1995 Research Report

SMBSC

1/1/1995
Southern Minnesota Beet Sugar Company
SMBSC

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VARIETY EVALUATION

Twenty two varieties have full approval for planting in the 1995 growing season. Four test market varieties: Beta 5014, Beta 6904, Maribo 9363 and HM 7518 and three special varieties: ACH 198, ACH 205 and HM Resist were also approved.

The approved varieties for Southern Minnesota Sugar Cooperative since 1981 are listed in Table 1. Certain varieties have been approved for a number of years, such as Hilleshog 5135 for the last 9 years and Mitsui Monohikari for the last 8 years. The remaining varieties have been approved from one to six years. This indicates a gradual influx of new varieties over time. This provides a good range of genetics available to a grower. Sugarbeet growers have the ability to grow the varieties for many years and also try new varieties as they come available. The turn over of varieties has been relatively good showing a positive influence of new genetic matieral.

Cercospora leaf spot and sugar production, not just tons, will remain a major concern for sugarbeet producers. This will allow for a good enough incentive for sugarbeet seed companies to produce new varieties.

A comparison of the average performance for all approved varieties is listed in Table 2. Tables 3 - 8 list the three and two year performance of the 22 approved varieties plus test market and special use varieties. Data from coded trial results for all varieties evaluated for the past three years are listed in Tables 9 - 19.

The seed issued to Southern Minnesota Sugar Cooperative growers in 1992 - 1995 was as follows (calculated on bare seed equivalent).

The most popular varieties grown in 1995 by SMSC growers were:

VDH 66140
ACH 198
ACH 302
ACH 196
KW 6770
KW 1800
Beta 2010
HM 5135
HM Hector

Use of mini and regular pellets has inreased from 28% in 1994 to 45% in 1995.

SEED USAGE
SMSC, 1991 - 1995

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
1995 LBS	19644	23288	32265	28805	0	46935	11566	162503
%	13.55	13.53	15.67	12.68	0.00	37.11	7.45	100.00
AVE.	25705.6	47943.6	32859.8	32842	434	27314.6	5288.8	172388.4
%	15.12	27.90	18.47	17.80	0.24	17.34	3.13	100.00

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

SEED USEAGE
POUNDS PLANTED PER ACRE
SMSC, 1991 - 1995

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
1995	109738	425	110163	162505	1.48
AVERAGE	**98535**	**4577**	**103112**	**172389**	**1.68**

SOUTHERN MINNESOTA SUGAR COOPERATIVE

List of Approved Varieties since 1981

Table 1.

1981	1982	1983	1984	1985
ACH 14	ACH 14	ACH 14	ACH 145	ACH 145
ACH 151	ACH 145	ACH 30	ACH 154	ACH 154
ACH 30	ACH 17	Beta 1230	ACH 30	ACH 30
Beta 1230	Beta 1230	Beta 1237	Beta 1230	Beta 1230
Beta 1237	Beta 1237	BJ Monofort	BJ Monofort	BJ Monofort
Beta 1345	BJ Monofort	Maribo Ultramono	KW 3394	KW 1132
Beta 1443	Holly HH33	Mono-Hy M7	Maribo Ultramono	KW 3394
BJ Monofort	Mono-Hy E4	Mono-Hy M8	Mono-Hy M7	Maribo 401
Maribo Ultramono	Mono-Hy M7	Mono-Hy R1	Mono-Hy R1	Maribo Ultramono
Maribo Unica	Mono-Hy M8			Mono-Hy M7
Mono-Hy M7	Mono-Hy R1			Mono-Hy R1
Mono-Hy M8				
Mono-Hy R1				
Mono-Hy X73				

1986	1987	1988	1988 (cont.)	1989
ACH 146	ACH 164	ACH 164	KW 6264	ACH 164
ACH 164	Beta 1230	ACH 178	Maribo 403	ACH 180
ACH 30	Beta 5494	ACH 180	Maribo 411	ACH 181
Beta 1230	Beta 6264	ACH 181	Maribo Ultramono	ACH 198
Beta 6264	BJ 1310	Beta 1230	Mitsui Monohikari	Beta 3614
BJ 1310	BJ Monofort	Beta 3614	Mono-Hy R103	Beta 6269
BJ Monofort	Hilleshog 4046	Beta 6625		Beta 6625
KW 1132	Hilleshog 5090	BJ 1310		Hilleshog 4046
KW 3265	Hilleshog 5135	BJ Monofort		Hilleshog 5090
KW 3394	KW 1132	Hilleshog 4046		Hilleshog 5135
Maribo 401	KW 3265	Hilleshog 5090		KW 1014
Maribo 403	KW 3394	Hilleshog 5135		KW 3145
Maribo Ultramono	Maribo 403	Hilleshog 8277		KW 3265
Mono-Hy M7	Maribo Ultramono	KW 1014		KW 3394
	Mitsui Monohikari	KW 1132		Maribo 403
	Mono-Hy M7	KW 3145		Maribo 411
	Mono-Hy R103	KW 3265		Maribo Ultramono
	Mono-Hy R117	KW 3394		Mitsui Monohikari

List of Approved Varieties since 1981

Table 1. (cont.)

1990	1991	1992	1993	1994
ACH 180	ACH 194	ACH 194	ACH 194	ACH 194
ACH 181	ACH 196	ACH 196	ACH 196	ACH 196
ACH 194	ACH 198	ACH 198	ACH 198	ACH 198
ACH 196	Beta 1238	Beta 1238	Beta 2010	ACH 205 (Special)
ACH 198	Beta 2988	Beta 2010	Beta 2988	ACH 302
Beta 3614	Beta 5657	Beta 2988	Hilleshog 5090	ACH 309
Beta 6269	Beta 6269	Beta 5657	Hilleshog 5133	ACH 311
Beta 6625	Beta 6625	Beta 6269	HM 2401	Beta 2010
Hilleshog 4046	Hilleshog 2401	Beta 6625	KW 1119	Hilleshog 5135
Hilleshog 5090	Hilleshog 5090	BJ 1330	KW 1800	Hill. 7505 (Niagara)
Hilleshog 5135	Hilleshog 5135	Hilleshog 5090	KW 2249	HM 2401
HM 2410	KW 2398	Hilleshog 5135	KW 2398	KW 1119
KW 1014	KW 3145	HM 2401	KW 3145	KW 1800
KW 3145	KW 3265	KW 1119	KW 3580	KW 2249 (Blend)
KW 3265	Maribo 403	KW 2398	KW 6770	KW 2398
KW 3394	Maribo 875	KW 3145	Maribo 875	KW 3291
Maribo 403	Maribo Ultramono	KW 3265	Seedex Monohikari	
Maribo 411	Mitsui Monohikari	Maribo 875	VDH 66140	
Maribo 875		Maribo Ultramono		
Maribo Ultramono		Mitsui Monohikari		
Mitsui Monohikari				

