	9119	28.40	17.46	1.37	4.60

Table 8. Combined data for 1992,1993, and 1994.

Three Year Performance Summary of 1994 SMSC Commercial Coded Entries (All Locations)

	------Rec. / Ton------					-----Rec. / Acre-----					--Loss to Molasses--					---Cercospora Leaf Spot Ratings---				
Description	1992	1993	1994	3 Yr Mean	3 Yr % Mean	1992	1993	1994	3 Yr Mean	3 Yr % Mean	1992	1993	1994	3 Yr Mean	3 Yr % Mean	1992	1993	1994	3 Yr Mean	3 Yr % Mean
ACH 194	328.1	322.1	321.5	323.9	100.3	7618	3710	8734	6687	98.4	1.22	1.33	1.48	1.34	101.5	5.67	4.97	5.12	5.25	104.2
ACH 196	329.2	317.1	323.2	323.2	100.1	7868	3861	9082	6937	102.1	1.25	1.37	1.51	1.38	104.0	5.38	4.97	5.00	5.12	101.5
ACH 198	322.1	315.7	318.4	318.7	98.7	7192	3650	8540	6461	95.0	1.31	1.38	1.56	1.42	107.1	4.79	4.23	4.47	4.50	89.2
ACH 205(Aphan.Spec.)	312.6	309.2	310.7	310.8	96.2	7344	3925	8718	6662	98.0	1.18	1.21	1.33	1.24	93.7	4.46	4.15	4.37	4.33	85.8
ACH 302	327.7	326.7	325.2	326.5	101.1	7182	3894	8494	6523	96.0	1.22	1.26	1.47	1.32	99.5	4.92	4.32	4.10	4.45	88.2
ACH 309	329.4	323.1	324.8	325.8	100.9	7205	3665	8779	6550	96.4	1.22	1.28	1.46	1.32	99.8	4.63	4.40	4.43	4.49	89.0
ACH 311	323.7	319.6	324.0	322.4	99.8	6968	3708	8503	6393	94.1	1.35	1.37	1.53	1.42	107.1	4.71	3.92	3.92	4.18	83.0
Beta 1492(NC)	330.8	316.2	321.8	322.9	100.0	8309	3989	9222	7173	105.5	1.17	1.29	1.41	1.29	97.5	5.42	4.95	5.18	5.18	102.8
Beta 2010	323.9	317.1	314.7	318.6	98.6	7309	4081	9224	6871	101.1	1.19	1.28	1.45	1.31	98.8	5.54	5.03	5.22	5.26	104.4
Beta 3712(NC)	335.2	323.3	323.0	327.2	101.3	8311	3923	8977	7070	104.0	1.19	1.14	1.42	1.25	94.5	5.96	4.98	5.53	5.49	108.9
Hilleshog 5135	323.6	324.8	322.2	323.5	100.2	7894	4242	8925	7020	103.3	1.31	1.32	1.48	1.37	103.5	5.38	5.05	5.25	5.23	103.7
Hilleshog Niagara(7505)	327.3	325.0	329.4	327.2	101.3	7238	4120	8861	6740	99.2	1.25	1.28	1.39	1.31	98.8	5.17	4.68	4.53	4.79	95.1
Hilleshog Shasta(2416)	337.5	333.2	330.7	333.8	103.3	7572	3773	8759	6701	98.6	1.21	1.26	1.40	1.29	97.5	5.75	5.27	5.38	5.47	108.4
HM 2401	326.5	314.3	319.2	320.0	99.1	7706	3874	8815	6798	100.0	1.23	1.35	1.46	1.35	101.8	5.21	4.97	5.50	5.23	103.7
KW 1119	334.1	317.3	328.7	326.7	101.2	7589	3449	8517	6518	95.9	1.18	1.30	1.46	1.31	99.3	5.88	5.10	5.22	5.40	107.1
KW 1800	328.6	306.8	315.1	316.8	98.1	8269	3916	9112	7099	104.4	1.20	1.34	1.48	1.34	101.3	5.83	4.98	5.07	5.29	105.0
KW 2249(Blend)	329.9	314.6	311.8	318.8	98.7	7783	3875	9043	6900	101.5	1.19	1.32	1.52	1.34	101.5	5.75	4.98	5.03	5.25	104.2
KW 2398(Aphan.Spec.)	338.5	324.5	333.1	332.0	102.8	7642	3689	8868	6733	99.1	1.19	1.27	1.38	1.28	96.7	5.79	5.02	5.10	5.30	105.2
KW 3291	336.6	327.2	318.1	327.3	101.3	7770	3830	8876	6825	100.4	1.18	1.23	1.43	1.28	96.7	5.63	4.93	5.18	5.25	104.1
KW 6770	330.0	331.1	320.1	327.1	101.3	7983	4199	9273	7152	105.2	1.16	1.28	1.41	1.28	97.0	5.33	5.05	5.22	5.20	103.1
Maribo 875	325.9	320.0	322.1	322.7	99.9	7563	3909	8646	6706	98.7	1.25	1.35	1.49	1.36	103.0	5.17	4.83	4.97	4.99	99.0
Maribo 923(NC)	326.8	319.6	322.6	323.0	100.0	7661	4134	8879	6891	101.4	1.30	1.37	1.49	1.39	104.8	5.46	4.97	5.28	5.24	103.9
Mitsui Monohikari	319.4	310.2	316.3	315.3	97.6	7634	3702	8641	6659	98.0	1.13	1.26	1.33	1.24	93.7	5.54	4.80	4.62	4.99	98.9
Seedex Laser(1004)	329.3	320.6	321.9	323.9	100.3	7029	3967	8444	6480	95.3	1.21	1.28	1.46	1.32	99.5	4.58	4.53	4.18	4.43	87.9
Van der Have H66140	322.7	314.8	315.8	317.8	98.4	7724	4179	9201	7035	103.5	1.22	1.32	1.45	1.33	100.5	5.25	5.15	5.50	5.30	105.1
Van der Have H66156	330.0	319.3	315.4	321.6	99.6	7998	4119	9308	7142	105.1	1.23	1.29	1.49	1.34	101.0	5.67	5.18	5.65	5.50	109.1
Mean	328.1	319.7	321.1	323.0	100.0	7629	3899	8863.1	6797	100.0	1.22	1.30	1.45	1.32	100.0	5.34	4.82	4.96	5.04	100.0

Table 9. Combined data from 1992,1993, and 1994.

Three Year Performance Summary of 1994 SMSC Commercial Coded Entries (All Locations)

Description	--Sugar Content (%)--					---Root Yield (T/A)---					---Seedling Vigor---					---Field Emerg (%)---				
	1992	1993	1994	3 Yr Mean	3 Yr % Mean	1992	1993	1994	3 Yr Mean	3 Yr % Mean	1992	1993	1994	3 Yr Mean	3 Yr % Mean	1992	1993	1994	3 Yr Mean	3 Yr % Mean
ACH 194	17.63	17.43	17.56	17.54	100.4	23.22	11.51	27.21	20.65	98.1	1.38	1.20	1.38	1.32	78.0	67.0	72.6	54.6	64.7	100.9
ACH 196	17.71	17.23	17.66	17.53	100.3	23.89	12.16	28.12	21.39	101.7	1.79	1.39	1.63	1.60	94.7	64.2	76.5	54.6	65.1	101.4
ACH 198	17.42	17.16	17.48	17.35	99.3	22.35	11.57	26.85	20.26	96.3	1.29	1.52	1.50	1.44	84.9	66.8	76.7	56.5	66.7	103.9
ACH 205(Aphan.Spec.)	16.80	16.67	16.87	16.78	96.0	23.53	12.67	28.08	21.43	101.9	1.83	1.56	1.54	1.64	97.1	68.9	79.5	62.8	70.4	109.7
ACH 302	17.61	17.59	17.73	17.64	101.0	21.94	11.92	26.15	20.00	95.1	1.63	1.29	1.63	1.52	89.6	65.0	73.0	56.2	64.7	100.9
ACH 309	17.69	17.44	17.70	17.61	100.8	21.90	11.34	27.07	20.10	95.6	1.32	1.46	1.21	1.33	78.6		72.3	62.1		
ACH 311	17.54	17.35	17.73	17.54	100.4	21.56	11.62	26.28	19.82	94.2	1.07	2.24	1.58	1.63	96.3		60.9	57.1		
Beta 1492(NC)	17.71	17.10	17.50	17.44	99.8	25.13	12.57	28.71	22.14	105.2	1.83	1.55	2.00	1.79	106.0			51.1		
Beta 2010	17.39	17.13	17.19	17.24	98.6	22.58	12.87	29.33	21.59	102.6	2.33	1.29	1.50	1.71	100.8	64.6	75.7	58.1	66.1	103.0
Beta 3712(NC)	17.95	17.31	17.57	17.61	100.8	24.81	12.11	27.81	21.58	102.6	1.61	1.55	2.25	1.80	106.6			48.7		
Hilleshog 5135	17.49	17.56	17.59	17.55	100.4	24.41	13.07	27.73	21.74	103.3	1.54	1.10	1.63	1.42	84.1	62.2	75.9	55.6	64.6	100.6
Hilleshog Niagara(7505)	17.62	17.53	17.86	17.67	101.1	22.12	12.66	26.93	20.57	97.8	1.51	2.30	2.21	2.01	118.6		53.9	51.3		
Hilleshog Shasta(2416)	18.09	17.93	17.94	17.99	102.9	22.45	11.30	26.55	20.10	95.6	1.61	2.11	1.63	1.78	105.4			58.5		
HM 2401	17.55	17.06	17.42	17.34	99.3	23.62	12.32	27.63	21.19	100.7	1.83	1.94	1.75	1.84	108.7	64.0	73.7	54.7	64.1	99.9
KW 1119	17.89	17.17	17.89	17.65	101.0	22.73	10.84	25.95	19.84	94.3	2.17	1.94	1.75	1.95	115.4	58.2	68.3	52.7	59.7	93.1
KW 1800	17.63	16.68	17.24	17.18	98.3	25.18	12.76	28.97	22.30	106.0	1.63	2.49	1.67	1.93	114.0	57.5	69.1	54.7	60.4	94.2
KW 2249(Blend)	17.69	17.05	17.11	17.28	98.9	23.61	12.30	29.05	21.65	102.9	2.04	1.45	1.71	1.73	102.4	62.5	75.9	58.8	65.7	102.4
KW 2398(Aphan.Spec.)	18.11	17.49	18.04	17.88	102.3	22.60	11.34	26.66	20.20	96.0	1.71	1.96	1.75	1.81	106.8	64.0	72.8	55.6	64.1	99.9
KW 3291	18.02	17.59	17.34	17.65	101.0	23.11	11.70	27.97	20.93	99.5	1.47	1.54	1.92	1.64	97.1		67.6	53.2		
KW 6770	17.66	17.83	17.42	17.64	100.9	24.20	12.67	29.02	21.96	104.4	1.75	1.55	2.13	1.81	107.0	55.4	64.5	49.9	56.6	88.2
Maribo 875	17.55	17.35	17.60	17.50	100.2	23.24	12.21	26.87	20.77	98.8	1.25	1.10	1.46	1.27	75.0	66.0	78.7	56.5	67.1	104.5
Maribo 923(NC)	17.64	17.34	17.62	17.53	100.3	23.44	12.93	27.58	21.32	101.3	1.25	1.13	1.42	1.27	74.8		70.9	49.9		
Mitsui Monohikari	17.10	16.77	17.15	17.01	97.3	23.92	11.92	27.35	21.06	100.1	2.75	2.42	2.04	2.40	142.0	61.6	69.4	54.7	61.9	96.4
Seedex Laser(1004)	17.68	17.31	17.55	17.51	100.2	21.34	12.37	26.26	19.99	95.0	2.54	2.42	1.67	2.21	130.6		52.8	53.9		
Van der Have H66140	17.36	17.06	17.24	17.22	98.6	23.95	13.24	29.18	22.12	105.2	2.04	1.58	1.75	1.79	105.8	61.6	73.1	59.9	64.9	101.1
Van der Have H66156	17.74	17.25	17.26	17.42	99.7	24.25	12.90	29.55	22.23	105.7	1.17	1.45	1.42	1.35	79.6		71.3	57.8		
Mean	17.63	17.28	17.51	17.47	100.0	23.27	12.19	27.65	21.04	100.0	1.71	1.67	1.70	1.69	100.0	63.1	70.7	55.4	64.2	100.0

+ Lower numbers indicate better vigor.

TABLE 10A. COMBINED ANALYSIS

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

26 Entries 24 RepsXLocs 3 Tests Combined 2 Rows/Plot 1 Sample/Plot

ENTRY	CODE	REC/T LBS		REC/A LBS		LTM		SUGAR %		YIELD T/A	
ACH 194	75	321.5	100	8734	99	1.48	102	17.56	100	27.21	98
ACH 196	92	323.2	101	9082	102	1.51	104	17.66	101	28.12	102
ACH 198	77	318.4	99	8540	96 -	1.56	107 +	17.48	100	26.85	97
ACH 205 (Aphan. Spec.)	70	310.7	97 -	8718	98	1.33	92 -	16.87	96 -	28.08	102
ACH 302	88	325.2	101	8494	96 -	1.47	101	17.73	101 +	26.15	95 -
ACH 309	85	324.8	101	8779	99	1.46	100	17.70	101	27.07	98
ACH 311	68	324.0	101	8503	96 -	1.53	106 +	17.73	101 +	26.28	95 -
Beta 1492 (NC)	89	321.8	100	9222	104 +	1.41	97	17.50	100	28.71	104 +
Beta 2010	86	314.7	98 -	9224	104 +	1.45	100	17.19	98 -	29.33	106 +
Beta 3712 (NC)	79	323.0	101	8977	101	1.42	98	17.57	100	27.81	101
Hilleshog 5135	67	322.2	100	8925	101	1.48	102	17.59	100	27.73	100
Hilleshog Niagara (7505)	90	329.4	103 +	8861	100	1.39	96 -	17.86	102 +	26.93	97
Hilleshog Shasta (2416)	82	330.7	103 +	8759	99	1.40	97	17.94	102 +	26.55	96 -
HM 2401	71	319.2	99	8815	99	1.46	100	17.42	99	27.63	100
KW 1119	87	328.7	102 +	8517	96 -	1.46	100	17.89	102 +	25.95	94 -
KW 1800	76	315.1	98 -	9112	103	1.48	102	17.24	98 -	28.97	105 +
KW 2249 (Blend)	81	311.8	97 -	9043	102	1.52	105 +	17.11	98 -	29.05	105 +
KW 2398 (Aphan. Spec.)	74	333.1	104 +	8868	100	1.38	95 -	18.04	103 +	26.66	96 -
KW 3291	83	318.1	99	8876	100	1.43	99	17.34	99	27.97	101
KW 6770	69	320.1	100	9273	105 +	1.41	97	17.42	99	29.02	105 +
Maribo 875	72	322.1	100	8646	98	1.49	103	17.60	101	26.87	97
Maribo 923 (NC)	80	322.6	100	8879	100	1.49	102	17.62	101	27.58	100
Mitsui Monohikari	91	316.3	98 -	8641	97	1.33	92 -	17.15	98 -	27.35	99
Seedex Laser (1004)	78	321.9	100	8444	95 -	1.46	101	17.55	100	26.26	95 -
Van der Have H66140	73	315.8	98 -	9201	104 +	1.45	100	17.24	98 -	29.18	106 +
Van der Have H66156	84	315.4	98 -	9308	105 +	1.49	103	17.26	99 -	29.55	107 +

General Mean	321.14	8863.12	1.45	17.51	27.65
Coeff. of Var. (%)	2.64	5.88	6.75	2.12	5.71
Variety Mean Square	758.51	1649213.50	0.07	1.89	28.38
Error Mean Square B	71.88	271981.00	0.01	0.14	2.50
F Value	10.55 **	6.06 **	6.79 **	13.68 **	11.37 **
L.S.D. (.05)	4.75	291.99	0.05	0.21	0.88
L.S.D. (.01)	6.01	369.60	0.07	0.26	1.12