1994 (cont.)	1995	1995 (cont.)	1996	1996 (cont.)
KW 3580	ACH 194	HM 2401	ACH 194	KW 6770
KW 6770	ACH 196	HM 7036 (Special)	ACH 196	Maribo 875
Maribo 875	ACH 198	KW 1119	ACH 302	Maribo 923
Mitsui Monohikari	ACH 205 (Special)	KW 1800	ACH 309	Mitsui Monohikari
Seedex SX1004	ACH 302	KW 2249	Beta 1492	Seedex Laser (1004)
VDH H16640	ACH 309	KW 2398	Beta 2010	VDH H66140
	ACH 311	KW 3291	Beta 3712	
	Beta 2010	KW 6770	Beta 6863	
	Beta 1492	Maribo 875	HM 5135	
	Beta 3712	Maribo 923	HM Niagara (7505)	
	Hilleshog 5135	Mitsui Monohikari	HM Shasta (2416)	
	Hilleshog 7034	Seedex Laser	HM Hector (2418)	
	Hilleshog 7514	VDH H66140	KW 1800	
	Hilleshog 2418		KW 2398	
	Hilleshog Niagra		KW 2249 (Blend)	
	Hilleshog Shasta		KW 3291	

Table 2. Comparison of Approved Varieties for Southern Minnesota over a sixteen 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
1995 (93-94-95)	22	6259	306.6	20.8	16.79	4.81	1.47

SOUTHERN MN SUGAR COOPERATIVE
LIST OF APPROVED VARIETIES FOR 1996

Table 3. Mean of Three Year performance Summary of SMSC commercial Coded Entries, 1993-1995.

VARIETY	Rec. S/ Ton	Rec. S/ Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf* Spot	Seed* Vigor	% Field Emerg.	Revenue/ Acre
ACH 194	305.7	6129	20.13	16.81	1.52	4.91	1.24	67.33	838.92
ACH 196	300.9	6138	20.38	16.59	1.55	4.94	1.37	66.87	828.14
ACH 302	312.2	6169	19.85	17.09	1.48	4.12	1.38	67.43	874.17
ACH 309	311.8	6244	20.09	17.05	1.46	4.23	1.31	70.73	879.87
Beta 1492	303.3	6376	21.01	16.65	1.48	4.96	1.75	61.15	863.93
Beta 2010	297.7	6423	21.67	16.35	1.46	5.02	1.47	69.53	864.63
Beta 3712	305.8	6234	20.43	16.71	1.41	5.04	1.62	61.30	848.78
HM 5135	305.6	6359	20.90	16.80	1.52	4.93	1.32	68.50	869.73
HM Niagara (7505)	314.8	6361	20.20	17.16	1.43	4.39	2.27	58.60	892.44
HM Shasta (2416)	314.8	6149	19.66	17.16	1.42	5.13	1.72	66.35	850.34
KW 1800	297.9	6306	21.13	16.40	1.51	4.97	1.83	65.20	845.41
KW 2249 (Blend)	295.7	6197	21.05	16.30	1.51	4.84	1.68	69.37	835.79
KW 2398 (Aphan. Spec.)	318.4	6176	19.36	17.33	1.41	4.87	1.61	67.43	857.86
KW 3291	307.0	6178	20.28	16.81	1.46	4.87	1.58	64.33	851.35
KW 6770	310.4	6419	20.79	16.95	1.43	5.09	1.80	61.00	881.57
Maribo 875	308.3	6028	19.54	16.92	1.50	4.77	1.29	68.63	828.71
Maribo 923	305.8	6343	20.79	16.81	1.52	5.05	1.20	64.87	863.30
Mitsui Monohikari	297.8	6124	20.62	16.28	1.39	4.69	2.24	66.40	831.76
Seedex Laser (1004)	310.1	6176	19.99	16.97	1.47	4.19	1.75	58.73	869.23
Van der Have H66140	297.3	6336	21.33	16.35	1.49	5.27	1.49	68.47	842.88
Beta 6863	314.6	6322	20.11	17.11	1.37	4.75	1.70		879.04
HM Hector (2418)	308.5	6504	21.09	16.88	1.45	4.89	2.15		892.09
Mean	**306.6**	**6259**	**20.47**	**16.79**	**1.47**	**4.81**	**1.63**	**65.61**	**858.634**

* Lower numbers indicate better cerc. resistance (1=ex,9=poor)

** Revenue per acre includes hauling cost (1.50per ton $.12/loaded mile) and cercospora leaf spot control cost (for every 8% over or under 100% of mean one spraying at $10.00/A is subtracted or added)

SOUTHERN MN SUGAR COOPERATIVE
LIST OF APPROVED VARIETIES FOR 1996

Table 4. Percent of Mean of approved of Three Year performance Summary of SMSC Commercial Coded Entries, 1993-1995.

VARIETY	Rec. S/ Ton	Rec. S/ Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf* Spot	Seed* Vigor	% Field Emerg.
ACH 194	99.7	97.9	98.3	100.1	103.9	102.0	76.1	102.6
ACH 196	98.2	98.1	99.6	98.8	105.7	102.6	84.1	101.9
ACH 302	101.8	98.6	97.0	101.8	101.2	85.6	84.7	102.8
ACH 309	101.7	99.8	98.1	101.5	99.6	87.9	80.8	107.8
Beta 1492	98.9	101.9	102.6	99.1	101.2	103.0	107.4	93.2
Beta 2010	97.1	102.6	105.8	97.3	99.8	104.3	90.6	106.0
Beta 3712	99.8	99.6	99.8	99.5	96.4	104.7	99.6	93.4
HM 5135	99.7	101.6	102.1	100.0	103.9	102.4	81.4	104.4
HM Niagara (7505)	102.7	101.6	98.6	102.2	97.3	91.2	139.4	89.3
HM Shasta (2416)	102.7	98.2	96.0	102.2	96.9	106.6	105.8	101.1
KW 1800	97.2	100.8	103.2	97.7	102.8	103.2	112.6	99.4
KW 2249 (Blend)	96.5	99.0	102.8	97.0	103.2	100.5	103.3	105.7
KW 2398 (Aphan. Spec.)	103.9	98.7	94.5	103.2	96.2	101.2	99.2	102.8
KW 3291	100.1	98.7	99.0	100.1	99.4	101.2	97.0	98.1
KW 6770	101.3	102.6	101.5	100.9	97.3	105.7	110.5	93.0
Maribo 875	100.6	96.3	95.5	100.7	102.1	99.1	79.3	104.6
Maribo 923	99.8	101.3	101.6	100.1	103.7	104.9	74.0	98.9
Mitsui Monohikari	97.1	97.8	100.7	97.0	94.8	97.4	137.6	101.2
Seedex Laser (1004)	101.2	98.7	97.6	101.1	100.5	87.0	107.8	89.5
Van der Have H66140	97.0	101.2	104.2	97.4	101.6	109.5	91.9	104.4
Beta 6863	102.6	101.0	98.2	101.9	93.7	98.7	104.6	0.0
HM Hector (2418)	100.6	103.9	103.0	100.5	98.9	101.6	132.2	0.0
Mean	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

* Lower numbers indicate better cerc. resistance (1=ex,9=poor)

SOUTHERN MN SUGAR COOPERATIVE APPROVED AND TEST MARKET VARIETIES FOR 1996

Table 5. Mean of Two year Performance Summary of SMSC Commercial Coded Entries, 1994-1995

VARIETY	Rec.S / Ton	Rec.S / Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf* Spot	Seed* Vigor	% Field Emerg.
ACH 194	297.6	7339	24.44	16.50	1.62	4.89	1.26	64.70
ACH196	292.8	7277	24.50	16.27	1.64	4.93	1.36	62.05
ACH302	305.0	7307	23.82	16.85	1.60	4.03	1.42	64.65
ACH 309	306.1	7533	24.47	16.86	1.55	4.14	1.24	69.95
Beta 1492	296.8	7569	25.24	16.42	1.58	4.97	1.85	61.15
Beta 2010	288.0	7595	26.07	15.96	1.56	5.01	1.57	66.45
Beta 3712	297.1	7390	24.60	16.41	1.55	5.07	1.66	61.30
HM 5135	296.0	7417	24.82	16.42	1.63	4.88	1.44	64.80
HM Niagra (7505)	309.7	7481	23.97	16.98	1.50	4.24	2.25	60.95
HM Shasta (2416)	305.6	7337	23.84	16.78	1.50	5.07	1.53	66.35
KW 1800	293.5	7501	25.32	16.27	1.59	4.96	1.50	63.25
KW 2398	315.4	7420	23.37	17.25	1.48	4.80	1.44	64.75
KW 3291	296.9	7353	24.57	16.42	1.57	4.84	1.60	62.70
KW 6770	300.0	7529	24.85	16.51	1.50	5.11	1.92	59.25
Maribo 875	302.5	7088	23.21	16.70	1.57	4.74	1.39	63.60
Maribo 923	299.0	7448	24.73	16.55	1.60	5.09	1.24	61.85
Mitsui Monohikari	291.7	7335	24.97	16.04	1.46	4.64	2.15	64.90
Seedex Laser (1004)	304.8	7281	23.80	16.81	1.57	4.02	1.42	61.70
Van Der Have H66140	288.6	7415	25.38	16.00	1.58	5.33	1.45	66.15
Beta 6863	307.4	7450	24.00	16.84	1.48	4.72	1.63	
HM Hector (2418)	301.7	7723	25.36	16.64	1.55	4.94	2.03	
Mean	**299.82**	**7418.26**	**24.54**	**16.54**	**1.55**	**4.78**	**1.59**	**63.71**

Test Market

Maribo 9363	306.3	7376	23.80	16.85	1.53	4.87	1.43
Beta 5014	312.7	7322	23.29	17.13	1.50	3.58	1.36
Beta 6904	310.0	7816	25.05	16.92	1.41	4.54	1.57
HM 7518	307.0	7619	24.57	16.88	1.54	4.74	1.60

* Lower numbers indicate better cerc. resistance (1=ex,9=poor)

SOUTHERN MN SUGAR COOPERATIVE APPROVED AND TEST MARKET VARIETIES FOR 1996 PERCENT OF MEAN OF APPROVED

Table 6. Percent of Mean of Two year Performance Summary of SMSC Commercial Coded Entries, 1994-1995

VARIETY	Rec.S / Ton	Rec.S / Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf* Spot	Seed* Vigor	% Field Emerg.
ACH 194	99.3	98.9	99.6	99.7	104.2	102.3	79.2	101.6
ACH196	97.7	98.1	99.8	98.3	105.5	103.1	85.5	97.4
ACH302	101.7	98.5	97.1	101.8	102.6	84.3	89.6	101.5
ACH 309	102.1	101.5	99.7	101.9	99.7	86.6	78.2	109.8
Beta 1492	99.0	102.0	102.8	99.2	101.7	103.9	116.4	96.0
Beta 2010	96.1	102.4	106.2	96.4	100.0	104.8	98.7	104.3
Beta 3712	99.1	99.6	100.2	99.2	99.7	106.0	104.4	96.2
HM 5135	98.7	100.0	101.1	99.2	104.5	102.1	90.5	101.7
HM Niagra (7505)	103.3	100.8	97.7	102.6	96.5	88.7	141.9	95.7
HM Shasta (2416)	101.9	98.9	97.2	101.4	96.5	106.0	96.2	104.1
KW 1800	97.9	101.1	103.2	98.3	102.3	103.7	94.6	99.3
KW 2398	105.2	100.0	95.2	104.3	95.2	100.4	90.8	101.6
KW 3291	99.0	99.1	100.1	99.2	101.0	101.2	100.6	98.4
KW 6770	100.1	101.5	101.3	99.8	96.5	106.9	121.1	93.0
Maribo 875	100.9	95.5	94.6	100.9	101.0	99.1	87.4	99.8
Maribo 923	99.7	100.4	100.8	100.0	102.6	106.4	78.2	97.1
Mitsui Monohikari	97.3	98.9	101.7	97.0	93.6	97.0	135.3	101.9
Seedex Laser (1004)	101.7	98.1	97.0	101.6	101.0	84.1	89.6	96.8
Van Der Have H66140	96.3	100.0	103.4	96.7	101.3	111.5	91.5	103.8
Beta 6863	102.5	100.4	97.8	101.8	94.9	98.7	102.8	----------
HM Hector (2418)	100.6	104.1	103.4	100.5	99.4	103.3	127.7	----------
Mean	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Test Market

Maribo 9363	102.2	99.4	97.0	101.8	98.4	101.8	90.2
Beta 5014	104.3	98.7	94.9	103.5	96.2	74.9	85.8
Beta 6904	103.4	105.4	102.1	102.2	90.7	94.9	98.7
HM 7518	102.4	102.7	100.1	102.0	98.8	99.1	100.6

* Lower numbers indicate better cerc. resistance (1=ex,9=poor)

Table 7. Comparison of special varieties to commercial varieties, 1993-1995

VARIETY	Rec.S/ Ton	Rec.S/ Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf* Spot	Seed* Vigor	% Field Emerg.
ACH 194	305.7	6129	20.13	16.81	1.52	4.91	1.24	67.33
ACH196	300.9	6138	20.38	16.59	1.55	4.94	1.37	66.87
ACH302	312.2	6169	19.85	17.09	1.48	4.12	1.38	67.43
ACH 309	311.8	6244	20.09	17.05	1.46	4.23	1.31	70.73
Beta 1492	303.3	6376	21.01	16.65	1.48	4.96	1.75	61.15
Beta 2010	297.7	6423	21.67	16.35	1.46	5.02	1.47	69.53
Beta 3712	305.8	6234	20.43	16.71	1.41	5.04	1.62	61.30
HM 5135	305.6	6359	20.90	16.80	1.52	4.93	1.32	68.50
HM Niagra (7505)	314.8	6361	20.20	17.16	1.43	4.39	2.27	58.60
HM Shasta (2416)	314.8	6149	19.66	17.16	1.42	5.13	1.72	66.35
KW 1800	297.9	6306	21.13	16.40	1.51	4.97	1.83	65.20
KW 2249 (Blend)	295.7	6197	21.05	16.30	1.51	4.84	1.68	69.37
KW 2398	318.4	6176	19.36	17.33	1.41	4.87	1.61	67.43
KW 3291	307.0	6178	20.28	16.81	1.46	4.87	1.58	64.33
KW 6770	310.4	6419	20.79	16.95	1.43	5.09	1.80	61.00
Maribo 875	308.3	6028	19.54	16.92	1.50	4.77	1.29	68.63
Maribo 923	305.8	6343	20.79	16.81	1.52	5.05	1.20	64.87
Mitsui Monohikari	297.8	6124	20.62	16.28	1.39	4.69	2.24	66.40
Seedex Laser (1004)	310.1	6176	19.99	16.97	1.47	4.19	1.75	58.73
Van Der Have H66140	297.3	6336	21.33	16.35	1.49	5.27	1.49	68.47
Beta 6863	314.6	6322	20.11	17.11	1.37	4.75	1.70	
HM Hector (2418)	308.5	6504	21.09	16.88	1.45	4.89	2.15	
Mean	**306.6**	**6259**	**20.47**	**16.79**	**1.47**	**4.81**	**1.63**	**65.61**