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 10B. COMBINED ANALYSIS

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

26 Entries 24 RepsXLocs 3 Tests Combined 2 Rows/Plot 1 Sample/Plot

ENTRY	CODE	NA	PPM	K	PPM	AM. N.	PPM	GROSS/A LBS.		EMERGENCE %	
ACH 194	75	175	109	2272	105 +	483	98	9544	99	54.6	99
ACH 196	92	199	124 +	2298	106 +	484	99	9929	103	54.6	99
ACH 198	77	144	90	2194	101	571	116 +	9377	97	56.5	102
ACH 205 (Aphan. Spec.)	70	134	83 -	1953	90 -	467	95	9470	98	62.8	113 +
ACH 302	88	145	90	2215	102	496	101	9263	96 -	56.2	102
ACH 309	85	125	78 -	2209	102	496	101	9570	99	62.1	112 +
ACH 311	68	141	88	2169	100	561	114 +	9312	96 -	57.1	103
Beta 1492 (NC)	89	148	92	2037	94 -	500	102	10036	104 +	51.1	92 -
Beta 2010	86	164	103	2223	103	476	97	10078	104 +	58.1	105
Beta 3712 (NC)	79	170	106	1991	92 -	511	104	9768	101	48.7	88 -
Hilleshog 5135	67	168	105	2273	105 +	481	98	9747	101	55.6	100
Hilleshog Niagara (7505)	90	148	92	2115	98	460	94	9610	99	51.3	93 -
Hilleshog Shasta (2416)	82	173	108	2023	93 -	487	99	9506	98	58.5	106
HM 2401	71	176	110	2241	103 +	469	95	9619	99	54.7	99
KW 1119	87	138	86 -	2174	100	502	102	9276	96 -	52.7	95
KW 1800	76	164	102	2244	104 +	494	101	9975	103	54.7	99
KW 2249 (Blend)	81	189	118 +	2238	103 +	512	104	9927	103	58.8	106
KW 2398 (Aphan. Spec.)	74	165	103	2062	95 -	465	95	9608	99	55.6	100
KW 3291	83	161	101	2197	101	468	95	9680	100	53.2	96
KW 6770	69	157	98	2241	103 +	442	90 -	10096	104 +	49.9	90 -
Maribo 875	72	201	125 +	2281	105 +	478	97	9450	98	56.5	102
Maribo 923 (NC)	80	167	104	2299	106 +	482	98	9702	100	49.9	90 -
Mitsui Monohikari	91	153	95	1990	92 -	447	91 -	9370	97	54.7	99
Seedex Laser (1004)	78	135	84 -	2084	96 -	530	108 +	9213	95 -	53.9	97
Van der Have H66140	73	163	102	2158	100	491	100	10050	104 +	59.9	108 +
Van der Have H66156	84	166	104	2187	101	513	104	10191	105 +	57.8	104

General Mean	160.26	2168.08	491.02	9667.99	55.35
Coeff. of Var. (%)	23.16	5.01	12.13	5.76	12.25
Variety Mean Square	8890.96	257331.20	21668.91	2040245.00	306.18
Error Mean Square B	1377.74	11798.32	3547.79	309972.09	45.95
F Value	6.45 **	21.81 **	6.11 **	6.58 **	6.66 **
L.S.D. (.05)	20.78	60.81	33.35	311.72	3.80
L.S.D. (.01)	26.31	76.98	42.21	394.57	4.80

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.
Emergence data collected from 3 locations.

TABLE 10C. COMBINED ANALYSIS

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

26 Entries 24 RepsXLocs 3 Tests Combined 2 Rows/Plot 1 Sample/Plot

ENTRY	CODE	BOLTERS %	VIGOR	
ACH 194	75	0.00	1.38	81
ACH 196	92	0.00	1.63	96
ACH 198	77	0.00	1.50	88
ACH 205 (Aphan. Spec.)	70	0.00	1.54	91
ACH 302	88	0.00	1.63	96
ACH 309	85	0.00	1.21	71 -
ACH 311	68	0.00	1.58	93
Beta 1492 (NC)	89	0.14	2.00	118
Beta 2010	86	0.00	1.50	88
Beta 3712 (NC)	79	0.36	2.25	133 +
Hilleshog 5135	67	0.00	1.63	96
Hilleshog Niagara (7505)	90	0.00	2.21	130 +
Hilleshog Shasta (2416)	82	0.00	1.63	96
HM 2401	71	0.00	1.75	103
KW 1119	87	0.00	1.75	103
KW 1800	76	0.00	1.67	98
KW 2249 (Blend)	81	0.00	1.71	101
KW 2398 (Aphan. Spec.)	74	0.08	1.75	103
KW 3291	83	0.00	1.92	113
KW 6770	69	0.00	2.13	125 +
Maribo 875	72	0.21	1.46	86
Maribo 923 (NC)	80	0.00	1.42	84
Mitsui Monohikari	91	0.00	2.04	120
Seedex Laser (1004)	78	0.00	1.67	98
Van der Have H66140	73	0.00	1.75	103
Van der Have H66156	84	0.00	1.42	84

General Mean	0.03	1.70
Coeff. of Var. (%)	868.19	37.00
Variety Mean Square	0.17	1.65
Error Mean Square B	0.07	0.39
F Value	2.42 **	4.18 **
L.S.D. (.05)	0.15	0.35
L.S.D. (.01)	0.19	0.44

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.
Vigor data collected from 3 locations

TABLE 11A. CLARA CITY

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/17/94
Harvest Date: 10/14/94

26 Entries 8 Replications 2 Rows/Plot 1 Samples/Plot

ENTRY	CODE	REC/T LBS		REC/A LBS		LTM		SUGAR %		YIELD T/A	
ACH 194	75	318.9	101	9239	102	1.51	102	17.45	101	29.03	100
ACH 196	92	324.4	103 +	9404	103	1.55	104	17.76	103 +	28.98	100
ACH 198	77	311.5	99	8694	96	1.60	108 +	17.18	100	27.93	97
ACH 205 (Aphan. Spec.)	70	305.9	97 -	8993	99	1.42	96	16.71	97 -	29.40	102
ACH 302	88	320.5	102	8591	94	1.51	102	17.54	102	26.83	93 -
ACH 309	85	319.4	101	8941	98	1.48	100	17.45	101	28.02	97
ACH 311	68	314.7	100	8315	91 -	1.58	106	17.31	100	26.47	92 -
Beta 1492 (NC)	89	314.1	100	9586	105	1.44	97	17.15	99	30.56	106 +
Beta 2010	86	313.5	99	9350	103	1.45	98	17.13	99	29.86	103
Beta 3712 (NC)	79	320.6	102	9328	102	1.44	98	17.47	101	29.10	101
Hilleshog 5135	67	316.8	100	9177	101	1.47	99	17.31	100	29.00	100
Hilleshog Niagara (7505)	90	323.0	102	8711	96	1.43	96	17.57	102	26.99	93 -
Hilleshog Shasta (2416)	82	326.1	103 +	9390	103	1.41	95	17.71	103 +	28.85	100
HM 2401	71	316.4	100	9353	103	1.46	98	17.27	100	29.56	102
KW 1119	87	328.4	104 +	8848	97	1.45	98	17.88	104 +	26.97	93 -
KW 1800	76	307.2	97	9432	104	1.53	103	16.89	98 -	30.77	106 +
KW 2249 (Blend)	81	300.0	95 -	9166	101	1.59	108 +	16.59	96 -	30.63	106 +
KW 2398 (Aphan. Spec.)	74	325.1	103 +	9093	100	1.38	93	17.64	102 +	28.01	97
KW 3291	83	307.5	97	9402	103	1.51	102	16.89	98 -	30.60	106 +
KW 6770	69	313.2	99	9536	105	1.49	101	17.15	99	30.43	105
Maribo 875	72	309.7	98	8620	95	1.59	107 +	17.07	99	27.88	96
Maribo 923 (NC)	80	313.9	100	9112	100	1.50	102	17.20	100	29.06	101
Mitsui Monohikari	91	310.1	98	9066	100	1.35	91 -	16.86	98 -	29.25	101
Seedex Laser (1004)	78	318.1	101	8083	89 -	1.43	97	17.34	100	25.45	88 -
Van der Have H66140	73	309.1	98	9546	105	1.50	101	16.95	98	30.94	107 +
Van der Have H66156	84	314.6	100	9662	106 +	1.43	96	17.16	99	30.77	106 +

General Mean	315.49	9101.50	1.48	17.26	28.90
Coeff. of Var. (%)	2.72	5.85	6.92	2.14	5.82
Variety Mean Square	381.21	1307086.38	0.03	0.85	18.22
Error Mean Square B	73.89	283818.84	0.01	0.14	2.83
F Value	5.16 **	4.61 **	3.22 **	6.26 **	6.44 **
L.S.D. (.05)	8.49	525.95	0.10	0.36	1.66
L.S.D. (.01)	11.15	691.24	0.13	0.48	2.18

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 11B. CLARA CITY

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/17/94
Harvest Date: 10/14/94

26 Entries 8 Replications 2 Rows/Plot 1 Samples/Plot

ENTRY	CODE	NA	PPM	K	PPM	AM. N.	PPM	GROSS/A LBS.		EMERGENCE %	
ACH 194	75	215	103	2617	106 +	395	95	10117	102	42.0	94
ACH 196	92	263	127 +	2569	104	421	101	10299	103	40.3	91
ACH 198	77	173	83	2484	101	517	124 +	9588	96	45.5	102
ACH 205 (Aphan. Spec.)	70	148	71 -	2280	92 -	439	105	9826	99	49.6	112
ACH 302	88	171	82	2490	101	448	107	9405	94	43.5	98
ACH 309	85	152	73 -	2527	103	422	101	9774	98	53.1	119 +
ACH 311	68	178	86	2482	101	498	119 +	9155	92 -	44.1	99
Beta 1492 (NC)	89	201	97	2273	92 -	442	106	10472	105	40.8	92
Beta 2010	86	198	95	2464	100	399	96	10219	103	49.0	110
Beta 3712 (NC)	79	219	105	2266	92 -	439	105	10168	102	36.8	83 -
Hilleshog 5135	67	220	106	2581	105	376	90	10033	101	42.1	95
Hilleshog Niagara (7505)	90	193	93	2486	101	376	90	9482	95	39.2	88
Hilleshog Shasta (2416)	82	225	108	2298	93 -	398	95	10204	102	42.3	95
HM 2401	71	224	108	2525	102	378	90	10215	103	45.2	102
KW 1119	87	176	85	2496	101	401	96	9635	97	38.6	87
KW 1800	76	235	113	2554	104	422	101	10378	104	46.2	104
KW 2249 (Blend)	81	263	127 +	2502	101	474	114	10149	102	50.1	113
KW 2398 (Aphan. Spec.)	74	197	95	2374	96	371	89	9870	99	49.6	111
KW 3291	83	217	104	2537	103	421	101	10329	104	42.6	96
KW 6770	69	206	99	2565	104	399	95	10441	105	41.3	93
Maribo 875	72	295	142 +	2608	106 +	432	103	9508	95	45.6	103
Maribo 923 (NC)	80	234	113	2601	105 +	390	93	9987	100	42.4	95
Mitsui Monohikari	91	194	93	2296	93 -	369	88	9858	99	46.3	104
Seedex Laser (1004)	78	182	87	2313	94 -	432	103	8815	89 -	44.0	99
Van der Have H66140	73	215	104	2455	100	430	103	10476	105	49.5	111
Van der Have H66156	84	210	101	2461	100	378	90	10549	106 +	47.0	106

General Mean	207.80	2465.39	417.92	9959.68	44.49
Coeff. of Var. (%)	23.99	5.03	14.00	5.75	15.89
Variety Mean Square	9205.36	102050.21	11642.28	1551678.75	129.98
Error Mean Square B	2485.56	15369.58	3422.88	328267.28	49.97
F Value	3.70 **	6.64 **	3.40 **	4.73 **	2.60 **
L.S.D. (.05)	49.22	122.39	57.76	565.64	6.98
L.S.D. (.01)	64.69	160.86	75.91	743.40	9.17

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 11C. CLARA CITY

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/17/94
Harvest Date: 10/14/94

26 Entries 8 Replications 2 Rows/Plot 1 Samples/Plot

ENTRY	CODE	BOLTERS %	VIGOR	
ACH 194	75	0.00	1.50	
ACH 196	92	0.00	1.88	
ACH 198	77	0.00	1.63	
ACH 205 (Aphan. Spec.)	70	0.00	1.50	
ACH 302	88	0.00	1.75	
ACH 309	85	0.00	1.25	
ACH 311	68	0.00	1.25	
Beta 1492 (NC)	89	0.21	2.13	
Beta 2010	86	0.00	1.50	
Beta 3712 (NC)	79	0.43	2.38	
Hilleshog 5135	67	0.00	1.63	
Hilleshog Niagara (7505)	90	0.00	2.13	
Hilleshog Shasta (2416)	82	0.00	1.63	
HM 2401	71	0.00	1.63	
KW 1119	87	0.00	2.50	
KW 1800	76	0.00	1.50	
KW 2249 (Blend)	81	0.00	1.75	
KW 2398 (Aphan. Spec.)	74	0.00	1.38	
KW 3291	83	0.00	1.88	
KW 6770	69	0.00	2.00	
Maribo 875	72	0.21	1.50	
Maribo 923 (NC)	80	0.00	1.38	
Mitsui Monohikari	91	0.00	2.00	
Seedex Laser (1004)	78	0.00	1.75	
Van der Have H66140	73	0.00	1.88	
Van der Have H66156	84	0.00	1.50	

General Mean	0.02	1.70
Coeff. of Var. (%)	795.22	35.76
Variety Mean Square	0.07	0.84
Error Mean Square B	0.04	0.37
F Value	1.77**	2.29 **
L.S.D. (.05)	0.19	0.60
L.S.D. (.01)	ns	.79

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 12A. OLIVIA

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/18/94
Harvest Date: 10/24/94

26 Entries 8 Replications 2 Rows/Plot 1 Samples/Plot

ENTRY	CODE	REC/T LBS		REC/A LBS		LTM		SUGAR %		YIELD T/A	
ACH 194	75	309.7	99	8261	96	1.62	105	17.10	99	26.68	97
ACH 196	92	312.6	99	8705	101	1.62	105	17.25	100	27.87	101
ACH 198	77	314.8	100	8604	100	1.66	108 +	17.40	101	27.30	99
ACH 205 (Aphan. Spec.)	70	310.4	99	8702	101	1.34	87 -	16.86	98 -	28.05	102
ACH 302	88	317.7	101	8562	99	1.55	101	17.44	101	26.93	98
ACH 309	85	318.9	101	8769	101	1.53	99	17.47	101	27.52	100
ACH 311	68	324.8	103 +	8655	100	1.52	99	17.76	103 +	26.68	97
Beta 1492 (NC)	89	314.9	100	8693	101	1.48	96	17.23	100	27.66	101
Beta 2010	86	299.6	95 -	8819	102	1.57	102	16.55	96 -	29.42	107 +
Beta 3712 (NC)	79	309.2	98	8461	98	1.55	101	17.01	99	27.35	99
Hilleshog 5135	67	317.2	101	8617	100	1.60	104	17.46	101	27.20	99
Hilleshog Niagara (7505)	90	324.5	103 +	8989	104	1.46	95	17.69	103 +	27.71	101
Hilleshog Shasta (2416)	82	320.0	102	8326	96	1.49	97	17.49	101	26.07	95
HM 2401	71	312.6	99	8404	97	1.53	100	17.16	99	26.92	98
KW 1119	87	312.7	99	8137	94	1.60	104	17.23	100	26.03	95
KW 1800	76	306.7	98	8827	102	1.58	103	16.91	98	28.77	105
KW 2249 (Blend)	81	312.6	99	8727	101	1.54	100	17.17	99	27.94	102
KW 2398 (Aphan. Spec.)	74	328.5	105 +	8836	102	1.50	97	17.92	104 +	26.88	98
KW 3291	83	311.0	99	8547	99	1.55	101	17.10	99	27.48	100
KW 6770	69	313.0	100	9202	107	1.49	97	17.14	99	29.41	107 +
Maribo 875	72	321.1	102	8367	97	1.53	99	17.59	102	26.05	95
Maribo 923 (NC)	80	315.8	100	8791	102	1.61	105	17.40	101	27.84	101
Mitsui Monohikari	91	315.2	100	8471	98	1.35	88 -	17.11	99	26.89	98
Seedex Laser (1004)	78	318.6	101	8760	101	1.56	101	17.49	101	27.51	100
Van der Have H66140	73	311.0	99	8801	102	1.54	100	17.09	99	28.31	103
Van der Have H66156	84	299.3	95 -	8622	100	1.66	108 +	16.63	96 -	28.87	105