SPECIAL

VARIETY	Rec.S/ Ton	Rec.S/ Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf* Spot	Seed* Vigor	% Field Emerg.
ACH 198(Aphan.)	305.7	6132	20.11	16.85	1.56	4.27	1.36	68.5
ACH 205(Aphan.)	298.0	6193	20.80	16.28	1.38	3.96	1.63	
HM RESIST (Aphan.)	305.4	6389	20.92	16.64	1.37	4.43	2.45	

* Lower numbers indicate better cerc. resistance (1=ex,9=poor)

Table 8. Comparison of special varieties to commercial varieties as percent of mean of approved, 1993-1995

VARIETY	Rec.S/ Ton	Rec.S/ Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf* Spot	Seed* Vigor	% Field Emerg.
ACH 194	99.72	97.93	98.32	100.09	103.91	101.98	76.07	102.62
ACH196	98.15	98.07	99.56	98.78	105.73	102.61	84.06	101.91
ACH302	101.84	98.57	96.97	101.78	101.18	85.57	84.68	102.78
ACH 309	101.71	99.77	98.13	101.52	99.59	87.86	80.78	107.81
Beta 1492	98.94	101.87	102.64	99.12	101.18	103.02	107.44	93.20
Beta 2010	97.11	102.63	105.85	97.33	99.81	104.27	90.62	105.98
Beta 3712	99.75	99.61	99.81	99.48	96.40	104.68	99.65	93.43
HM 5135	99.69	101.60	102.08	100.03	103.91	102.40	81.40	104.40
HM Niagra (7505)	102.69	101.63	98.65	102.20	97.31	91.18	139.42	89.31
HM Shasta (2416)	102.69	98.25	96.03	102.20	96.86	106.55	105.80	101.13
KW 1800	97.17	100.76	103.21	97.67	102.77	103.23	112.56	99.37
KW 2249 (Blend)	96.46	99.01	102.82	97.04	103.22	100.53	103.34	105.72
KW 2398	103.86	98.68	94.55	103.19	96.18	101.15	99.24	102.78
KW 3291	100.14	98.71	99.04	100.07	99.36	101.15	96.98	98.05
KW 6770	101.25	102.56	101.53	100.91	97.31	105.72	110.51	92.97
Maribo 875	100.57	96.31	95.46	100.73	102.09	99.07	79.35	104.61
Maribo 923	99.75	101.35	101.56	100.09	103.68	104.89	74.02	98.86
Mitsui Monohikari	97.14	97.85	100.70	96.96	94.81	97.41	137.58	101.20
Seedex Laser (1004)	101.15	98.68	97.64	101.07	100.50	87.03	107.85	89.52
Van Der Have H66140	96.98	101.24	104.20	97.37	101.63	109.46	91.85	104.35
Beta 6863	102.62	101.01	98.23	101.86	93.68	98.66	104.57	0.00
HM Hector (2418)	100.63	103.92	103.03	100.51	98.90	101.57	132.25	0.00
Mean	100	100	100	100	100	100	100	100

SPECIAL

VARIETY	Rec.S/ Ton	Rec.S/ Acre	Tons/ Acre	Percent Sugar	Percent LTM	Leaf* Spot	Seed* Vigor	% Field Emerg.
ACH 198(Aphan.)	99.72	97.98	98.23	100.33	106.41	88.69	83.65	104.36
ACH 205(Aphan.)	97.21	98.95	101.60	96.94	94.13	82.25	100.26	
HM RESIST (Aphan.)	99.62	102.08	102.18	99.08	93.45	92.01	150.70	

* Lower numbers indicate better cerc. resistance (1=ex,9=poor)

Table 9. Three Year Performance Summary of 1995 SMSC Commercial Coded Entries (All Locations)

	Rec./Ton					Rec./Acre					Loss to Molasses					Cercospora Leaf Spot Ratings				
Description	1993	1994	1995	3 Yr. Mean	3 Yr. % Mean	1993	1994	1995	3 Yr. Mean	3 Yr. % Mean	1993	1994	1995	3 Yr. Mean	3 Yr. % Mean	1993	1994	1995	3 Yr. Mean	3 Yr. % Mean
ACH 194	322.1	321.5	273.6	305.7	100.0	3710	8734	5943	6129	98.0	1.33	1.48	1.76	1.52	103.6	4.97	5.12	4.65	4.91	102.5
ACH 195	317.1	323.2	262.3	300.9	98.4	3861	9082	5472	6138	98.2	1.37	1.51	1.77	1.55	105.4	4.97	5.00	4.85	4.94	103.0
ACH 198 (Aphan. Spec.)	315.7	318.4	282.9	305.7	100.0	3650	8540	6206	6132	98.1	1.38	1.56	1.75	1.56	106.3	4.23	4.47	4.10	4.27	89.0
ACH 205 (Aphan. Spec.)	309.2	310.7	274.0	298.0	97.5	3925	8718	5935	6193	99.1	1.21	1.33	1.61	1.38	94.1	4.15	4.37	3.35	3.96	82.5
ACH 302	326.7	325.2	284.7	312.2	102.1	3894	8494	6119	6169	98.7	1.26	1.47	1.72	1.48	100.9	4.32	4.10	3.95	4.12	86.0
ACH 309	323.1	324.8	287.4	311.8	102.0	3665	8779	6287	6244	99.9	1.28	1.46	1.64	1.46	99.3	4.40	4.43	3.85	4.23	88.1
Beta 1492	316.2	321.8	271.8	303.3	99.2	3989	9222	5916	6376	102.0	1.29	1.41	1.75	1.48	100.9	4.95	5.18	4.75	4.96	103.4
Beta 2010	317.1	314.7	261.2	297.7	97.4	4081	9224	5965	6423	102.7	1.28	1.45	1.66	1.46	99.5	5.03	5.22	4.80	5.02	104.6
Beta 3712	323.3	323.0	271.1	305.8	100.0	3923	8977	5803	6234	99.7	1.14	1.42	1.68	1.41	96.1	4.98	5.53	4.60	5.04	105.0
Beta 6863	329.2	329.6	285.1	314.6	102.9	4066	9040	5860	6322	101.1	1.17	1.38	1.57	1.37	93.4	4.82	5.33	4.10	4.75	99.1
HM 5135	324.8	322.2	269.7	305.6	100.0	4242	8925	5909	6359	101.7	1.32	1.48	1.77	1.52	103.6	5.05	5.26	4.50	4.94	102.9
HM Empire (7034)	328.0	315.8	260.0	301.3	98.6	4052	8864	5799	6238	99.8	1.31	1.48	1.71	1.50	102.0	5.15	5.63	4.85	5.21	108.6
HM Granite (7514)	325.9	322.9	266.5	305.1	99.8	4128	9094	5753	6325	101.2	1.32	1.43	1.72	1.49	101.3	5.07	5.15	4.75	4.99	104.1
HM Hector (2418)	322.2	321.7	281.7	308.5	100.9	4066	9190	6255	6504	104.0	1.26	1.43	1.66	1.45	98.6	4.80	5.22	4.65	4.89	102.0
HM Niagara (7505)	325.0	329.4	289.9	314.8	103.0	4120	8861	6101	6361	101.7	1.28	1.39	1.61	1.43	97.0	4.68	4.53	3.95	4.39	91.5
HM Shasta (2416)	333.2	330.7	280.4	314.8	103.0	3773	8759	5915	6149	98.4	1.26	1.40	1.60	1.42	96.5	5.27	5.38	4.75	5.13	107.0
HM Thunder (7035)	325.1	316.0	274.2	305.1	99.8	4249	8955	5484	6229	99.6	1.35	1.52	1.70	1.52	103.6	5.05	5.48	4.70	5.08	105.9
KW 1800	306.8	315.1	271.8	297.9	97.5	3916	9112	5889	6306	100.9	1.34	1.48	1.70	1.51	102.4	4.98	5.07	4.85	4.97	103.6
KW 2249 (Blend)	314.6	311.8	260.6	295.7	96.7	3875	9043	5672	6197	99.1	1.32	1.52	1.70	1.51	102.9	4.98	5.03	4.50	4.84	100.9
KW 2398 (Aphan. Spec.)	324.5	333.1	297.7	318.4	104.2	3689	8868	5972	6176	98.8	1.27	1.38	1.58	1.41	95.9	5.02	5.10	4.50	4.87	101.6
KW 3291	327.2	318.1	275.7	307.0	100.4	3830	8876	5829	6178	98.8	1.23	1.43	1.71	1.46	99.0	4.93	5.18	4.50	4.87	101.6
KW 6770	331.1	320.1	279.9	310.4	101.5	4199	9273	5785	6419	102.7	1.28	1.41	1.59	1.43	97.0	5.05	5.22	5.00	5.09	106.1
Maribo 875	320.0	322.1	282.9	308.3	100.9	3909	8646	5529	6028	96.4	1.35	1.49	1.65	1.50	101.8	4.83	4.97	4.50	4.77	99.4
Maribo 923	319.6	322.6	275.3	305.8	100.0	4134	8879	6017	6343	101.5	1.37	1.49	1.70	1.52	103.3	4.97	5.28	4.90	5.05	105.3
Mariob 9363		330.6	282.0				9063	5688				1.37	1.69				4.98	4.75	4.87	101.5
Maribo 9369 (NC)	311.6	319.5	273.6	301.6	98.7	4254	9372	6074	6567	105.0	1.29	1.43	1.70	1.47	100.2	5.00	5.27	4.90	5.06	105.5
Mitsui Monohikari	310.2	316.3	267.0	297.8	97.4	3702	8641	6028	6124	98.0	1.26	1.33	1.58	1.39	94.5	4.80	4.62	4.65	4.69	97.8
Seedex Laser (1004)	320.6	321.9	287.7	310.1	101.4	3967	8444	6117	6176	98.8	1.28	1.46	1.68	1.47	100.2	4.53	4.18	3.85	4.19	87.3
Seedex SX1006(NC)	318.6	319.2	274.3	304.0	99.5	3616	8558	5581	5918	94.7	1.36	1.41	1.63	1.47	99.7	4.20	4.48	4.90	4.53	94.4
Van der Have H66140	314.8	315.8	261.3	297.3	97.3	4179	9201	5629	6336	101.4	1.32	1.45	1.70	1.49	101.3	5.15	5.50	5.15	5.27	109.8
Mean	**320.8**	**321.3**	**275.5**	**305.7**	**100.0**	**3954**	**8914**	**5884**	**6251**	**100.0**	**1.29**	**1.44**	**1.68**	**1.47**	**100.0**	**4.84**	**5.01**	**4.54**	**4.80**	**100.0**

Table 10. Three Year Performance Summary of 1995 SMSC Commercial Coded Entries (All Locations)