General Mean	314.32	8640.50	1.54	17.26	27.51
Coeff. of Var. (%)	2.68	6.51	6.47	2.12	6.07
Variety Mean Square	370.81	430050.75	0.05	0.84	6.89
Error Mean Square B	71.22	316395.63	0.01	0.13	2.79
F Value	5.21 **	1.36	4.74 **	6.29 **	2.47 **
L.S.D. (.05)	8.33	ns	0.10	0.36	1.65
L.S.D. (.01)	10.95	ns	0.13	0.48	2.17

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 12B. OLIVIA

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/18/94
Harvest Date: 10/24/94

26 Entries 8 Replications 2 Rows/Plot 1 Samples/Plot

ENTRY	CODE	NA	PPM	K	PPM	AM. N.	PPM	GROSS/A	LBS.	EMERGENCE %	
ACH 194	75	154	112	2210	105 +	611	104	9123	96	66.1	102
ACH 196	92	165	120	2232	106 +	601	103	9607	101	67.0	103
ACH 198	77	134	97	2155	103	664	113 +	9508	100	65.2	100
ACH 205 (Aphan. Spec.)	70	130	94	1834	87 -	506	86 -	9456	100	74.0	114 +
ACH 302	88	130	95	2159	103	583	99	9397	99	65.7	101
ACH 309	85	115	83	2109	101	583	99	9610	101	70.1	108
ACH 311	68	123	89	2045	98	591	101	9468	100	68.7	106
Beta 1492 (NC)	89	117	85	1988	95 -	577	98	9516	100	63.2	97
Beta 2010	86	163	118	2224	106 +	568	97	9743	103	67.1	103
Beta 3712 (NC)	79	162	118	1979	94 -	619	106	9309	98	58.3	90 -
Hilleshog 5135	67	144	105	2177	104	612	104	9491	100	66.4	102
Hilleshog Niagara (7505)	90	120	87	2000	95	557	95	9799	103	64.9	100
Hilleshog Shasta (2416)	82	161	117	1937	92 -	580	99	9104	96	70.9	109
HM 2401	71	146	106	2182	104	556	95	9231	97	63.3	97
KW 1119	87	123	89	2119	101	629	107	8967	95	64.5	99
KW 1800	76	119	87	2190	104	598	102	9735	103	65.7	101
KW 2249 (Blend)	81	137	99	2142	102	573	98	9588	101	65.6	101
KW 2398 (Aphan. Spec.)	74	157	114	2015	96	568	97	9642	102	61.9	95
KW 3291	83	145	105	2146	102	580	99	9400	99	59.2	91
KW 6770	69	133	97	2145	102	535	91	10080	106	59.1	91
Maribo 875	72	149	108	2176	104	554	95	9164	97	65.3	101
Maribo 923 (NC)	80	140	102	2252	107 +	601	103	9689	102	55.1	85 -
Mitsui Monohikari	91	122	89	1887	90 -	504	86 -	9199	97	61.2	94
Seedex Laser (1004)	78	107	77	2006	96	635	108	9617	101	62.5	96
Van der Have H66140	73	135	98	2110	101	582	99	9674	102	70.4	108
Van der Have H66156	84	147	107	2100	100	674	115 +	9582	101	67.5	104

General Mean	137.60	2096.81	586.17	9488.52	64.95
Coeff. of Var. (%)	24.74	4.79	10.32	6.35	10.04
Variety Mean Square	2242.05	97900.27	12980.76	509675.75	144.00
Error Mean Square B	1158.86	10081.53	3658.02	362521.53	42.51
F Value	1.93 **	9.71 **	3.55 **	1.41 **	3.39 **
L.S.D. (.05)	33.61	99.13	59.71	ns	6.44
L.S.D. (.01)	44.17	130.28	78.47	ns	8.46

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 12C. OLIVIA

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/18/94
Harvest Date: 10/24/94

26 Entries 8 Replications 2 Rows/Plot 1 Samples/Plot

ENTRY	CODE	BOLTERS %	VIGOR	
ACH 194	75	0.00	1.13	67
ACH 196	92	0.00	1.38	82
ACH 198	77	0.00	1.63	97
ACH 205 (Aphan. Spec.)	70	0.00	1.38	82
ACH 302	88	0.00	1.75	105
ACH 309	85	0.00	1.25	75
ACH 311	68	0.00	1.63	97
Beta 1492 (NC)	89	0.00	1.50	90
Beta 2010	86	0.00	1.50	90
Beta 3712 (NC)	79	0.22	2.25	135
Hilleshog 5135	67	0.00	1.75	105
Hilleshog Niagara (7505)	90	0.00	2.25	135
Hilleshog Shasta (2416)	82	0.00	1.50	90
HM 2401	71	0.00	1.88	112
KW 1119	87	0.00	1.25	75
KW 1800	76	0.00	1.63	97
KW 2249 (Blend)	81	0.00	1.75	105
KW 2398 (Aphan. Spec.)	74	0.23	1.88	112
KW 3291	83	0.00	2.00	120
KW 6770	69	0.00	2.13	127
Maribo 875	72	0.42	1.50	90
Maribo 923 (NC)	80	0.00	1.50	90
Mitsui Monohikari	91	0.00	2.25	135
Seedex Laser (1004)	78	0.00	1.75	105
Van der Have H66140	73	0.00	1.63	97
Van der Have H66156	84	0.00	1.38	82

General Mean	0.03	1.67
Coeff. of Var. (%)	877.50	38.44
Variety Mean Square	0.08	0.80
Error Mean Square B	0.09	0.41
F Value	0.92	1.94 **
L.S.D. (.05)	ns	0.63
L.S.D. (.01)	ns	0.83

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 13A. COMBINED ANALYSIS

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/18/94
Harvest Date: 10/28/94

26 Entries 8 Replications 2 Rows/Plot 1 Samples/Plot

ENTRY	CODE	REC/T LBS		REC/A LBS		LTM		SUGAR %		YIELD T/A	
ACH 194	75	336.0	101	8703	98	1.33	99	18.13	101	25.92	98
ACH 196	92	332.4	100	9136	103	1.35	101	17.98	100	27.50	104
ACH 198	77	328.8	99	8320	94 -	1.41	106	17.85	99	25.32	95
ACH 205 (Aphan. Spec.)	70	315.8	95 -	8460	96	1.25	93 -	17.04	95 -	26.79	101
ACH 302	88	337.3	101	8327	94 -	1.34	100	18.20	101	24.70	93 -
ACH 309	85	336.1	101	8627	98	1.36	102	18.16	101	25.69	97
ACH 311	68	332.4	100	8540	97	1.50	113 +	18.12	101	25.70	97
Beta 1492 (NC)	89	336.5	101	9386	106 +	1.31	98	18.14	101	27.90	105 +
Beta 2010	86	331.0	99	9504	107 +	1.34	100	17.89	99	28.72	108 +
Beta 3712 (NC)	79	339.2	102	9142	103	1.27	95	18.23	101	26.98	102
Hilleshog 5135	67	332.6	100	8982	102	1.36	102	17.99	100	27.00	102
Hilleshog Niagara (7505)	90	340.7	102	8884	100	1.28	96	18.31	102	26.08	98
Hilleshog Shasta (2416)	82	345.9	104 +	8560	97	1.32	99	18.61	103 +	24.74	93 -
HM 2401	71	328.7	99	8688	98	1.38	103	17.81	99	26.41	100
KW 1119	87	345.0	103 +	8568	97	1.32	99	18.57	103 +	24.85	94 -
KW 1800	76	331.4	99	9076	103	1.34	101	17.91	99	27.38	103
KW 2249 (Blend)	81	322.9	97 -	9236	104	1.42	106	17.56	97 -	28.59	108 +
KW 2398 (Aphan. Spec.)	74	345.6	104 +	8675	98	1.27	95	18.55	103 +	25.11	95 -
KW 3291	83	335.9	101	8680	98	1.23	92 -	18.02	100	25.85	97
KW 6770	69	334.1	100	9081	103	1.26	94	17.96	100	27.21	103
Maribo 875	72	335.6	101	8952	101	1.36	102	18.14	101	26.68	101
Maribo 923 (NC)	80	338.1	101	8734	99	1.35	101	18.25	101	25.84	97
Mitsui Monohikari	91	323.6	97 -	8387	95 -	1.28	96	17.46	97 -	25.92	98
Seedex Laser (1004)	78	328.9	99	8489	96	1.39	104	17.84	99	25.81	97
Van der Have H66140	73	327.2	98	9255	105	1.32	99	17.67	98	28.30	107 +
Van der Have H66156	84	332.4	100	9640	109 +	1.38	103	18.00	100	29.02	109 +

General Mean	333.62	8847.37	1.33	18.02	26.54
Coeff. of Var. (%)	2.52	5.25	6.53	2.10	5.15
Variety Mean Square	393.00	1098252.00	0.03	0.95	12.66
Error Mean Square B	70.65	215748.92	0.01	0.14	1.87
F Value	5.56**	5.09**	3.85**	6.65**	6.78**
L.S.D. (.05)	8.30	458.57	0.09	0.37	1.35
L.S.D. (.01)	10.91	602.67	0.11	0.49	1.77

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 13B. COMBINED ANALYSIS

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/18/94
Harvest Date: 10/28/94

26 Entries 8 Replications 2 Rows/Plot 1 Samples/Plot

ENTRY	CODE	NA	PPM	K	PPM	AM. N.	PPM	GROSS/A	LBS.	EMERGENCE	%
ACH 194	75	156	115	1989	102	445	95	9392	98	55.7	98
ACH 196	92	169	124 +	2094	108 +	431	92	9881	103	56.5	100
ACH 198	77	124	92	1944	100	531	113 +	9035	95 -	58.8	104
ACH 205 (Aphan. Spec.)	70	123	91	1745	90 -	457	97	9128	96	64.9	115 +
ACH 302	88	134	99	1996	103	457	97	8987	94 -	59.4	105
ACH 309	85	107	79 -	1990	102	484	103	9325	98	63.0	111
ACH 311	68	123	91	1981	102	594	127 +	9312	97	58.5	103
Beta 1492 (NC)	89	125	92	1849	95	481	103	10119	106 +	49.2	87 -
Beta 2010	86	132	97	1982	102	460	98	10271	107 +	58.0	102
Beta 3712 (NC)	79	128	95	1727	89 -	477	102	9826	103	51.0	90
Hilleshog 5135	67	140	103	2063	106 +	454	97	9716	102	58.2	103
Hilleshog Niagara (7505)	90	131	96	1857	96	449	96	9550	100	49.8	88 -
Hilleshog Shasta (2416)	82	133	99	1834	94 -	484	103	9211	96	62.4	110
HM 2401	71	157	116 +	2017	104	473	101	9412	98	55.5	98
KW 1119	87	114	84	1909	98	477	102	9225	97	54.8	97
KW 1800	76	137	101	1990	102	463	99	9811	103	52.1	92
KW 2249 (Blend)	81	167	123 +	2071	107 +	490	104	10045	105 +	60.8	107
KW 2398 (Aphan. Spec.)	74	142	105	1798	93 -	454	97	9313	97	55.2	98
KW 3291	83	122	90	1909	98	402	86 -	9313	97	57.9	102
KW 6770	69	132	98	2014	104	393	84 -	9768	102	49.3	87 -
Maribo 875	72	159	117 +	2060	106 +	447	95	9676	101	58.5	103
Maribo 923 (NC)	80	127	94	2046	105 +	454	97	9430	99	52.0	92
Mitsui Monohikari	91	141	104	1785	92 -	467	100	9052	95 -	56.5	100
Seedex Laser (1004)	78	118	87	1934	100	522	111	9208	96	55.4	98
Van der Have H66140	73	138	102	1910	98	463	99	10001	105	59.7	108
Van der Have H66156	84	142	105	2001	103	487	104	10442	109 +	59.0	104

General Mean	135.39	1942.03	468.97	9555.76	56.62
Coeff. of Var. (%)	16.35	5.13	12.72	5.12	11.91
Variety Mean Square	1960.13	85526.54	12147.26	1297283.88	140.39
Error Mean Square B	489.83	9917.51	3556.40	239134.22	45.48
F Value	4.00 **	8.62 **	3.42 **	5.42 **	3.09 **
L.S.D. (.05)	21.85	98.32	58.88	482.78	6.66
L.S.D. (.01)	28.72	129.21	77.38	634.50	8.75

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 14

1994 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/18/94
Harvest Date: 10/28/94

26 Entries 8 Replications 2 Rows/Plot 1 Samples/Plot

ENTRY	CODE	BOLTERS %	VIGOR	
ACH 194	75	0.00	1.50	88
ACH 196	92	0.00	1.63	96
ACH 198	77	0.00	1.25	74
ACH 205 (Aphan. Spec.)	70	0.00	1.75	103
ACH 302	88	0.00	1.38	81
ACH 309	85	0.00	1.13	66
ACH 311	68	0.00	1.88	110
Beta 1492 (NC)	89	0.21	2.38	140 +
Beta 2010	86	0.00	1.50	88
Beta 3712 (NC)	79	0.43	2.13	125
Hilleshog 5135	67	0.00	1.50	88
Hilleshog Niagara (7505)	90	0.00	2.25	133
Hilleshog Shasta (2416)	82	0.00	1.75	103
HM 2401	71	0.00	1.75	103
KW 1119	87	0.00	1.50	88
KW 1800	76	0.00	1.88	110
KW 2249 (Blend)	81	0.00	1.63	96
KW 2398 (Aphan. Spec.)	74	0.00	2.00	118
KW 3291	83	0.00	1.88	110
KW 6770	69	0.00	2.25	133
Maribo 875	72	0.00	1.38	81
Maribo 923 (NC)	80	0.00	1.38	81
Mitsui Monohikari	91	0.00	1.88	110
Seedex Laser (1004)	78	0.00	1.50	88
Van der Have H66140	73	0.00	1.75	103
Van der Have H66156	84	0.00	1.38	81

General Mean	0.02	1.70
Coeff. of Var. (%)	795.22	35.76
Variety Mean Square	0.07	0.84
Error Mean Square B	0.04	0.37
F Value	1.77**	2.29 **
L.S.D. (.05)	0.19	0.60
L.S.D. (.01)	ns	.79

* significant at 5% ** significant at 1% ns not significant
Second column for each trait is percent of check. General Mean used as check.

TABLE 15

1994 CERCOSPORA READINGS FOR SMBSC COMMERCIAL CODED ENTRIES
BETASEED NURSERY - SHAKOPEE, MN
Average Rating at Each Date *

CODE	DESCRIPTION	7/28	8/04	8/10	8/13	8/19	8/24	1994 MEAN	2 YR MEAN	3 YR MEAN	3 YR % MEAN
75	ACH 194	3.0	3.7	5.0	6.0	6.0	7.0	5.12	5.05	5.25	104.6
92	ACH 196	3.0	3.3	5.0	5.7	6.0	7.0	5.00	4.99	5.12	101.8
77	ACH 198	2.5	3.5	4.5	5.0	5.0	6.3	4.47	4.35	4.50	89.5
70	ACH 205 (Aphan. Spec.)	2.3	3.3	4.5	4.5	5.3	6.3	4.37	4.26	4.33	86.1
88	ACH 302	2.5	3.0	4.0	4.5	4.5	6.1	4.10	4.21	4.45	88.5
85	ACH 309	2.5	3.3	4.5	5.3	5.0	6.0	4.43	4.42	4.49	89.3
68	ACH 311	2.0	3.0	4.0	4.0	4.5	6.0	3.92	3.92	4.18	83.3
89	Beta 1492 (NC)	3.0	4.0	5.0	6.0	6.3	6.8	5.18	5.07	5.18	103.2
86	Beta 2010	3.0	3.5	5.0	6.0	6.5	7.3	5.22	5.13	5.26	104.8
79	Beta 3712 (NC)	3.3	4.0	5.3	6.3	7.0	7.3	5.53	5.26	5.49	109.3
67	Hilleshog 5135	3.0	4.0	5.0	6.0	6.5	7.0	5.25	5.15	5.23	104.0
90	Hilleshog Niagara (7505)	2.7	3.0	4.3	5.3	5.3	6.6	4.53	4.61	4.79	95.4
82	Hilleshog Shasta (2416)	3.0	3.5	5.3	6.0	6.5	8.0	5.38	5.33	5.47	108.8
71	HM 2401	3.3	3.7	5.4	6.3	7.0	7.3	5.50	5.24	5.23	104.0
87	KW 1119	3.0	4.0	5.0	6.0	6.0	7.3	5.22	5.16	5.40	107.5
76	KW 1800	3.0	3.3	5.0	5.8	6.3	7.0	5.07	5.03	5.29	105.4
81	KW 2249 (Blend)	3.0	3.3	4.6	5.7	6.3	7.3	5.03	5.01	5.25	104.6
74	KW 2398 (Aphan. Spec.)	3.0	3.3	5.0	6.0	6.3	7.0	5.10	5.06	5.30	105.6
83	KW 3291	3.0	3.8	5.0	6.0	6.3	7.0	5.18	5.06	5.25	104.4
69	KW 6770	3.5	3.8	5.0	6.0	6.0	7.0	5.22	5.14	5.20	103.5
72	Maribo 875	3.0	3.8	5.0	5.5	6.0	6.5	4.97	4.90	4.99	99.3
80	Maribo 923 (NC)	3.0	3.7	5.0	6.0	6.7	7.3	5.28	5.13	5.24	104.2
91	Mitsui Monohikari	2.7	3.7	4.0	5.3	5.3	6.7	4.62	4.71	4.99	99.3
78	Seedex Laser (1004)	2.5	3.0	4.3	4.5	4.5	6.3	4.18	4.36	4.43	88.2
73	Van der Have H66140	3.5	4.0	5.5	6.5	6.5	7.0	5.50	5.33	5.30	105.5
84	Van der Have H66156	3.3	4.0	5.5	6.5	7.3	7.3	5.65	5.42	5.50	109.5
	LSD .05	0.4	0.6	0.5	0.6	0.7	0.6	0.4			
	CV %	10.7	12.7	7.6	7.9	8.5	6.5	5.6			

* Lower numbers indicate better leaf spot resistance (1 = Ex, 9 = Poor)
NC = Non-commercially graded seed used in trials

TABLE 16

1994 CERCOSPORA READINGS FOR SMBSC
SEMI COMMERCIAL CODED ENTRIES
BETASEED NURSERY - SHAKOPEE, MN
Average Rating at Each Date *

CODE	DESCRIPTION	7/28	8/04	8/10	8/13	8/19	8/24	1994 MEAN	2 YR MEAN
188	ACH 194 (Check)	3.0	3.7	5.0	6.0	6.0	7.0	5.12	5.05
190	ACH 310	3.0	3.7	5.0	5.6	6.0	7.0	5.05	4.90
199	ACH 9100022	3.0	3.5	5.1	6.0	7.0	7.5	5.35	
192	ACH 9100270	3.0	3.3	4.3	5.0	5.0	6.0	4.43	
210	ACH 9100274	2.8	3.0	4.3	5.0	5.0	6.5	4.43	
214	ACH 9490001	3.0	3.3	5.0	6.0	7.3	7.4	5.33	
196	Beta 1154	3.3	4.0	5.3	6.3	6.8	7.5	5.53	
216	Beta 1724	2.8	3.0	4.3	5.3	6.3	7.0	4.78	
189	Beta 1994	3.0	3.3	5.3	6.5	7.3	7.8	5.53	
211	Beta 2010 (Check)	3.0	3.5	5.0	6.0	6.5	7.3	5.22	5.13
204	Beta 2074	3.0	3.5	5.0	6.0	6.0	7.1	5.10	
183	Beta 3863	3.0	3.5	5.0	5.5	6.0	7.0	5.00	4.92
187	Beta 5014 (Aphan. Spec.)	2.5	3.3	4.0	4.0	4.8	6.0	4.10	
208	Beta 6863	3.5	3.5	5.0	6.0	6.5	7.5	5.33	5.08
219	Beta 6904 (Aphan. Spec.)	3.0	3.3	4.5	5.3	6.0	6.8	4.82	
184	Hilleshog 5135 (Check)	3.0	4.0	5.0	6.0	6.5	7.0	5.25	5.15
200	Hilleshog 7034	3.3	4.0	5.5	6.5	7.0	7.5	5.63	5.39
213	Hilleshog 7035	3.0	4.0	5.0	6.3	6.8	7.8	5.48	5.27
206	Hilleshog 7040	2.7	3.3	4.3	5.3	5.7	6.4	4.62	
191	Hilleshog 7514	3.0	4.0	5.0	6.0	6.3	6.6	5.15	5.11
202	Hilleshog 7517	3.0	4.0	5.3	6.0	6.5	7.0	5.30	
218	Hilleshog 7518	2.7	3.3	5.0	6.0	6.3	7.7	5.17	
194	HM 2418	3.0	3.5	5.0	6.0	6.3	7.5	5.22	5.01
180	HM 7036(Aphan. Spec.)	3.0	3.3	4.3	5.3	5.3	6.4	4.60	
185	Holly 94HX240	3.0	3.5	4.9	6.0	6.0	7.0	5.07	
197	Holly 94HX245	3.0	3.0	5.0	6.0	6.0	7.0	5.00	
201	Holly 94HX247	3.0	3.5	5.3	5.8	6.3	6.5	5.07	
217	Holly 94HX250	3.0	4.0	5.0	6.0	6.7	7.0	5.28	
203	Holly 94HX251	3.0	3.8	5.5	6.0	6.8	7.3	5.40	
209	Maribo 875 (Check)	3.0	3.8	5.0	5.5	6.0	6.5	4.97	4.90
205	Maribo 9360 (NC)	3.3	3.7	5.3	6.6	7.7	8.0	5.77	5.53
182	Maribo 9363 (NC)	3.0	3.8	5.0	5.5	5.8	6.8	4.98	
212	Maribo 9364	3.5	4.0	5.0	6.5	6.5	7.1	5.43	5.22
198	Maribo 9369	3.3	4.0	5.0	5.5	6.3	7.5	5.27	5.14
220	Maribo 9470	3.0	3.5	5.0	6.0	6.3	6.8	5.10	
186	Mariob 9472	3.0	3.3	5.0	5.3	6.0	6.7	4.88	
181	Seedex SX1006	2.9	3.0	5.1	4.9	5.0	6.0	4.48	4.34
195	Seedex SX1007	2.8	3.3	4.3	4.5	4.8	5.8	4.25	
215	Van der Have H66157	3.3	3.8	5.3	6.5	6.8	7.0	5.45	
193	Van der Have H66183	3.0	3.8	5.3	6.3	6.3	6.8	5.25	
207	Van der Have H66186	3.0	4.0	5.0	6.0	6.3	6.8	5.18	
	LSD .05	0.4	0.6	0.5	0.6	0.7	0.6	0.4	
	CV %	10.7	12.7	7.6	7.9	8.5	6.5	5.6	

* Lower numbers indicate better leaf spot resistance (1 = Ex, 9 = Poor)

TABLE 17A

1994 CERCOSPORA READINGS FOR CODED TEST ENTRIES
BETASEED NURSERY - SHAKOPEE, MN
Average Rating at Each Date*

Description	7/28	8/04	8/10	8/13	8/19	8/24	1993 Mean	2 Yr Mean	3 Yr Mean	3 Yr% Mean	1992	1991
ACH 192	3.3	4.0	5.0	5.8	6.0	6.8	5.15	5.02	5.12	100.3	4.88	5.33
ACH 194	3.0	3.7	5.0	6.0	6.0	7.0	5.12	5.05	5.25	102.9	4.97	5.67
ACH 196	3.0	3.3	5.0	5.7	6.0	7.0	5.00	4.99	5.12	100.2	4.97	5.38
ACH 198	2.5	3.5	4.5	5.0	5.0	6.3	4.47	4.35	4.50	88.1	4.23	4.79
ACH 205 (Aphan. Spec.)	2.3	3.3	4.5	4.5	5.3	6.3	4.37	4.26	4.33	84.8	4.15	4.46
ACH 302	2.5	3.0	4.0	4.5	4.5	6.1	4.10	4.21	4.45	87.1	4.32	4.92
ACH 306 (Rhizoctonia)	3.0	3.8	5.0	5.3	5.3	5.8	4.70	4.70	4.76	93.2	4.70	4.88
ACH 309	2.5	3.3	4.5	5.3	5.0	6.0	4.43	4.42	4.49	87.9	4.40	4.63
ACH 310	3.0	3.7	5.0	5.6	6.0	7.0	5.05	4.90	4.95	96.9	4.75	5.04
ACH 311	2.0	3.0	4.0	4.0	4.5	6.0	3.92	3.92	4.18	81.9	3.92	4.71
ACH 9000502	3.0	3.7	5.0	5.3	6.0	7.0	5.00	4.87			4.73	
ACH 9000524	3.0	3.3	5.0	6.0	6.7	7.7	5.28	5.17			5.05	
ACH 9100022	3.0	3.5	5.1	6.0	7.0	7.5	5.35	5.20			5.05	
ACH 9100097	3.0	3.0	5.0	5.4	6.0	7.0	4.90	4.95			5.00	
ACH 9100171	3.3	3.7	5.3	6.3	6.7	7.0	5.38	5.22			5.05	
ACH 9100270	3.0	3.3	4.3	5.0	5.0	6.0	4.43					
ACH 9100274	2.8	3.0	4.3	5.0	5.0	6.5	4.43					
ACH 9100275	3.0	3.7	5.0	6.0	6.7	7.0	5.23					
ACH 9490001	3.0	3.3	5.0	6.0	7.3	7.4	5.33					
ACH 9490002	3.0	3.7	5.7	6.6	7.3	7.6	5.65					
ACH 9490003	3.0	3.8	5.0	6.3	7.3	7.3	5.45					
Beta 1144	3.3	3.5	5.3	6.3	6.8	7.0	5.37					
Beta 1154	3.3	4.0	5.3	6.3	6.8	7.5	5.53					
Beta 1252	3.0	3.3	5.0	5.5	6.0	6.8	4.93	4.82	5.09	99.6	4.70	5.63
Beta 1273	3.3	4.0	5.8	7.0	7.5	7.5	5.85	5.45			5.05	
Beta 1492 (NC)	3.0	4.0	5.0	6.0	6.3	6.8	5.18	5.07	5.18	101.5	4.95	5.42
Beta 1524	2.7	3.3	5.0	6.0	6.7	7.4	5.18					
Beta 1724	2.8	3.0	4.3	5.3	6.3	7.0	4.78					
Beta 1794	2.7	3.3	4.7	5.7	6.3	7.3	5.00					
Beta 1994	3.0	3.3	5.3	6.5	7.3	7.8	5.53					
Beta 2010	3.0	3.5	5.0	6.0	6.5	7.3	5.22	5.13	5.26	103.1	5.03	5.54
Beta 2074	3.0	3.5	5.0	6.0	6.0	7.1	5.10					
Beta 2084	3.0	3.3	5.3	6.3	6.3	7.0	5.20					
Beta 2988	3.0	3.8	5.0	5.8	6.3	6.8	5.12	4.98	5.09	99.8	4.83	5.33
Beta 3712 (NC)	3.3	4.0	5.3	6.3	7.0	7.3	5.53	5.26	5.49	107.5	4.98	5.96
Beta 3843	3.0	3.8	5.3	5.8	6.3	7.3	5.25	5.09			4.93	
Beta 3863	3.0	3.5	5.0	5.5	6.0	7.0	5.00	4.92			4.83	
Beta 5004 (Aphan. Spec.)	3.0	3.0	4.5	4.8	5.3	6.8	4.57					
Beta 5014 (Aphan. Spec.)	2.5	3.3	4.0	4.0	4.8	6.0	4.10					
Beta 6002 (NC)	3.5	3.5	5.3	6.5	6.3	7.3	5.40	5.24	5.27	103.2	5.07	5.33
Beta 6104	3.0	3.0	5.0	5.5	6.0	8.0	5.08					
Beta 6863	3.5	3.5	5.0	6.0	6.5	7.5	5.33	5.08			4.82	
Beta 6904 (Aphan. Spec.)	3.0	3.3	4.5	5.3	6.0	6.8	4.82					
Beta 6934	3.3	4.0	5.5	6.5	7.3	8.0	5.77					
Bush Johnson 1330	3.0	4.0	5.3	6.0	6.5	7.0	5.30	5.19	5.30	103.9	5.07	5.54
Bush Johnson 1337	3.3	3.3	5.4	6.3	6.3	7.0	5.27	5.04	5.16	101.1	4.80	5.42
Bush Johnson 1340	3.0	3.7	5.3	6.4	6.3	7.3	5.33	5.11	5.29	103.7	4.88	5.67
Bush Johnson 1392	3.0	4.0	5.0	6.0	6.0	7.0	5.17	5.11			5.05	
Bush Johnson 1401	3.0	4.0	5.3	6.5	7.5	7.8	5.68					
Bush Johnson 1412	3.3	4.0	5.3	6.0	6.8	7.0	5.40					
Hilleshog 5135	3.0	4.0	5.0	6.0	6.5	7.0	5.25	5.15	5.23	102.4	5.05	5.38
Hilleshog 7030	3.0	3.8	5.3	6.8	7.5	8.0	5.73					
Hilleshog 7033	3.0	3.5	5.0	6.0	6.8	7.3	5.27	5.23			5.18	
Hilleshog 7034	3.3	4.0	5.5	6.5	7.0	7.5	5.63	5.39			5.15	
Hilleshog 7035	3.0	4.0	5.0	6.3	6.8	7.8	5.48	5.27			5.05	
Hilleshog 7037	3.3	3.8	5.0	6.5	7.3	8.3	5.70					
Hilleshog 7038	3.0	4.0	5.5	6.8	7.5	7.5	5.72					
Hilleshog 7040	2.7	3.3	4.3	5.3	5.7	6.4	4.62					
Hilleshog 7511	3.0	3.5	5.3	6.0	6.5	7.0	5.22	5.14			5.05	
Hilleshog 7514	3.0	4.0	5.0	6.0	6.3	6.6	5.15	5.11			5.07	
Hilleshog 7516	3.0	4.0	5.3	6.4	7.0	7.3	5.50					
Hilleshog 7517	3.0	4.0	5.3	6.0	6.5	7.0	5.30					
Hilleshog 7518	2.7	3.3	5.0	6.0	6.3	7.7	5.17					
Hilleshog 8277	3.0	3.0	5.0	6.0	6.0	7.1	5.02	5.15	5.41	105.9	5.28	5.92
Hilleshog 8351	3.0	3.7	4.7	6.0	7.0	7.4	5.30	5.13	5.25	102.8	4.95	5.50
Hilleshog Glacier (7017)	3.0	4.0	5.3	6.5	7.5	7.8	5.68	5.49	5.51	107.9	5.30	5.54
Hilleshog Niagara (7505)	2.7	3.0	4.3	5.3	5.3	6.6	4.53	4.61	4.79	93.9	4.68	5.17
Hilleshog Shasta (2416)	3.0	3.5	5.3	6.0	6.5	8.0	5.38	5.33	5.47	107.1	5.27	5.75
Hilleshog Yukon (2412)	3.0	3.8	5.0	5.5	5.8	6.8	4.98	4.67	4.78	93.6	4.35	5.00