	Sugar Content (%)					Root Yield (T/A)					Seedling Vigor					Field Emerg (%)				
Description	1993	1994	1995	3 Yr. Mean	3 Yr. % Mean	1993	1994	1995	3 Yr. Mean	3 Yr. % Mean	1993	1994	1995	3 Yr. Mean	3 Yr. % Mean	1993	1994	1995	3 Yr. Mean	3 Yr. % Mean
ACH 194	17.43	17.56	15.44	16.81	100.3	11.51	27.21	21.67	20.13	98.2	1.20	1.38	1.13	1.24	75.1	72.6	54.6	74.8	67.3	101.1
ACH 195	17.23	17.66	14.88	16.59	99.0	12.16	28.12	20.87	20.38	99.4	1.39	1.63	1.08	1.37	83.0	76.5	54.6	69.5	66.9	100.4
ACH 198 (Aphan. Spec.)	17.16	17.48	15.90	16.85	100.5	11.57	26.85	21.91	20.11	98.1	1.52	1.50	1.06	1.36	82.6	76.7	56.5	72.2	68.5	102.8
ACH 205 (Aphan. Spec.)	16.67	16.87	15.31	16.28	97.2	12.67	28.08	21.67	20.81	101.5	1.56	1.54	1.79	1.63	99.0	79.5	62.8	77.5	73.3	110.0
ACH 302	17.59	17.73	15.96	17.09	102.0	11.92	26.15	21.49	19.85	96.8	1.29	1.63	1.21	1.38	83.6	73.0	56.2	73.1	67.4	101.3
ACH 309	17.44	17.70	16.01	17.05	101.8	11.34	27.07	21.86	20.09	98.0	1.46	1.21	1.27	1.31	79.8	72.3	62.1	77.8	70.7	106.2
Beta 1492	17.10	17.50	15.34	16.65	99.3	12.57	28.71	21.76	21.01	102.5	1.55	2.00	1.69	1.75	106.1		51.1	71.2		
Beta 2010	17.13	17.19	14.72	16.35	97.6	12.87	29.33	22.81	21.67	105.7	1.29	1.50	1.63	1.47	89.5	75.7	58.1	74.8	69.5	104.4
Beta 3712	17.31	17.57	15.24	16.71	99.7	12.11	27.81	21.38	20.43	99.6	1.55	2.25	1.06	1.62	98.4		48.7	73.9		
Beta 6863	17.64	17.88	15.82	17.11	102.1	12.33	27.43	20.57	20.11	98.1	1.84	1.70	1.56	1.70	103.3			70.8		
HM 5135	17.56	17.59	15.25	16.80	100.3	13.07	27.73	21.90	20.90	101.9	1.10	1.63	1.24	1.32	80.4	75.9	55.6	74.0	68.5	102.9
HM Empire (7034)	17.71	17.27	14.71	16.56	98.9	12.31	28.09	22.30	20.90	101.9	1.97	1.42	1.52	1.64	99.4			73.8		
HM Granite (7514)	17.61	17.58	15.04	16.74	99.9	12.64	28.23	21.61	20.83	101.5	1.84	1.54	2.17	1.85	112.4			63.9		
HM Hector (2418)	17.37	17.52	15.75	16.88	100.7	12.56	28.59	22.13	21.09	102.8	2.40	1.97	2.08	2.15	130.6			76.7		
HM Niagara (7505)	17.53	17.86	16.10	17.16	102.4	12.66	26.93	21.00	20.20	98.5	2.30	2.21	2.29	2.27	137.7	53.9	51.3	70.6	58.6	88.0
HM Shasta (2416)	17.93	17.94	15.62	17.16	102.4	11.30	26.55	21.13	19.66	95.9	2.11	1.63	1.42	1.72	104.5		58.5	74.2		
HM Thunder (7035)	17.60	17.33	15.41	16.78	100.1	13.03	28.35	20.00	20.46	99.8	1.84	1.62	1.88	1.78	108.1			77.7		
KW 1800	16.68	17.24	15.29	16.40	97.9	12.76	28.97	21.66	21.13	103.0	2.49	1.67	1.33	1.83	111.2	69.1	54.7	71.8	65.2	97.9
KW 2249 (Blend)	17.05	17.11	14.73	16.30	97.3	12.30	29.05	21.80	21.05	102.6	1.45	1.71	1.88	1.68	102.0	75.9	58.8	73.4	69.4	104.2
KW 2398 (Aphan. Spec.)	17.49	18.04	16.46	17.33	103.4	11.34	26.66	20.07	19.36	94.4	1.96	1.75	1.13	1.61	98.0	72.8	55.6	73.9	67.4	101.3
KW 3291	17.59	17.34	15.49	16.81	100.3	11.70	27.97	21.16	20.28	98.9	1.54	1.92	1.27	1.58	95.8	67.6	53.2	72.2	64.3	96.6
KW 6770	17.83	17.42	15.59	16.95	101.1	12.67	29.02	20.67	20.79	101.4	1.55	2.13	1.71	1.80	109.1	64.5	49.9	68.6	61.0	91.6
Maribo 875	17.35	17.60	15.80	16.92	101.0	12.21	26.87	19.55	19.54	95.3	1.10	1.46	1.31	1.29	78.4	78.7	56.5	70.7	68.6	103.1
Maribo 923	17.34	17.62	15.47	16.81	100.3	12.93	27.58	21.87	20.79	101.4	1.13	1.42	1.06	1.20	73.1	70.9	49.9	73.8	64.9	97.4
Mariob 9363		17.90	15.79				27.42	20.17				1.46	1.40					64.8		
Maribo 9369 (NC)	16.86	17.41	15.38	16.55	98.8	13.64	29.36	22.23	21.74	106.0	2.54	1.38	1.56	1.83	111.0			70.7		
Mitsui Monohikari	16.77	17.15	14.93	16.28	97.2	11.92	27.35	22.58	20.62	100.5	2.42	2.04	2.25	2.24	135.9	69.4	54.7	75.1	66.4	99.7
Seedex Laser (1004)	17.31	17.55	16.06	16.97	101.3	12.37	26.26	21.34	19.99	97.5	2.42	1.67	1.17	1.75	106.5	52.8	53.9	69.5	58.7	88.2
Seedex SX1006(NC)	17.29	17.37	15.34	16.67	99.5	11.31	26.88	20.34	19.51	95.1	2.40	1.90	1.38	1.89	115.0			70.2		
Van der Have H66140	17.06	17.24	14.76	16.35	97.6	13.24	29.18	21.58	21.33	104.0	1.58	1.75	1.15	1.49	90.7	73.1	59.9	72.4	68.5	102.8
Mean	**17.33**	**17.51**	**15.45**	**16.76**	**100.0**	**12.31**	**27.79**	**21.37**	**20.51**	**100.0**	**1.75**	**1.69**	**1.49**	**1.65**	**100.0**	**71.1**	**55.3**	**72.5**	**66.6**	**100.0**

TABLE 11A. COMBINED ANALYSIS

1995 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

30 Entries 14 RepsXLocs 2 Tests Combined 2 Rows/Plot 1 Sample/Plot

ENTRY	CODE	REC/T LBS		REC/A LBS		LTM		SUGAR %		YIELD T/A	
ACH 194	88	273.6	99	5943	101	1.76	105 +	15.44	100	21.67	101
ACH 196	85	262.3	95 -	5472	93 -	1.77	105 +	14.88	96 -	20.87	98
ACH 198 (Aphan. Spec.)	102	282.9	103	6206	105	1.75	105 +	15.90	103 +	21.91	103
ACH 205 (Aphan. Spec.)	97	274.0	99	5935	101	1.61	96	15.31	99	21.67	101
ACH 302	80	284.7	103 +	6119	104	1.72	103	15.96	103 +	21.49	101
ACH 309	99	287.4	104 +	6287	107 +	1.64	98	16.01	104 +	21.86	102
Beta 1492	103	271.8	99	5916	101	1.75	104 +	15.34	99	21.76	102
Beta 2010	84	261.2	95 -	5965	101	1.66	99	14.72	95	22.81	107 +
Beta 3712	92	271.1	98	5803	99	1.68	100	15.24	99	21.38	100
Beta 6863	87	285.1	103 +	5860	100	1.57	93 -	15.82	102 +	20.57	96
HM 5135	76	269.7	98	5909	100	1.77	105 +	15.25	99	21.90	103
HM Empire (7034)	74	260.0	94 -	5799	99	1.71	102	14.71	95 -	22.30	104
HM Granite (7514)	91	266.5	97 -	5753	98	1.72	102	15.04	97 -	21.61	101
HM Hector (2418)	96	281.7	102	6255	106 +	1.66	99	15.75	102	22.13	104
HM Niagara (7505)	82	289.9	105 +	6101	104	1.61	96	16.10	104 +	21.00	98
HM Shasta (2416)	101	280.4	102	5915	101	1.60	95 -	15.62	101	21.13	99
HM Thunder (7035)	89	274.2	100	5484	93 -	1.70	101	15.41	100	20.00	94 -
KW 1800	90	271.8	99	5889	100	1.70	102	15.29	99	21.66	101
KW 2249 (Blend)	94	260.6	95 -	5672	96	1.70	101	14.73	95 -	21.80	102
KW 2398 (Aphan. Spec.)	95	297.7	108 +	5972	101	1.58	94 -	16.46	107 +	20.07	94 -
KW 3291	78	275.7	100	5829	99	1.71	102	15.49	100	21.16	99
KW 6770	75	279.9	102	5785	98	1.59	95 -	15.59	101	20.67	97
Maribo 875	83	282.9	103	5529	94 -	1.65	98	15.80	102 +	19.55	91 -
Maribo 923	79	275.3	100	6017	102	1.70	102	15.47	100	21.87	102
Maribo 9363	98	282.0	102	5688	97	1.69	101	15.79	102	20.17	94 -
Maribo 9369 (NC)	86	273.6	99	6074	103	1.70	102	15.38	100	22.23	104
Mitsui Monohikari	100	267.0	97 -	6028	102	1.58	94 -	14.93	97 -	22.58	106 +
Seedex Laser (1004)	93	287.7	104 +	6117	104	1.68	100	16.06	104 +	21.34	100
Seedex SX1006 (NC)	77	274.3	100	5581	95	1.63	97	15.34	99	20.34	95
Van der Have H66140	81	261.3	95 -	5629	96	1.70	101	14.76	96 -	21.58	101