TABLE 17B

1994 CERCOSPORA READINGS FOR CODED TEST ENTRIES
BETASEED NURSERY - SHAKOPEE, MN
Average Rating at Each Date*

Description	7/28	8/04	8/10	8/13	8/19	8/24	1993 Mean	2 Yr Mean	3 Yr Mean	3 Yr% Mean	1992	1991
HM 1117	3.0	4.0	5.3	6.8	7.3	8.5	5.82	5.68			5.53	
HM 2401	3.3	3.7	5.4	6.3	7.0	7.3	5.50	5.24	5.23	102.4	4.97	5.21
HM 2418	3.0	3.5	5.0	6.0	6.3	7.5	5.22	5.01	5.06	99.2	4.80	5.17
HM 7036 (Aphan. Spec.)	3.0	3.3	4.3	5.3	5.3	6.4	4.60					
Holly 94HX215	3.3	3.8	5.5	6.5	7.0	7.0	5.52					
Holly 94HX223	3.0	3.8	5.0	5.8	6.3	7.0	5.15					
Holly 94HX235	3.0	3.8	5.0	6.0	6.5	7.0	5.22					
Holly 94HX240	3.0	3.5	4.9	6.0	6.0	7.0	5.07					
Holly 94HX241	3.0	3.0	4.8	5.3	5.5	7.0	4.77					
Holly 94HX242	3.0	3.8	4.8	5.8	6.5	6.8	5.12					
Holly 94HX244	3.0	3.7	5.0	5.6	6.3	7.3	5.15					
Holly 94HX245	3.0	3.0	5.0	6.0	6.0	7.0	5.00					
Holly 94HX246	3.0	4.0	5.6	6.5	6.5	7.5	5.52					
Holly 94HX247	3.0	3.5	5.3	5.8	6.3	6.5	5.07					
Holly 94HX250	3.0	4.0	5.0	6.0	6.7	7.0	5.28					
Holly 94HX251	3.0	3.8	5.5	6.0	6.8	7.3	5.40					
KW 1119	3.0	4.0	5.0	6.0	6.0	7.3	5.22	5.16	5.40	105.8	5.10	5.88
KW 1800	3.0	3.3	5.0	5.8	6.3	7.0	5.07	5.03	5.29	103.7	4.98	5.83
KW 2249 (Blend)	3.0	3.3	4.6	5.7	6.3	7.3	5.03	5.01	5.25	102.9	4.98	5.75
KW 2262 (Blend) (NC)	3.5	4.0	5.0	6.5	7.0	6.9	5.48	5.29	5.36	105.0	5.10	5.50
KW 2398 (Aphan. Spec.)	3.0	3.3	5.0	6.0	6.3	7.0	5.10	5.06	5.30	103.9	5.02	5.79
KW 3291	3.0	3.8	5.0	6.0	6.3	7.0	5.18	5.06	5.25	102.8	4.93	5.63
KW 3580	3.0	3.8	4.8	6.0	6.3	7.3	5.20	5.10	5.33	104.4	5.00	5.79
KW 6770	3.5	3.8	5.0	6.0	6.0	7.0	5.22	5.14	5.20	101.9	5.05	5.33
Maribo 410	3.0	4.0	5.0	6.0	6.0	7.1	5.18	5.08	5.15	100.8	4.97	5.29
Maribo 862	3.0	3.8	5.5	6.0	6.3	7.0	5.27	5.12	5.33	104.4	4.97	5.75
Maribo 875	3.0	3.8	5.0	5.5	6.0	6.5	4.97	4.90	4.99	97.7	4.83	5.17
Maribo 897	3.0	3.0	4.3	5.7	6.0	7.0	4.83	4.91	5.08	99.4	4.98	5.42
Maribo 923 (NC)	3.0	3.7	5.0	6.0	6.7	7.3	5.28	5.13	5.24	102.6	4.97	5.46
Maribo 9360 (NC)	3.3	3.7	5.3	6.6	7.7	8.0	5.77	5.53			5.28	
Maribo 9363 (NC)	3.0	3.8	5.0	5.5	5.8	6.8	4.98	4.98			4.97	
Maribo 9364	3.5	4.0	5.0	6.5	6.5	7.1	5.43	5.22			5.00	
Maribo 9368 (NC)	3.0	4.0	5.0	6.5	7.0	7.0	5.42	5.15			4.88	
Maribo 9369	3.3	4.0	5.0	5.5	6.3	7.5	5.27	5.14			5.00	
Maribo 9470	3.0	3.5	5.0	6.0	6.3	6.8	5.10					
Maribo 9471	3.0	3.5	5.0	5.8	6.0	7.0	5.05					
Maribo 9472	3.0	3.3	5.0	5.3	6.0	6.7	4.88					
Maribo 9743	3.3	4.3	6.0	6.3	7.0	7.0	5.65					
Maribo Ultramono	3.5	3.5	5.5	6.5	6.5	7.1	5.43	5.16	5.28	103.5	4.88	5.54
Mitsui Monohikari	2.7	3.7	4.0	5.3	5.3	6.7	4.62	4.71	4.99	97.7	4.80	5.54
Seedex Gladiator (0805)	3.3	3.8	5.0	6.0	6.3	7.0	5.23	5.29	5.36	105.0	5.35	5.50
Seedex Laser (1004)	2.5	3.0	4.3	4.5	4.5	6.3	4.18	4.36	4.43	86.8	4.53	4.58
Seedex Monarch (0806)	3.0	4.0	5.0	6.4	7.0	7.0	5.40	5.25	5.36	105.0	5.10	5.58
Seedex SX0808	3.3	3.7	5.0	5.7	6.3	7.0	5.17	5.07			4.97	
Seedex SX0809	3.0	3.0	5.0	6.0	6.0	7.0	5.00					
Seedex SX0905 (NC)	3.0	3.5	5.0	5.3	5.5	6.5	4.80	4.57	4.82	94.4	4.33	5.33
Seedex SX0906	3.0	3.3	5.0	6.0	6.3	7.0	5.10	4.71			4.32	
Seedex SX0907	3.0	3.5	5.0	6.0	6.5	7.0	5.17					
Seedex SX1006	2.9	3.0	5.1	4.9	5.0	6.0	4.48	4.34			4.20	
Seedex SX1007	2.8	3.3	4.3	4.5	4.8	5.8	4.25					
Seedex SX2	3.0	3.7	4.6	5.7	5.7	6.7	4.90	4.69	4.88	95.5	4.48	5.25
Seedex Turbo (0902)	2.0	3.0	3.7	4.0	4.3	5.7	3.78	4.15	4.48	87.7	4.52	5.13
Van der Have H66140	3.5	4.0	5.5	6.5	6.5	7.0	5.50	5.33	5.30	103.8	5.15	5.25
Van der Have H66156	3.3	4.0	5.5	6.5	7.3	7.3	5.65	5.42	5.50	107.7	5.18	5.67
Van der Have H66157	3.3	3.8	5.3	6.5	6.8	7.0	5.45					
Van der Have H66168	3.4	4.3	5.6	6.7	7.3	7.7	5.83	5.53	5.63	110.2	5.22	5.83
Van der Have H66170	3.0	3.7	5.0	6.3	6.7	7.7	5.40	5.19	5.38	105.3	4.98	5.75
Van der Have H66183	3.0	3.8	5.3	6.3	6.3	6.8	5.25					
Van der Have H66184	3.0	3.7	5.7	6.6	6.7	7.3	5.50					
Van der Have H66186	3.0	4.0	5.0	6.0	6.3	6.8	5.18					
Van der Have H66189	3.0	4.0	5.8	6.8	6.8	7.3	5.62	5.50			5.38	
Seedex Gladiator (SX0903)											5.05	5.88
Seedex Monarch (SX0904)											5.02	5.54

Test Mean	3.0	3.6	5.0	5.9	6.3	7.0	5.10	5.00	5.10	100.0	4.89	5.39
LSD .05	0.4	0.6	0.5	0.6	0.7	0.6	0.40					
CV %	10.7	12.7	7.6	7.9	8.5	6.5	5.60					

TABLE 18. RESULTS OF 1994 APHANOMYCES TESTING AT BUSHLAND, TEXAS

Disease Rating (DR) over time (a)

	DR1	DR2	DR3	DR4	DR5
ACH 198	0.86 ab	4.0 a	5.4 abc	5.7 ab	6.7 a
KW 2398	0.57 ab	2.4 ab	4.7 abc	5.7 ab	6.0 a
ACH 205	0.00 b	0.8 b	2.6 c	4.6 b	5.7 a
HM 7036 (Resist)	0.14 b	0.7 b	3.1 bc	5.1 ab	7.0 a
Susc. Check	0.43 ab	3.5 a	4.3 abc	4.8 ab	6.1 a
LSD	**1.54**	**2.7**	**3.0**	**3.3**	**3.1**

a - Disease ratings were taken every 3-4 days, beginning 16 days after planting. Ratings were on a 0 - 9 scale with 0 = no disease symptoms and 9 = dead seedlings. Means followed by the same letter are not significantly different according to Fisher's LSD test.

HIGH SUGAR VARIETY EVALUATION

OBJECTIVE

Evaluate varieties for early sugar accumulation.

EXPERIMENTAL

Trials were planted at four locations in 1994. Varieties were replicated eight times in a randomized complete block design. Entries were chosen by their abilities to produce high percent sugar. The trials were planted May 5, 7, 10 and 12 in 1994 and May 5 and 14 in 1993 for the respective locations. Varieties planted were as follows:

ACH 9340081	KW 6770
ACH 197	HM 2424
ACH 319	HM 2423
ACH 9200042	HM 2416
ACH 9340058	Seedex 1004
KW 3291	KW 2249

Trials were harvested on September 5 and 6. The sugarbeets were analyzed for yield and quality.

RESULTS AND DISCUSSION

Early sugar accumulation generally occurs in varieties with high sugar percent. The earlier this sugar accumulation occurs, the earlier the processing can be initiated. Processing is more easily conducted and more economically efficient with higher sugar content. These factors in mind and increased production makes producing a variety with early high sugar content increasingly important. The varieties tested are all varieties with high sugar content. However, the objective of this research is to determine which of the varieties tested will produce the highest sugar content at an early harvest date (September 1).

Data for sugar percent, tons/acre, loss to molasses (LTM), recoverable sugar per ton and recoverable sugar per acre are found in Table 1. Tons per acre ranged from 21.26 to 16.95. ACH 9340058 gave the highest tons per acre. The next highest tons per acre was obtained with Seedex 1004 at 19.38. There were five varieties that statistically gave the highest tons per acre. These five varieties were ACH 9340058, Seedex 1004, ACH 9200042, HM 1918, and ACH 197. Seedex 1004 was the only SMSC approved variety in this group. Tons per acre were 18.56 and seven varieties were above average. The five varieties mentioned above, KW 6770 and HM 2416

were above average in tons per acre. KW 6770 and HM 2416 are approved varieties for SMSC. Seedex 1004, KW 6770 and HM 2416 are all considered among the best sugar type varieties of the approved varieties. This is a good indication since root yield is needed as well as quality, although quality (sugar percent and LTM) are the greatest concern at early harvest.

Sugar percent ranged from 12.95 to 12.24 which is only a .71 percent spread. There are 8 of the 12 tested varieties that have no difference in sugar percent. The remaining four varieties were below this group in sugar percent. The average sugar percent was 12.52 and only four varieties were above average on tons per acre and sugar percent. The four varieties were ACH 197, KW 6770, HM 2423, and HM 2416 and these varieties ranked 4, 3, 1 and 3 for sugar percent and 5, 6, 4 and 7 for tons per acre, respectively. This indicates that these four varieties were among the top varieties with both sugar percent and tons per acre. These are the type of varieties needed for early harvest when considering processing and grower return.

Loss to molasses needs to be low to be advantageous to processing and grower return. Loss to molasses generally relates inversely to sugar percent. Thus, high sugar content usually yields low loss to molasses. This was the case in these data. These data showed that 10 of the 12 varieties were not significantly different. There was a trend of low loss to molasses with high sugar content. The two varieties with the best quality data were KW 6770 and HM 2433.

Recoverable sugar per ton is a direct result of sugar content and loss to molasses. Varieties that were above average on sugar content were above average on recoverable sugar per ton. Recoverable sugar per ton is a deciding factor in approval of a variety for growing in SMSC growing area. In relation to KW 6770, KW 3291, and HM 2416, all approved varieties, HM 2423 is the only tested variety that gave better sugar content and equal or lower loss to molasses. ACH 197 gave recoverable sugar per ton slightly above average and similar to the approved varieties tested. HM 2423 and ACH 197 were the only two varieties that were not approved for growing in SMSC growing area that gave above average recoverable sugar per ton.

Recoverable sugar per acre is the end result of all production factors. This test was conducted to determine which varieties, approved or unapproved, would give high sugar content at an early harvest interval. The goals for this test could also be stated as which variety will give a high recoverable sugar per ton at an early harvest date. The best result of such test would be a variety with a high sugar content or recoverable sugar per ton along with high tons per acre which would result in a high recoverable sugar per acre. High recoverable sugar per ton doesn't always extrapolate into high recoverable sugar per acre. ACH 9340058 was 98.1 percent of the mean on recoverable sugar per ton, but was 112.7 percent of the mean on recoverable sugar per acre. Tons per acre was 114.5 percent of the mean and that resulted in a high recoverable sugar per acre. The next highest recoverable sugar per acre was with HM 2423 at 107.6 percent of the mean. HM 2423 was above average on tons/acre, sugar percent, and recoverable sugar per ton and below average on loss

to molasses. This is exactly the type of variety needed by SMSC for processing and growing. ACH 197 is the only other unapproved variety that was above average on recoverable sugar per acre, recoverable sugar per ton, tons/acre, sugar content, and below average on loss to molasses. The remaining varieties that met the above criteria are approved varieties for growing in the SMSC growing area. These varieties are KW 3291, KW 6770, and HM 2416.

These data indicate the best varieties that would meet the objectives of this trial would be HM 2423 and ACH 197 for unapproved varieties and KW 3291, KW 6770, and HM 2416.

Table 1. Combined location yield and quality performance of early harvest trials with high sugar type varieties.

1994 Data

Variety	Tons Acre	% Mean	Sucrose	% Mean	LTM %	% Mean	Rec. Suc. Ton	% Mean	Rec. Suc. Acre	% Mean	Estmated Grower Return Per Ton	Per Acre
ACH 9340081	17.65	95.1	12.41	99.1	1.18	102.8	224.5	98.7	3863.6	90.9	97.7	93.1
ACH 197	19.04	102.6	12.56	100.3	1.16	100.4	228.0	100.3	4364.6	102.7	100.4	103.2
ACH 319	17.47	94.1	12.41	99.2	1.16	100.7	225.1	99.0	4004.0	94.2	98.2	92.6
ACH 9200042	19.23	103.6	12.43	99.3	1.18	102.7	225.0	99.0	4361.0	102.6	98.0	101.8
ACH 9340058	21.26	114.5	12.31	98.4	1.17	101.3	223.0	98.1	4790.7	112.7	96.6	110.8
KW 3291	17.50	94.3	12.62	100.8	1.15	100.1	229.5	100.9	4060.5	95.5	101.4	95.8
KW 6770	19.02	102.5	12.61	100.7	1.12	97.2	229.8	101.1	4396.4	103.4	101.7	104.4
HM 2424	17.16	92.5	12.62	100.8	1.14	99.4	229.4	100.9	3998.2	94.1	101.4	94.0
HM 2423	19.18	103.3	12.95	103.5	1.12	97.4	236.7	104.1	4573.3	107.6	106.9	110.6
HM 2416	18.88	101.7	12.60	100.7	1.13	98.6	229.4	100.9	4382.9	103.1	101.4	103.3
SEEDEX1004	19.38	104.4	12.24	97.7	1.18	102.2	221.2	97.3	4316.7	101.5	95.2	99.6
KW 2249	16.95	91.3	12.46	99.5	1.13	98.2	226.6	99.7	3900.8	91.8	99.3	90.8
Mean	18.56	100.0	12.52	100.0	1.15	100.0	227.3	100.0	4251.1	100.0	100.0	100.0
LSD(0.05)	2.23		0.52		0.05		6.6		372.1			
C. V. %	12.69		9.38		11.8		10.5		16.2			

VARIETIES EVALUATED FOR CERCOSPORA LEAF SPOT TOLERANCE

OBJECTIVE

Evaluate varieties with above average cercospora leaf spot for root yield and quality characteristics.

EXPERIMENTAL PROCEDURE

Trials were planted at four locations in 1994 and two locations in 1993. Varieties were replicated eight times in a randomized complete block design. Entries were chosen for their high tolerance to cercospora leaf spot and relatively high sugar percent. The trials were planted on May 5, 7, 10 and 12 in 1994 and May 5 and 14 in 1993 for the respective locations. Varieties planted were as follows:

ACH 308	HM 1620
ACH 197	Beta 5135
ACH 319	Beta 5603
HM 2717	Beta 5639
HM 2718	KW 6770 (check)
Yukon	ACH 9040013

KW 6770, an SMSC approved variety, was used as a check in comparison to the remaining 11 varieties. The experimental area was sprayed an average of three times with standard fungicides and rates. This procedure was conducted since yield and quantity analysis was the primary purpose of this trial and not tolerance evaluation.

RESULTS AND DISCUSSION

This trial was initiated as a response to EBDC and Triphenyl Tin being suspect to EPA scrutiny. Triphenyl-Tin tolerance detected in 1994 emphasizes the importance of this trial. The varieties in this trial possess an above average level of genetic tolerance to cercospora leaf spot. Cercospora leaf spot ratings are presented in Table 1. These data are an accumulation of ratings taken for the respective varieties at two locations. These data will be presented only to indicate variety tolerance to cercospora leaf spot.

Tons per acre was highest with ACH 9340081 at 18.80, although KW 6770 gave 18.79 tons per acre. Nine of the twelve varieties produced tons per acre statistically similar to ACH 9340081. This indicates that there is a good selection of high cercospora leaf spot tolerant varieties in comparison to KW 6770.

Sucrose percent mean of all varieties tested was 13.10 which was .13 percent better than the check KW 6770. All varieties tested gave similar or better sucrose percent than KW 6770. There was only one variety that gave sucrose percent lower than KW 6770.

Loss to molasses was non-significant. The mean of varieties tested varied only .07 percent.

Recoverable sugar per ton was highest with Beta 5603 at 241.9 pounds. Seven varieties gave statistically similar recoverable sugar per ton in comparison to Beta 5603. The lowest recoverable sugar per ton was produced by Beta 5135 at 234.4. Thus, there was a range of only 7.5 pounds recoverable sugar per ton indicating there was not a large variation among varieties.

Recoverable sugar per acre was highest with ACH 9340081 at 4,496 and 106.5 percent of the mean. Separation of varieties is more prominent with recoverable sugar per acre. Varieties with similar recoverable sugar per acre in comparison to Ach 9340081 were ACH 9040013, KW 6770, and HM 2717. All other varieties were significantly lower in recoverable sugar per acre than ACH 9040013.

The check KW 6770 produced recoverable sugar per acre similar to six other varieties tested. These data indicate that there is a good selection of high cercospora leaf spot tolerant varieties in comparison to KW 6770.

Table 1. CLS Ratings for Cercospora Leaf Spot Tolerant Type Varieties

Variety	CLS Rating
ACH 308	3.0
ACH 197	2.6
ACH 319	2.5
HM 2717	2.9
HM 2718	2.9
Yokon	----
HM 1620	----
Beta 5315	2.8
Beta 5603	3.0
Beta 5639	2.2
KW 6770	5.1
ACH 9040013	----
Mean	2.5

Table 2. Combined location yield and quality performance of cercospora leaf spot tolerant type varieties, 1994.

Variety	Tons/ Acre	% Mean	Sucrose	% Mean	LTM %	% Mean	Rec. Suc. Ton	% Mean	Rec. Suc. Acre	% Mean	Estmated Grower Return Per Ton	Per Acre
ACH 9340081	18.80	106.1	13.12	100.2	1.16	98.5	239.2	100.3	4496.0	106.5	100.6	106.4
ACH 197	17.76	100.2	12.97	99.0	1.21	102.8	235.3	98.7	4179.9	99.0	97.8	97.7
ACH 319	16.71	94.3	13.05	99.6	1.16	98.5	237.9	99.8	3975.8	94.2	99.6	93.6
HM 2717	18.13	102.3	13.24	101.1	1.19	101.1	241.1	101.1	4371.4	103.5	101.8	103.9
HM 2718	17.67	99.7	12.98	99.1	1.15	97.7	236.5	99.2	4177.5	98.9	98.8	98.2
Yukon	17.17	96.9	13.26	101.2	1.17	99.4	241.7	101.4	4148.7	98.2	102.4	98.9
HM 1620	17.73	100.1	13.12	100.2	1.15	97.7	239.4	100.4	4244.4	100.5	100.7	100.5
Beta 5315	18.22	102.8	12.91	98.6	1.19	101.1	234.4	98.3	4269.9	101.1	97.2	99.7
Beta 5603	17.55	99.1	13.28	101.4	1.18	100.2	241.9	101.5	4245.0	100.5	102.5	101.2
Beta 5639	16.28	91.9	13.01	99.3	1.17	99.4	236.7	99.3	3853.4	91.3	98.9	90.6
KW 6770	18.79	106.1	12.97	99.0	1.22	103.6	235.0	98.6	4416.8	104.6	97.6	103.2
ACH 9040013	17.79	100.4	13.25	101.2	1.18	100.2	241.4	101.3	4295.2	101.7	102.1	102.2
Mean	17.72	100.0	13.10	100.0	1.18	100.0	238.38	100.0	4222.83	100.0	100.0	100.0
LSD(0.05)	4.28		0.63		0.07		5.3		230.3			
C. V. %	18.10		5.32		12.1		7.0		18.8			

FERTILIZER INFLUENCE ON SEEDLING DISEASE

OBJECTIVE

To evaluate fertilizer, specifically chloride, nitrogen and combination for control of seedling disease.

PROCEDURES

Fertilizers, potash (KC1), calcium chloride (Ca Cl), and urea [CO $(NH_2)2$] were weighed to obtain exact amounts to apply to plot area. Experimental units were 18 ft. wide by 40 ft. long. Fertilizer was applied by hand with pre-weighed treatment to each experimental unit. The treatments were potash, calcium chloride, urea and calcium chloride + urea at 50 and 100 pounds of actual chloride or urea, respectively.

Variety VDH 140 was planted on June 3 and 4 at 4 inch spacing 1.25 inches deep. Stand counts were obtained at six weeks after emergence and at harvest. Each experimental unit was treated for weeds, insects, and diseases as a commercial field be would treated.

RESULT AND DISCUSSION

Research with fertilizers, particularly chloride, was initiated on sugarbeets due to results of research conducted by Dr. Paul Fixen while at South Dakota State University. This research indicated that chloride had a positive influence on root diseases of wheat.

Stand counts from the two dates were combined due to homogeneity of variances and thus, are presented as an average of the two dates (Table 2). Regardless of fertilizer or rate of fertilizer, stand count and all factors of yield (sucrose, LTM, tons/acre, recoverable sugar/ton, and recoverable sugar/acre) were non-significant . Thus, since no significance was observed in comparison of treatments, an investigation for trends in data was considered. Stand count data did not exhibit any trends. In consideration of trends in yield data, the lower rate of fertilizers gave higher sucrose percent, tons/acre, recoverable sugar/ton, and recoverable sugar/acre. However, it is very important to note that trends in data do not indicate significance. Trends should only be considered applicable if observed over many years of data collection and there is only one years worth of data presented here. Furthermore, these data may indicate that a lower rate of fertilizer or better managed fertility program could result in as high or higher yields than higher rates of fertilizer or mismanagement of a fertility program.

Table 1. Quantity and Quality of sugarbeets as effected by fertilizer.

Treatment	Rate	Sucrose	LTM	Tons/acre	Rcoverable Sugar/ton	Rcoverable Sugar/acre
Potash (KCl)	50	12.78	1.49	18.1	225.7	4051
Calcium Chloride (CaCl)	50	12.72	1.50	18.0	224.4	3830
Urea + Calcium Chloride	50	12.72	1.51	18.0	224.2	4006
Urea	50	12.67	1.51	17.9	223.3	4002
Potash (KCl)	100	12.75	1.46	17.9	225.6	4004
Calcium Chloride (CaCl)	100	12.53	1.54	17.2	219.8	3766
Urea + Calcium Chloride	100	12.56	1.53	17.1	220.6	3706
Urea	100	12.62	1.52	16.9	222.1	3999
LSD (0.05)		NS	NS	NS	NS	NS
C.V.%		6.37	16.50	14.5	9.0	24

Table 2. Sugarbeet Stand as effected by fertilizer.

Treatment	Rate	PERCENT OF PLANTED STAND
Potash (KCl)	50	46
Calcium Chloride (CaCl)	50	46
Urea + Calcium Chloride	50	48
Urea	50	49
Potash (KCl)	100	45
Calcium Chloride (CaCl)	100	49
Urea + Calcium Chloride	100	46
Urea	100	47
LSD (0.05)	----------	NS----------
C.V.%	----------	28 ----------

SEED TREATMENT FOR SEEDLING DISEASE CONTROL WITH A TOLERANT VARIETY

OBJECTIVE

To evaluate seed treatment for control of seedling disease with a tolerant variety.

PROCEDURE

Tolerant variety ACH 198 was pelleted by Seed Systems. The seed was treated with seed treatments in various combinations at rates in g/100 kg seed. The treatments were as follows:

1) Apron (1.25) + Thiram (5) [check]
2) Thiram (5) + Tachigaren (45)
3) Apron (1.25) + Thiram (5) PAT*
4) Thiram (5) + Tachigaren (45) PAT*

* Seed treatment by Seed Systems

The seed was planted June 3 in a randomized complete block design at 60 seeds per 30 ft. Experimental units were 3 rows wide and 30 ft. long. Stand counts were taken at six weeks after emergence and at harvest time. Quality and quantity data were collected at harvest time (12 weeks after emergence).

RESULT AND DISCUSSION

Data from three locations were combined and thus, will be discussed as an average of the three locations. These data pertain to a tolerant variety to seedling diseases.

Even though seedling disease pressure in the plot area was not high, stand count was significantly increased with the addition of Tachigaren at 45 grams. Seed Systems seed treatment, PAT, also gave a significant increase in stand count with or without Tachigaren. These data indicate that under low disease pressure either PAT or Tachigaren at 45 grams will increase stand count. The addition of both PAT and Tachigaren to the seed treatment had an accumulative effect in that there was a significant increase in stand count compared to either one alone. The next question to be answered is, does this increased stand count result in increased yield.

Loss to molasses, tons per acre, and recoverable sugar per ton were non-significant. Sucrose was significantly higher when PAT was part of the seed treatment. Tachigaren significantly increased sucrose percent only when the seed was treated by the PAT system. Thus, sucrose was higher only when PAT was part of the seed treatment with or without Tachigaren.

Recoverable sugar per acre was significantly higher with Tachigaren or PAT as the seed treatment. These data indicate that with a tolerant variety, either PAT or Tachigaren, will increase sugar production and stand count when seedling disease pressure is low.

Table 1. Quantity and Quality of sugarbeets as effected by seed treatments with a tolerant variety.

Treatment	Sucrose	LTM	Tons/acre	Rcoverable Sugar/ton	Rcoverable Sugar/acre
Apron (1.25)+Thiram(5)	11.66	1.51	16.3	203.0	3313
Thiram(5)+Tachigaren(45)	11.61	1.51	17.7	202.0	3571
Apron(1.25)+Thiram(5)PAT	11.8	1.5	17.3	206.0	3560
Thiram(5)+Tachigaren(45)PAT	12.08	1.48	16.9	212.0	3572
LSD (0.05)	0.05	NS	NS	NS	157
C.V.%	4.89	6.26	12.2	5.9	11.5

Table 2. Sugarbeet Stand as effected by seed treatments with a tolerant variety.

Treatment	PERCENT OF PLANTED STAND
Apron (1.25)+Thiram(5)	31
Thiram(5)+Tachigaren(45)	35
Apron(1.25)+Thiram(5)PAT	39
Thiram(5)+Tachigaren(45)PAT	44
Check	
LSD (0.05)	2
C.V.%	17

SEED TREATMENT FOR SEEDLING DISEASE CONTROL WITH A SUSCEPTIBLE VARIETY

OBJECTIVE

To evaluate seed treatment for control of seedling disease with a susceptible variety.

PROCEDURE

Susceptible variety VDH 140 was pelleted by Seed Systems. The seed was treated with seed treatments in various combinations at rates in g/100 kg seed. The treatments were as follows:

1. Apron (1.25) + Thiram (5) [check]
2. Thiram (5) + Tachigaren (45)
3. Thiram (5) + Tachigaren (60)
4. Thiram (5) + Tachigaren (90)

The seed was planted June 3 in a randomized complete block design at 60 seeds per 30 ft. Experimental units were 3 rows wide and 30 ft. long. Stand counts were taken at six weeks after emergence and at harvest time. Quality and quantity data were collected at harvest time (12 weeks after emergence).

RESULTS AND DISCUSSION

Data from three locations were combined and thus, the data will be discussed as an average of the three locations. These data pertain to a susceptible variety to seedling diseases.

Stand count was significantly increased by adding Tachigaren to the seed treatment, regardless of Tachigaren rate. Tachigaren at 45, 60, or 90 grams/100 kg seed equally influenced stand count. Stand count without Tachigaren was 6% less than with Tachigaren at 45 grams. Sugarbeet seed treated with Tachigaren at 60 grams gave a higher stand count than Tachigaren at 45 grams, but not significantly higher.

Sucrose, loss to molasses, tons per acre, and recoverable sugar per ton were non-significant. Thus, all treatments influenced the above factors equally. However, recoverable sugar per acre was significantly higher when Tachigaren was added to the seed treatment on a susceptible variety. Recoverable sugar per acre was not significantly influenced by rate of

Tachigaren. Recoverable sugar per acre was higher with Tachigaren at 60 grams vs. 45 grams, but not significantly higher. This has been the trend in research over the last two years for no significant increase in yield with higher than 45 grams of Tachigaren with a susceptible variety. These data indicate that recoverable sugar per acre and stand count was significantly increased by adding Tachigaren to the seed treatment. Recoverable sugar per acre or stand count were not significantly increased by increasing Tachigaren rate from 45 grams to 60 or 90 grams..

Table 1. Quantity and Quality of sugarbeets as effected by seed treatments with a susceptible variety.

Treatment	Sucrose	LTM	Tons/acre	Rcoverable Sugar/ton	Rcoverable Sugar/acre
Apron (1.25)+Thiram(5)	11.72	1.38	16.6	206.8	3439
Thiram(5)+Tachigaren(45)	11.65	1.35	17.4	206.0	3589
Thiram(5)+Tachigaren(60)	11.61	1.34	18.2	205.4	3728
Thiram(5)+Tachigaren(90)	11.38	1.37	18.4	200.2	3684
LSD (0.05)	NS	NS	NS	NS	140
C.V.%	6.20	7.58	14.5	7.7	17.6

Table 2. Sugarbeet Stand as effected by seed treatments with a susceptible variety.

Treatment	PERCENT OF PLANTED STAND
Apron (1.25)+Thiram(5)	34
Thiram(5)+Tachigaren(45)	40
Thiram(5)+Tachigaren(60)	43
Thiram(5)+Tachigaren(90)	42
LSD (0.05)	3
C.V.%	18

POSTEMERGENCE HERBICIDES FOR KOCHIA CONTROL AT MILAN, 1994

'KW 2010' sugarbeet was seeded April 23. The first half of split application herbicide treatments were applied 3:00 pm May 12 when the air temperature was 70F, soil temperature at six inches was 65F, relative humidity was 40%, wind velocity was 0-5 mph, soil moisture was good, and kochia was 0.5 inch rosette diameter. The second half of split applications were applied 1:00 pm May 19 when the air temperature was 85F, soil temperature at six inches was 78F, relative humidity was 50%, wind velocity was 5-10 mph, soil moisture was good, and kochia was in the cotyledon stage to 1 inch rosette diameter. All herbicides were applied in 8.5 gpa water at 40 psi through 8001 nozzles to the center four rows of six row plots. Kochia control was evaluated.

RESULT AND DISCUSSION

Kochia control was 25 percent or less when Upbeet was not included in the spray mix. Combination of Betanex, Nortron-SC, Betanex Progress, and Stinger did not give adequate control of kochia (less than 70%).

Kochia control was 73% to 100% when Upbeet was included in the spray mix. Kochia control with Upbeet + Betanex was significantly increased by adding Stinger at .25 pt/A to the spray mix. Stinger added to the spray mix at .16 pt/A only increased Betamix + Upbeet kochia control 6% but Stinger at .25 pt/A increased kochia control 25 percent. Scoil added to the spray mix with Upbeet + Betamix and Stinger at .16 pt/A increased kochia control 16 percent, although not statistically significant. R-11 added to the spray mix of Upbeet + Betamix and Stinger at .16 pt/A increased kochia control by only 10 percent. This indicates Scoil would be the better additive to mix with Betamix + Upbeet + Stinger when comparing Scoil and R-11. Kochia control with Betamix Progress plus Stinger was only 15%, but when Betamix Progress was mixed with Upbeet, kochia control was 99%. The treatment with the highest kochia control at 100% was Stinger + Upbeet + Scoil applied at .25 pt/A + .5 oz/A + 1% V/V, respectively. Kochia control was very effective with Upbeet with additions of Scoil, Stinger and/or Betamix Progress. The determining factor in which herbicide to add to Upbeet for kochia control may be cost or the weed spectrum needed to be controlled.