General Mean	275.54	5884.54	1.68	15.45	21.37
Coeff. of Var. (%)	3.83	7.75	5.75	3.00	6.66
Variety Mean Square	1285.01	639651.94	0.05	3.03	9.10
Error Mean Square B	110.05	204819.81	0.01	0.21	2.02
F Value	11.68 **	3.12 **	5.65 **	14.23 **	4.50 **
L.S.D. (.05)	7.76	334.79	0.07	0.34	1.05
L.S.D. (.01)	10.01	432.05	0.09	0.44	1.36

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

TABLE 11B. COMBINED ANALYSIS

1995 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

30 Entries 14 RepsXLocs 2 Tests Combined 2 Rows/Plot 1 Sample/Plot

ENTRY	CODE	NA ppm		K ppm		Am. N ppm		Gross/A lbs.		Emergence %	
ACH 194	88	371	117 +	2323	110 +	608	98	6701	102	74.8	103
ACH 196	85	430	135 +	2274	107 +	608	98	6211	94 -	69.5	96
ACH 198 (Aphan. Spec.)	102	242	76 -	2148	101	699	113 +	6970	106 +	72.2	100
ACH 205 (Aphan. Spec.)	97	278	88	2014	95	608	98	6633	100	77.5	107 +
ACH 302	80	285	90	2147	101	658	106	6857	104	73.1	101
ACH 309	99	240	76 -	2233	106 +	590	95	7001	106 +	77.8	107 +
Beta 1492	103	326	103	2142	101	668	108 +	6677	101	71.2	98
Beta 2010	84	322	102	2187	103	591	95	6724	102	74.8	103
Beta 3712	92	321	101	2062	97	637	103	6519	99	73.9	102
Beta 6863	87	264	83 -	1854	88 -	623	100	6502	98	70.8	98
HM 5135	76	372	117 +	2308	109 +	621	100	6683	101	74.0	102
HM Empire (7034)	74	354	111	2065	98	646	104	6562	99	73.8	102
HM Granite (7514)	91	394	124 +	2286	108 +	580	93	6498	98	63.9	88 -
HM Hector (2418)	96	302	95	1903	90 -	673	109 +	6989	106 +	76.7	106 +
HM Niagara (7505)	82	280	88	2039	96	601	97	6771	103	70.6	97
HM Shasta (2416)	101	343	108	2000	94 -	583	94	6593	100	74.2	102
HM Thunder (7035)	89	277	87	2111	100	656	106	6165	93 -	77.7	107 +
KW 1800	90	317	100	2139	101	635	102	6626	100	71.8	99
KW 2249 (Blend)	94	351	111	2193	104	604	97	6416	97	73.4	101
KW 2398 (Aphan. Spec.)	95	295	93	1993	94 -	587	95	6608	100	73.9	102
KW 3291	78	292	92	2039	96	676	109 +	6553	99	72.2	100
KW 6770	75	264	83 -	2180	103	558	90 -	6441	98	68.6	95 -
Maribo 875	83	328	103	2157	102	586	94	6175	94 -	70.7	98
Maribo 923	79	374	118 +	2177	103	604	97	6762	102	73.8	102
Maribo 9363	98	293	92	2182	103	622	100	6369	96	64.8	89 -
Maribo 9369 (NC)	86	341	107	2158	102	621	100	6834	104	70.7	98
Mitsui Monohikari	100	341	107	1939	92 -	587	95	6744	102	75.1	104
Seedex Laser (1004)	93	242	76 -	2117	100	651	105	6839	104	69.5	96
Seedex SX1006 (NC)	77	332	104	2018	95	604	97	6242	95	70.2	97
Van der Have H66140	81	357	113	2106	100	627	101	6364	96	72.4	100

General Mean	317.55	2116.36	620.38	6600.92	72.44
Coeff. of Var. (%)	20.79	6.57	8.72	7.40	5.70
Variety Mean Square	31572.28	186311.88	17358.97	744947.38	145.88
Error Mean Square B	4393.91	19783.40	3089.92	236256.02	17.04
F Value	7.19 **	9.42 **	5.62 **	3.15 **	8.56 **
L.S.D. (.05)	49.04	104.05	41.12	359.57	3.05
L.S.D. (.01)	63.28	134.28	53.07	464.03	3.94

* significant at 5% ** significant atns not significant
Second column for each trait is percent of check. General Mean used as check.
Emergence data collected from 2 locations.

TABLE 11C. COMBINED ANALYSIS

1995 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

30 Entries 14 RepsXLocs 2 Tests Combined 2 Rows/Plot 1 Sample/Plot

ENTRY	CODE	BOLTERS %	VIGOR	
ACH 194	88	0.00	1.13	76 -
ACH 196	85	0.00	1.08	73 -
ACH 198 (Aphan. Spec.)	102	0.00	1.06	71 -
ACH 205 (Aphan. Spec.)	97	0.00	1.79	120
ACH 302	80	0.00	1.21	81
ACH 309	99	0.00	1.27	85
Beta 1492	103	0.00	1.69	113
Beta 2010	84	0.00	1.63	109
Beta 3712	92	0.00	1.06	71 -
Beta 6863	87	0.00	1.56	105
HM 5135	76	0.00	1.24	83
HM Empire (7034)	74	0.00	1.52	102
HM Granite (7514)	91	0.00	2.17	146 +
HM Hector (2418)	96	0.00	2.08	140 +
HM Niagara (7505)	82	0.00	2.29	154 +
HM Shasta (2416)	101	0.00	1.42	95
HM Thunder (7035)	89	0.00	1.88	126 +
KW 1800	90	0.00	1.33	90
KW 2249 (Blend)	94	0.00	1.88	126 +
KW 2398 (Aphan. Spec.)	95	0.00	1.13	76 -
KW 3291	78	0.00	1.27	85
KW 6770	75	0.00	1.71	115
Maribo 875	83	0.15	1.31	88
Maribo 923	79	0.00	1.06	71 -
Maribo 9363	98	0.00	1.40	94
Maribo 9369 (NC)	86	0.00	1.56	105
Mitsui Monohikari	100	0.00	2.25	151 +
Seedex Laser (1004)	93	0.00	1.17	78
Seedex SX1006 (NC)	77	0.00	1.38	92
Van der Have H66140	81	0.11	1.15	77 -

General Mean	0.01	1.49
Coeff. of Var. (%)	1416.67	29.50
Variety Mean Square	0.01	1.89
Error Mean Square B	0.01	0.19
F Value	0.98	9.81 **
L.S.D. (.05)	ns	0.32
L.S.D. (.01)	ns	0.42

* 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 2 locations

TABLE 12A. HECTOR

1995 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/19/95
Harvest Date: 11/07/95