Treatment	Rate lb/A	Kochia Control %
Betanex/Betanex	0.25/0.33	6
Betanex + Frontier/Betanex + Frontier	0.25+1.5/0.33	24
Betanex + Nortron-sc/Betanex + Nortron sc	0.17+0.08/0.22+0.11	0
Betamix Progress/Betamix Progress	0.25/0.33	15
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	18
Betanex + Upbeet/Betanex + Upbeet	0.25+0.0156/0.33+0.0156	73
Betanex + Stinger + Upbeet/Betanex + Stinger + Upbeet	0.16+0.06+0.01/0.25+same	79
Betanex + Scoil/Betanex + Scoil	0.25+1%/0.33+1%	1
Betanex + R-11/Betanex + R-11	0.25+0.25%/0.33+0.25%	25
Betanex + Stinger + Upbeet + Scoil/same	0.16+.06+.01+1%/.25+same	95
Betanex + Stinger + Upbeet + R-11/same	.16+.06+.01+.25%/0.25+same	89
Betanex + Stinger + Upbeet/Betanex + Stinger + Upbeet	.025+0.09+0.01556/0.33+same	98
Betamix Progress + Stinger/Betamix Progress + Stinger	0.25+0.09/0.33+0.09	15
Betamix Progress + Upbeet/Betamix Progress + Upbeet	0.25+0.0156/0.33+0.0156	99
Stinger + Upbeet + Scoil/Stinger + Upbeet + Scoil	0.09+0.0156+1%/same	100
Betamix Progress + Stinger + Upbeet/same	0.16+0.06+0.01/0.25+same	98
Betanex + H-273/Betanex + H-273	0.25+0.25/0.33+0.33	25
Betanex + Stinger + Poast/Betanex + Stinger + Poast	0.25+0.025+0.07/0.33+same	13
EXP MEAN		48
C.V. %		31
LSD 5%		21
LSD 1%		28
# OF REPS		4

* NA-308=desmedipham+phenmedipham+ethofumesate, 1:1:1 ratio; R-11=non-ionic surfactant from Wilbur-Ellis; Scoil=methylated seed oil from Agsco

POSTEMERGENCE HERBICIDE CONTROL OF COMMON LAMBSQUARTER IN SOUTHERN MINNESOTA SUGAR GROWING AREA

PROCEDURES

Postemergence herbicides, Renville, 1994. 'KW 2398' sugarbeet was seeded 1.25 inches deep in 22 inch rows May 11. The first half of split application herbicide treatments were applied 1:00 pm May 25 when the air temperature was 80F, soil temperature at six inches was 70F, relative humidity was 60%, wind velocity was 10-15 mph, soil moisture was good, sugarbeet was in the 2 leaf stage, and common lambsquarters was in the cotyledon stage to 2 inches tall. The second half of split applications were applied 11:00 am June 1 when the air temperature was 72F, soil temperature at six inches was 67F, relative humidity was 50%, wind velocity was 10 mph, soil moisture was good, sugarbeet was in the 4 leaf stage, and common lambsquarters was in the cotyledon stage to 3 inches tall. All herbicides were applied in 8.5 gpa water at 40 psi through 8001 nozzles to the center four rows of six row plots. Sugarbeet injury and common lambsquarters control were evaluated.

Postemergence herbicides, Prinsburg, 1994. 'KW 2398' sugarbeet was seeded 1.25 inches deep in 22 inch rows May 9. The first half of split application herbicide treatments were applied 4:00 pm May 26 when the air temperature was 70F, soil temperature at six inches was 68F, relative humidity was 50%, wind velocity was 0-5 mph, soil moisture was good, sugarbeet was in the cotyledon to 2 leaf stage, and common lambsquarters was in the cotyledon stage to 1 inch tall. The second half of split applications were applied 3:00 pm June 2 when the air temperature was 80F, soil temperature at six inches was 70F, relative humidity was 60%, wind velocity was 10 mph, soil moisture was good, sugarbeet was in the 2 to 4 leaf stage, and common lambsquarters was in the cotyledon stage to 3 inches tall. All herbicides were applied in 8.5 gpa water at 40 psi through 8001 nozzles to the center four rows of six plots. Sugarbeet injury and common lambsquarters control were evaluated.

RESULT AND DISCUSSION

Sugarbeet injury and common lambsquarter control were evaluated at both the Renville location and Prinsburg location. Renville and Prinsburg location data are presented in Table 1 and 2. Since the same factors were evaluated at Renville and Prinsburg, these two trials will be discussed in this article together. These data indicate how sugarbeet injury, as well as weed control, and in this case, common lambsquarter control, can be variable from one environment to another. This can be dependent on weed pressure, climatic condition at application time, growing conditions prior to and following application, and characteristic of herbicides.

However, trends can be observed at both locations. Treatments with Nortron SC or Betamix Progress tended to give higher rates of sugarbeet injury. The addition of spray additives such as R-11 and Scoil did not increase sugarbeet injury, but also did not significantly increase common lambsquarter control.

There was some consistency in the results at both locations. Betamix plus Stinger at .25 pt/A consistently gave higher control of common lambsquarter than Betanex alone. Common lambsquarter control was consistently above 85% with Stinger applied at .25 pt/A with Betanex or Betamix Progress. Stinger applied at .16 pt/A did not give the same results. This indicates that Stinger needs to be applied at .25 pt/A with Betanex or Betamix Progress to obtain control above 85%. Common lambsquarter control with other treatments were not as consistent as when Stinger at .25 pt/A was in the spray mix with Betanex or Betamix Progress.

Table 1. Sugarbeet Injury and Common Lambsquarter with Postemergence Herbicides at Renville.

Treatment	Rate lb/A	Sugarbeet Inj %	Colq Cntrl %
Betanex/Betanex	0.25/0.33	0	88
Betanex + Frontier/Betanex + Frontier	0.25+1.5/0.33	0	81
Betanex + Nortron-sc/Betanex + Nortron sc	0.17+0.08/0.22+0.11	13	83
Betamix Progress/Betamix Progress	0.25/0.33	5	70
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	5	98
Betanex + Upbeet/Betanex + Upbeet	0.25+0.0156/0.33+0.0156	0	84
Betanex + Stinger + Upbeet/Betanex + Stinger + Upbeet	0.16+0.06+0.01/0.25+same	3	88
Betanex + Scoil/Betanex + Scoil	0.25+1%/0.33+1%	3	76
Betanex + R-11/Betanex + R-11	0.25+0.25%/0.33+0.25%	3	69
Betanex + Stinger + Upbeet + Scoil/same	0.16+.06+.01+1%/.25+same	5	93
Betanex + Stinger + Upbeet + R-11/same	.16+.06+.01+.25%/0.25+same	5	88
Betanex + Stinger + Upbeet/Betanex + Stinger + Upbeet	.025+0.09+0.0156/0.33+same	10	99
Betamix Progress + Stinger/Betamix Progress + Stinger	0.25+0.09/0.33+0.09	8	87
Betamix Progress + Upbeet/Betamix Progress + Upbeet	0.25+0.0156/0.33+0.0156	13	93
Stinger + Upbeet + Scoil/Stinger + Upbeet + Scoil	0.09+0.0156+1%/same	4	71
Betamix Progress + Stinger + Upbeet/same	0.16+0.06+0.01/0.25+same	3	90
Betanex + H-273/Betanex + H-273	0.25+0.25/0.33+0.33	9	64
Betanex + Stinger + Poast/Betanex + Stinger + Poast	0.25+0.025+0.07/0.33+same	0	79
EXP MEAN		5	83
C.V. %		117	12
LSD 5%		8	14
LSD 1%		NS	18
# OF REPS		4	4

* Betamix Progress = desmedipham+phenmedipham+ethofumesate, 1:1:1 ratio; R-11=non-ionic surfactant from Wilbur-Ellis; Scoil=methylated seed oil from Agsco

Table 2. Sugarbeet Injury and Common Lambsquarter with Postemergence Herbicides at Prinsburg.

Treatment	Rate lb/A	Sugarbeet Inj %	Colq Cntrl %
Betanex/Betanex	0.25/0.33	1	54
Betanex + Frontier/Betanex + Frontier	0.25+1.5/0.33	8	66
Betanex + Nortron-sc/Betanex + Nortron sc	0.17+0.08/0.22+0.11	4	59
Betamix Progress/Betamix Progress	0.25/0.33	5	73
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	10	91
Betanex + Upbeet/Betanex + Upbeet	0.25+0.0156/0.33+0.0156	5	61
Betanex + Stinger + Upbeet/Betanex + Stinger + Upbeet	0.16+0.06+0.01/0.25+same	6	74
Betanex + Scoil/Betanex + Scoil	0.25+1%/0.33+1%	3	68
Betanex + R-11/Betanex + R-11	0.25+0.25%/0.33+0.25%	5	66
Betanex + Stinger + Upbeet + Scoil/same	0.16+.06+.01+1%/.25+same	4	73
Betanex + Stinger + Upbeet + R-11/same	.16+.06+.01+.25%/0.25+same	4	73
Betanex + Stinger + Upbeet/Betanex + Stinger + Upbeet	.025+0.09+0.0156/0.33+same	9	91
Betamix Progress + Stinger/Betamix Progress + Stinger	0.25+0.09/0.33+0.09	8	94
Betamix Progress + Upbeet/Betamix Progress + Upbeet	0.25+0.0156/0.33+0.0156	19	74
Stinger + Upbeet + Scoil/Stinger + Upbeet + Scoil	0.09+0.0156+1%/same	4	55
Betamix Progress + Stinger + Upbeet/same	0.16+0.06+0.01/0.25+same	0	61
Betanex + H-273/Betanex + H-273	0.25+0.25/0.33+0.33	3	53
Betanex + Stinger + Poast/Betanex + Stinger + Poast	0.25+0.025+0.07/0.33+same	4	80
EXP MEAN		5	70
C.V. %		120	21
LSD 5%		NS	20
LSD 1%		NS	27
# OF REPS		4	4

* Betamix Progress = desmedipham+phenmedipham+ethofumesate, 1:1:1 ratio; R-11=non-ionic surfactant from Wilbur-Ellis; Scoil=methylated seed oil from Agsco

SOIL APPLIED PLUS POSTEMERGENCE HERBICIDES, PRINSBURG, 1994

PROCEDURES

Preplant incorporated herbicides were applied May 9 and incorporated with a rototiller set four inches deep for treatments containing EPTC or cycloate and two inches deep for all other PPI treatments. 'KW 2398' sugarbeet was seeded 1.25 inches deep in 22 inch rows May 9. Preemergence treatments were applied May 9 after planting. All soil applied herbicides were applied in 17 gpa water at 40 psi through 8002 nozzles to the center four rows of six row plots 3:00 pm May 9 when the air temperature was 68F, soil temperature at six inches was 55F, relative humidity was 32%, wind velocity was 22 mph, and soil moisture was good. The first half of postemergence split application treatments was applied 4:00 pm May 26 when the air temperature was 70F, soil temperature at six inches was 68F, relatively humidity was 50%, wind velocity was 0-5 mph, soil moisture was good, sugarbeet was in the cotyledon to 2 leaf stage, and common lambsquarters was in the cotyledon stage to 1 inch tall. The second half of split applications was applied 3:00 pm June 2 when the air temperature was 80F, soil temperature at six inches was 70F, relative humidity was 60%, wind velocity was 10 mph, soil moisture was good, sugarbeet was in the 2 to 4 leaf stage, and common lambsquarters was in the cotyledon stage to 3 inches tall. Postemergence treatments were applied in 8.5 gpa water at 40 psi through 8001 nozzles to the center four rows of six row plots. Sugarbeet injury and common lambsquarters control were evaluated.

Treatments were hand weeded and hand weeding was timed on June 28 and August 5. Sugarbeets were harvested September 22 and analyzed for yield and quality.

RESULTS AND DISCUSSION

There are multiple management practices that are considered each year, and management of weed control is always a concern of producers. The primary concerns are the use or not to use preemergence or postemergence herbicides and economics of hand labor. Hand labor will become more of a concern as labor laws change.

These data (Table 2) indicate the effects of various rates and application techniques with postemergence and preemergence herbicides. Sugarbeet injury tended to be directly related to common lambsquarter control. Frontier applied preemergence gave lower sugarbeet injury than Frontier applied preplant incorporated. Common lambsquarter control was 0 percent regardless the rate of Frontier applied preemergence. However, Frontier

applied preplant incorporated gave 60 and 69 percent control of common lambsquarter at 17 and 25 oz/A rates, respectively. The lack of control and significantly lower injury with Frontier applied preemergence may be due to the lack of rainfall following the application. Ro-Neet applied alone gave only 38 and 49 percent common lambsquarter control at 2.66 and 5.33 pt/A rates, respectively. Eptam added to Ro-Neet increased common lambsquarter control compared to Ro-Neet applied alone, although this increase was not significant. Common lambsquarter control with Eptam + Ro-Neet was similar to that received with Frontier + Ro-Neet. However, sugarbeet injury was significantly lower with Eptam + Ro-Neet than Frontier + Ro-Neet.

The addition of postemergence herbicides significantly increased common lambsquarter control with all preplant incorporated herbicide treatments. Preplant incorporated herbicides at 50% rates plus postemergence herbicides gave similar control of common lambsquarter as 100% rates plus postemergence herbicides included in the spray mix. Betamix applied at 1 and 1.5 pt/A sequentially, with Ro-Neet, Ro-Neet + Eptam or Frontier gave a 28 to 48 percent increase in common lambsquarter control. Stinger added to Eptam + Ro-Neet (ppi) and Betamix (post) increased control of common lambsquarter an additional 10 percent. The treatment with the highest common lambsquarter control was Eptam + Ro-Neet preplant incorporated plus Betamix + Stinger applied postemergence.

Postemergence herbicides applied without a preplant incorporated herbicide gave sugarbeet injury equal to that received when there was a preplant herbicide. Common lambsquarter control with Betamix at 1.5 and 2 pt/A applied alone sequentially, was significantly lower than Betamix applied at 1 and 1.5 pt/A applied after preplant incorporated herbicides. Stinger added to Betamix applied alone increased common lambsquarter control 29 percent. The addition of Stinger to Betamix without a preemergence herbicide increased common lambsquarter control so that it was similar to that obtained with Betamix applied alone with a preemergence herbicide.

The conclusions to the efficacy data obtained in this trial were:

1) Frontier gave as much as twice the sugarbeet injury with a high of 73% control of lambsquarter.

2) Fifty percent rates of Ro-Neet gave similar control of common lambsquarter as 100% rates.

3) Postemergence herbicides increased control of common lambsquarter so that 50% rates of all preemergence herbicides were equal to 100% rates.

4) Stinger added to Betamix significantly increased common lambsquarter control with Desmedipham and Phenmedipham applied alone.

Yield data presented in Table 1 indicates a direct relationship to percent control. Tons per acre were lower in treatments with low percent control of common lambsquarter. Sugar percent and loss to molasses did not seem to be affected negatively or positively by percent control. Thus, there was not a pattern in relation to percent control for recoverable sugar per ton. The end result, which is recoverable sugar per acre, is a factor of tons per acre and quality. Since tons per acre was effected by percent control of common lambsquarter, there was a relationship of recoverable sugar per acre and common lambsquarter control. This relationship of recoverable sugar per acre and percent control of common lambsquarter resulted in a range of 4,127 lb. recoverable sugar per acre with 0 percent control to 7,965 lb. recoverable sugar per acre with 95 percent control. This resulted in greater revenue returns with treatments that had a higher percent control.

Treatment cost presented in Table 3 are a combination of hand labor cost and herbicide cost for each treatment. Net revenue is total revenue minus cost of treatment.

Cost of treatment did not relate to percent control. The treatment with Eptam (.85 pt) + Ro-Neet (1.66 pt) ppi plus Betamix + Stinger at 1 pt + 4 oz first application and 1.5 pt + 4 oz second application, respectively, cost $77.70 with lambsquarters control of 95%. This is compared to Herbicide 273 at 5.33 pt which cost $88.41 and gave 0 percent control. Thus, a higher priced treatment did not in all cases result in a higher weed control. In many cases, lack of control greatly added to the cost due to hand labor cost.

Net revenue was a result of treatment cost and yield. Net revenue generally was directly related to weed control received by each treatment. Treatments with preplant incorporated herbicide alone gave lower percent control and net revenue in general compared to preplant incorporated plus postemergence and postemergence herbicide alone. Treatments with postemergence herbicides with or without preplant herbicides tended or did give the highest net revenue. However, treatments with both preplant incorporated herbicides and postemergence herbicides generally gave higher net revenue than postemergence herbicides alone. The highest net revenue was 126 percent of the mean which was received with Eptam (.85 pt) + Ro-Neet (1.66 pt) plus Betamix + Stinger which also gave 95 percent control of common lambsquarters. Betamix + Stinger applied alone gave 116 percent net revenue and 88 percent control. Thus, treatments with Betamix and Stinger performed similarily for net revenue and common lambsquarter control with or without Eptam and Ro-Neet. Revenue tended to be as high or higher with 50% rates of Eptam + Ro-Neet (.85 pt + 1.66 pt) plus Betamix + Stinger or Betamix Progress compared to 100% rates of Eptam + Ro-Neet (1.70 pt + 3.33 pt) plus Betamix.

Table 1. Yield and quality of sugarbeets as influenced by preplant and postemergence herbicides.

TREATMENTS	RATES	TON/ ACRE	SUCROSE %	LTM	RECOVER. SUGAR/T	RECOVER. SUGAR/A
Frontier pre	17 oz.	18.23	12.63	1.31	226.40	4127
Frontier ppi	17 oz.	28.82	13.23	1.32	238.20	6865
Frontier pre	25 oz.	20.20	12.49	1.31	223.60	4516
Frontier ppi	25 oz.	27.45	12.6	1.36	224.80	6171
Fronter + Roneet ppi	17 oz. + 3.33 pt.	28.50	12.5	1.28	224.40	6396
Roneet ppi	2.66 pt.	27.19	12.68	1.35	226.60	6161
Roneet ppi	5.33 pt.	29.45	12.91	1.26	233.00	6862
Herbicide 273 ppi	1.33 pt.	20.36	12.61	1.35	225.20	4585
Herbicide 273 ppi	2.66 pt.	20.83	12.26	1.28	219.60	4574
Herbicide 273 ppi	5.33 pt.	20.67	13.02	1.15	237.40	4907
Eptam + Roneet	.85 + 1.66 pt.	27.24	13.02	1.26	235.20	6407
Eptam + Roneet	1.70 + 3.33 pt.	27.41	12.89	1.3	231.80	6354
Roneet/Betamix/Betamix	2.66 pt./1 pt./1.5 pt.	28.32	13.14	1.32	236.40	6695
Roneet/Betamix/Betamix	5.33 pt./1 pt./1.5 pt.	28.69	13.36	1.31	241.00	6914
Eptam + Roneet/Betamix/Betamix	.85 + 1.66 pt./1 pt./1.5 pt.	29.12	13.04	1.34	234.00	6814
Eptam + Roneet/Betamix/Betamix	1.70 + 3.33 pt./1 pt./1.5 pt.	32.67	12.95	1.41	230.80	7541
Frontier/Betamix/Betamix	17 oz./1 pt./1.5 pt.	31.45	13.01	1.39	232.40	7309
Eptam + Roneet/Betamix + Stinger/Betamix + Stinger	.85 + 1.66 pt./1 pt. + 4 oz./1.5 qt. + 4 oz.	33.44	13.24	1.33	238.20	7965
Betamix/Betamix	1.5 pt./2 pt.	30.05	13.05	1.29	235.20	7068
Betamix + Stinger/Betamix + Stinger	1.5 pt. + 4 oz./2 pt. + 4 oz.	29.04	13.71	1.29	248.40	7214
Betamix + Stinger + Poast/Betamix + Stinger + Poast	1.5 pt. + 4 oz. + .8 pt./2 pt. + 4 oz. + .8 pt.	31.34	12.58	1.36	224.40	7033
Eptam + Roneet/Betamix Progress/Betamix Progress	.85 + 1.66 pt./.75 pt./1.11 pt.	30.34	13.19	1.28	238.20	7227
Eptam + Roneet/Betamix + Upbeet/Betamix + Upbeet	.85 + 1.66 pt./1 pt. + .5 oz./1.6 + .5 oz.	32.38	13.08	1.34	234.80	7603
Betamix + Upbeet/Betamix + Upbeet	1.5 pt. + .5 oz./2 pt. + .5 oz.	29.86	13.21	1.34	237.40	7088
Betamix Progress/Betamix Progress	1.11 pt./1.46 pt.	26.32	13.23	1.25	239.60	6306
LSD (0.05)		3.23	0.99	0.21	12.78	700

Table 2. Common Lambsquarters control in sugarbeets as influenced by preplant and postemergence herbicides.

TREATMENTS	RATES	SGBT INJ %	COLQ CONTROL
Frontier pre	17 oz.	3	0
Frontier ppi	17 oz.	18	60
Frontier pre	25 oz.	5	0
Frontier ppi	25 oz.	30	69
Fronter + Roneet ppi	17 oz. + 3.33 pt.	28	73
Roneet ppi	2.66 pt.	3	38
Roneet ppi	5.33 pt.	5	49
Herbicide 273 ppi	1.33 pt.	0	0
Herbicide 273 ppi	2.66 pt.	0	0
Herbicide 273 ppi	5.33 pt.	0	0
Eptam + Roneet	.85 + 1.66 pt.	3	43
Eptam + Roneet	1.70 + 3.33 pt.	14	63
Roneet/Betamix/Betamix	2.66 pt./1 pt./1.5 pt.	13	86
Roneet/Betamix/Betamix	5.33 pt./1 pt./1.5 pt.	14	85
Eptam + Roneet/Betamix/Betamix	.85 + 1.66 pt./1 pt./1.5 pt.	15	79
Eptam + Roneet/Betamix/Betamix	1.70 + 3.33 pt./1 pt./1.5 pt.	18	90
Frontier/Betamix/Betamix	17 oz./1 pt./1.5 pt.	14	88
Eptam + Roneet/Betamix + Stinger/Betamix + Stinger	.85 + 1.66 pt./1 pt. + 4 oz./1.5 qt. + 4 oz.	16	95
Betamix/Betamix	1.5 pt./2 pt.	8	60
Betamix + Stinger/Betamix + Stinger	1.5 pt. + 4 oz./2 pt. + 4 oz.	14	89
Betamix + Stinger + Poast/Betamix + Stinger + Poast	1.5 pt. + 4 oz. + .8 pt./2 pt. + 4 oz. + .8 pt.	14	88
Eptam + Roneet/Betamix Progress/Betamix Progress	.85 + 1.66 pt./.75 pt./1.11 pt.	15	88
Eptam + Roneet/Betamix + Upbeet/Betamix + Upbeet	.85 + 1.66 pt./1 pt. + .5 oz./1.6 + .5 oz.	16	89
Betamix + Upbeet/Betamix + Upbeet	1.5 pt. + .5 oz./2 pt. + .5 oz.	9	79
Betamix Progress/Betamix Progress	1.11 pt./1.46 pt.	8	71
LSD (0.05)		8	15

Table 3. Sugarbeet revenue and economics of common lambsquarters control as influenced by preplant and postemergence herbicides

TREATMENTS	RATES	Cost* $/acre	Net Revenue % of mean
Frontier pre	17 oz.	69.92	62
Frontier ppi	17 oz.	45.24	112
Frontier pre	25 oz.	68.31	103
Frontier ppi	25 oz.	48.44	95
Fronter + Roneet ppi	17 oz. + 3.33 pt.	70.68	66
Roneet ppi	2.66 pt.	55.36	94
Roneet ppi	5.33 pt.	67.78	107
Herbicide 273 ppi	1.33 pt.	61.97	81
Herbicide 273 ppi	2.66 pt.	84.56	71
Herbicide 273 ppi	5.33 pt.	88.41	73
Eptam + Roneet	.85 + 1.66 pt.	52.40	102
Eptam + Roneet	1.70 + 3.33 pt.	57.68	99
Roneet/Betamix/Betamix	2.66 pt./1 pt./1.5 pt.		106
Roneet/Betamix/Betamix	5.33 pt./1 pt./1.5 pt.	72.20	110
Eptam + Roneet/Betamix/Betamix	.85 + 1.66 pt./1 pt./1.5 pt.	61.52	107
Eptam + Roneet/Betamix/Betamix	1.70 + 3.33 pt./1 pt./1.5 pt.	69.73	117
Frontier/Betamix/Betamix	17 oz./1 pt./1.5 pt.	68.67	115
Eptam + Roneet/Betamix + Stinger/Betamix + Stinger	.85 + 1.66 pt./1 pt. + 4 oz./1.5 qt. + 4 oz.	77.70	126
Betamix/Betamix	1.5 pt./2 pt.	66.50	111
Betamix + Stinger/Betamix + Stinger	1.5 pt. + 4 oz./2 pt. + 4 oz.	81.74	116
Betamix + Stinger + Poast/Betamix + Stinger + Poast	1.5 pt. + 4 oz. + .8 pt./2 pt. + 4 oz. + .8 pt.	98.23	102
Eptam + Roneet/Betamix Progress/Betamix Progress	.85 + 1.66 pt./.75 pt./1.11 pt.	61.71	116
Eptam + Roneet/Betamix + Upbeet/Betamix + Upbeet	.85 + 1.66 pt./1 pt. + .5 oz./1.6 + .5 oz.	-------**	-------**
Betamix + Upbeet/Betamix + Upbeet	1.5 pt. + .5 oz./2 pt. + .5 oz.	-------**	-------**
Betamix Progress/Betamix Progress	1.11 pt./1.46 pt.	49.18	102
LSD (0.05)		9.5	13

* COST = HANDLABOR PLUS HERBICIDE COST
** NO COST DUE TO UNREGISTERED PRODUCTS IN DEVELOPEMENTAL STAGE

EVALUATION OF FUNGICIDES FOR CERCOSPORA LEAF SPOT

OBJECTIVE

To evaluate fungicide efficacy for cercospora leaf spot control, sugarbeet yield and quality.

PROCEDURES

Sugarbeets were planted by the cooperator on May 8, 1994, and were grown with typical production practices. The experiment was set up as a randomized complete block design. Experimental units were 6 rows wide (11 ft.) and 30 ft. long. The 4 middle rows were treated in all 6 replications. The first treatments were applied on July 14, 1994. Treatments were applied with a high pressure (150 psi) sprayer applying 20 gal per acre. Treatments were applied in spray intervals as provided in Table 1. Experimental units were hand harvested on September 28, 1994. The middle two treated rows were harvested and analyzed for yield and quality.

RESULTS AND DISCUSSION

There are two parts to the results of this trial: 1) disease control efficacy, 2) yield and quality analysis. The first part of this discussion will pertain to efficacy of the fungicides for controls (protectants) against cercospora leaf spot. The second part of the discussion will pertain to yield and quality of sugarbeets (tons per acre, sugar %, LTM, recoverable sugar/ton, and recoverable sugar per acre). The third part of the discussion will consider the interaction of efficacy and yield and quality.

Efficacy

Efficacy of fungicides for cercospora leaf spot was evaluated in mid September, two weeks after the final fungicide application. RH7592 gave the lowest CLS rating of all fungicides tested, Table 1. However, all but three fungicides gave similar CLS ratings compared to RH7592. RH74068, TD-2343, and Supertin gave significant higher CLS ratings than RH7592. Untreated sugarbeets had a CLS rating significantly higher than all fungicide treatments. This effect of the high CLS rating shows up in the yield and quality data.

Yield and Quality Analysis

Sugarbeets treated with 10 of the 12 treatments gave tons/acre similar to each other (Table 2). This indicates relatively small variability in these treatments to influence tons per acre.

RH7592 treated sugarbeets were significantly higher than all other sugarbeets treated with various fungicides for sugar percent.

Sugarbeets treated with RH7592 and Exp. #3 gave similar loss to molasses and were significantly lower than sugarbeets treated with other fungicides. The untreated and TD-2343 treated sugarbeets gave the highest loss to molasses at 1.62. These treatments were lower in sugar content also which is usually the trend (low sugar content/high loss to molasses).

Recoverable sugar per ton was significantly higher with sugarbeets treated with RH7592 in comparison to all other fungicide treated sugarbeets. RH7592 treated sugarbeets similarly produced the highest recoverable sugar per acre. The next highest recoverable sugar per acre treatment was Exp. #3. Sugarbeets treated with all other fungicides tested were significantly lower in recoverable sugar per acre than RH7592 treated sugarbeets.

The most common fungicide treatment for cercospora leaf spot is Supertin at .1875 lb. ai/acre (3.75 oz. Supertin Agpak/acre). This treatment ranked sixth in recoverable sugar per acre. This is probably the best gauge for comparison since this is the end result and what the grower gets paid for. This relates into revenue per acre as indicated in the grower return per acre column where the Supertin treatment ranks sixth overall.

Cercospora leaf spot control is a misnomer, since most fungicides are protectants and will not control but do prevent infections from occurring. Prevention is the key word in cercospora leaf spot management. These data presented in Tables 1 and 2, indicate that not only is there prevention of cercospora leaf spot but prevention of yield and quality loss as well as revenue loss. RH7592 had the best CLS rating and the highest revenue per acre. The opposite can be said for the untreated checks. Considering the other fungicides, the relationship is generally that the better the CLS rating the higher the yield and quality.

Table 1. Evaluation ratings for fungicide control of cercospora leaf sp
based on KWS rating scale

Fungicide	Rate	Spray Interval	CLS Rating
MANZATE	1.5 lb	7	1.00
EXP #3	1.5 lb	7	1.00
EXP #5	1.5 lb	7	1.17
DITHANE	1.6 lb	10	1.00
RH 74068	1.6 lb	10	1.67
RH 7592	0.12 lb	14	0.50
TOPSIN M	0.35 lb	14	1.00
PENNCOZEB	1.5 lb	10	1.33
TD-2343	1.5 lb	14	1.67
PENC+TOPSIN	1.5+.35 lb	14	0.67
SUPERTIN	0.1875 lb	14	1.33
UNTREATED	0 lb	0	7.33
	Mean		1.64
LSD(0.05)			0.80
C. V. %			4.80

Table 2. Yield and quality performance of sugarbeets treated with fungicides for cercospora leaf spot.

Fungicide	Rate	Tons Acre	% Mean	Sucrose	% Mean	LTM %	% Mean	Rec. Suc. Ton	% Mean	Rec. Suc. Acre	% Mean	Estmated Grower Return Per Ton	Per Acre
MANZATE	1.5 lb	30.56	104.7	14.90	100.8	1.47	98.3	268.7	101.1	8211.4	105.8	101.8	105.1
EXP #3	1.5 lb	30.48	104.4	15.01	101.6	1.35	90.5	273.2	102.8	8327.9	107.3	104.4	107.6
EXP #5	1.5 lb	29.01	99.4	14.76	99.8	1.53	102.5	264.5	99.5	7671.5	98.9	99.3	97.4
DITHANE	1.6 lb	31.05	106.4	14.34	97.0	1.61	107.6	254.6	95.8	7906.8	101.9	93.5	98.2
RH 74068	1.6 lb	27.08	92.8	14.83	100.3	1.44	96.1	267.8	100.8	7252.0	93.5	101.2	92.7
RH 7592	0.12 lb	30.04	102.9	15.74	106.5	1.38	92.5	287.2	108.1	8627.5	111.2	112.6	114.3
TOPSIN M	0.35 lb	31.36	107.4	14.69	99.4	1.50	100.7	263.8	99.3	8272.0	106.6	98.9	104.8
PENNCOZEB	1.5 lb	26.24	89.9	14.78	100.0	1.47	98.4	266.1	100.2	6981.7	90.0	100.2	88.9
TD-2343	1.5 lb	28.83	98.8	14.35	97.1	1.62	108.5	254.5	95.8	7337.5	94.6	93.4	91.1
PENC+TOPSIN	1.5+.35 lb	29.44	100.9	14.71	99.5	1.48	99.0	264.6	99.6	7790.4	100.4	99.4	98.9
SUPERTIN	0.1875 lb	30.56	104.7	14.78	100.0	1.45	97.3	266.5	100.3	8144.1	105.0	100.5	103.8
UNTREATED	0 lb	25.64	87.8	14.46	97.8	1.62	108.5	256.7	96.6	6583.6	84.9	94.8	82.1
Mean		29.19	100.0	14.78	100.0	1.49	100.0	265.69	100.0	7758.86	100.0	100.0	100.0
LSD(0.05)		4.28		0.63		0.07		5.3		230.3			
C. V. %		18.10		5.32		12.1		7.0		18.8			