30 Entries **6 Replications** **2 Rows/Plot** **1 Sample/Plot**

ENTRY	CODE	REC/T LBS		REC/A LBS		LTM		SUGAR %		YIELD T/A	
ACH 194	88	291.2	101	6581	106	1.48	101	16.04	101	22.59	105
ACH 196	85	266.9	92 -	5544	89 -	1.62	111 +	14.97	94 -	20.78	97
ACH 198 (Aphan. Spec.)	102	300.3	104	6693	108	1.43	98	16.44	103	22.29	104
ACH 205 (Aphan. Spec.)	97	285.4	99	6163	99	1.33	91 -	15.60	98	21.58	100
ACH 302	80	295.4	102	6554	106	1.50	102	16.27	102	22.18	103
ACH 309	99	294.8	102	6509	105	1.45	99	16.18	102	22.07	103
Beta 1492	103	282.8	98	6240	101	1.52	104	15.66	99	22.07	103
Beta 2010	84	278.2	96	6390	103	1.43	98	15.33	96	22.93	107
Beta 3712	92	281.4	97	6208	100	1.48	101	15.55	98	22.06	103
Beta 6863	87	298.0	103	6294	101	1.32	90 -	16.22	102	21.16	98
HM 5135	76	280.8	97	6165	99	1.53	105	15.57	98	21.97	102
HM Empire (7034)	74	272.3	94 -	6093	98	1.55	106	15.17	95 -	22.35	104
HM Granite (7514)	91	279.7	97	5896	95	1.48	101	15.47	97	21.07	98
HM Hector (2418)	96	304.9	106 +	6944	112 +	1.37	94	16.62	105 +	22.71	106
HM Niagara (7505)	82	303.7	105 +	6687	108	1.38	94	16.57	104 +	22.00	102
HM Shasta (2416)	101	288.2	100	6083	98	1.44	99	15.85	100	21.13	98
HM Thunder (7035)	89	291.0	101	5851	94	1.51	104	16.07	101	20.11	93
KW 1800	90	281.9	98	6155	99	1.50	103	15.60	98	21.82	101
KW 2249 (Blend)	94	272.5	94 -	5998	97	1.56	107	15.19	96 -	22.01	102
KW 2398 (Aphan. Spec.)	95	313.3	109 +	6328	102	1.38	95	17.05	107 +	20.18	94
KW 3291	78	289.4	100	6100	98	1.51	103	15.98	101	21.10	98
KW 6770	75	294.0	102	6131	99	1.40	96	16.10	101	20.88	97
Maribo 875	83	298.3	103	5842	94	1.44	98	16.35	103	19.59	91 -
Maribo 923	79	291.1	101	6324	102	1.43	98	15.99	101	21.73	101
Maribo 9363	98	293.0	102	5901	95	1.48	102	16.13	102	20.15	94
Maribo 9369 (NC)	86	289.3	100	6273	101	1.48	102	15.95	100	21.66	101
Mitsui Monohikari	100	279.2	97	6305	102	1.36	93	15.32	96	22.54	105
Seedex Laser (1004)	93	301.2	104	6181	100	1.45	100	16.52	104 +	20.58	96
Seedex SX1006 (NC)	77	283.2	98	5860	94	1.52	104	15.68	99	20.69	96
Van der Have H66140	81	277.6	96	5932	96	1.47	101	15.35	97	21.39	99

General Mean	288.64	6207.54	1.46	15.89	21.51
Coeff. of Var. (%)	3.95	8.87	6.45	3.35	7.72
Variety Mean Square	695.62	543850.81	0.03	1.50	4.48
Error Mean Square B	129.81	303045.19	0.01	0.28	2.76
F Value	5.36 **	1.79 **	3.37 **	5.28 **	1.63 **
L.S.D. (.05)	13.01	628.51	0.11	0.61	1.90
L.S.D. (.01)	17.15	ns	0.14	0.80	ns

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

TABLE 12B. HECTOR

1995 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/19/95
Harvest Date: 11/07/95

30 Entries 6 Replications 2 Rows/Plot 1 Sample/Plot

ENTRY	CODE	NA ppm		K ppm		Am. N ppm		Gross/A lbs.		Emergence %	
ACH 194	88	334	108	2170	111 +	448	89	7252	106	76.6	105
ACH 196	85	467	151 +	2157	111 +	512	102	6219	91	69.0	95
ACH 198 (Aphan. Spec.)	102	219	71 -	1854	95	534	106	7328	107	73.5	101
ACH 205 (Aphan. Spec.)	97	277	90	1765	91 -	459	91	6736	99	77.8	107 +
ACH 302	80	294	95	1951	100	534	106	7219	106	75.4	103
ACH 309	99	244	79	2030	104	492	98	7146	105	80.0	109 +
Beta 1492	103	310	100	1992	102	537	107	6911	101	72.5	99
Beta 2010	84	307	99	1991	102	464	92	7045	103	75.3	103
Beta 3712	92	343	111	1967	101	498	99	6861	100	75.7	104
Beta 6863	87	258	84	1620	83 -	495	99	6851	100	72.9	100
HM 5135	76	358	116	2063	106	505	101	6839	100	73.5	101
HM Empire (7034)	74	344	111	1980	102	550	110	6788	99	73.3	100
HM Granite (7514)	91	354	115	2045	105	474	95	6521	95	62.3	85 -
HM Hector (2418)	96	241	78 -	1639	84 -	541	108	7569	111 +	78.1	107 +
HM Niagara (7505)	82	282	91	1839	94	477	95	7293	107	70.6	97
HM Shasta (2416)	101	354	115	1848	95	496	99	6694	98	74.2	102
HM Thunder (7035)	89	273	88	1928	99	562	112 +	6459	94	79.9	109 +
KW 1800	90	339	110	2049	105	497	99	6810	100	71.8	98
KW 2249 (Blend)	94	346	112	2074	106	532	106	6689	98	75.0	103
KW 2398 (Aphan. Spec.)	95	282	91	1862	96	474	95	6887	101	73.8	101
KW 3291	78	280	91	1908	98	561	112 +	6738	99	73.6	101
KW 6770	75	258	84	2014	103	455	91	6714	98	66.3	91 -
Maribo 875	83	321	104	1984	102	469	94	6405	94	72.1	99
Maribo 923	79	356	115	2015	103	444	89	6947	102	75.7	104
Maribo 9363	98	302	98	2082	107	487	97	6499	95	63.5	87 -
Maribo 9369 (NC)	86	316	102	1998	103	503	100	6916	101	70.4	96
Mitsui Monohikari	100	310	100	1724	89 -	481	96	6916	101	76.0	104
Seedex Laser (1004)	93	230	75 -	1957	100	523	104	6782	99	67.6	93 -
Seedex SX1006 (NC)	77	343	111	1937	99	541	108	6490	95	70.8	97
Van der Have H66140	81	316	102	1985	102	497	99	6561	96	73.6	101

General Mean	308.54	1947.44	501.34	6836.20	73.03
Coeff. of Var. (%)	18.37	6.71	10.31	8.64	5.54
Variety Mean Square	15205.60	106057.11	6852.43	554631.38	106.24
Error Mean Square B	3213.70	17050.56	2669.61	348944.00	16.36
F Value	4.73 **	6.22 **	2.57 **	1.59 **	6.49 **
L.S.D. (.05)	64.72	149.08	58.99	674.43	4.62
L.S.D. (.01)	85.33	196.54	77.77	ns	6.09

* 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. HECTOR

1995 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/19/95
Harvest Date: 11/07/95

30 Entries 6 Replications 2 Rows/Plot 1 Sample/Plot

ENTRY	CODE	BOLTERS %	VIGOR	
ACH 194	88	0.00	1.00	67
ACH 196	85	0.00	1.17	78
ACH 198 (Aphan. Spec.)	102	0.00	1.00	67
ACH 205 (Aphan. Spec.)	97	0.00	1.83	123
ACH 302	80	0.00	1.17	78
ACH 309	99	0.00	1.17	78
Beta 1492	103	0.00	1.50	101
Beta 2010	84	0.00	1.50	101
Beta 3712	92	0.00	1.00	67
Beta 6863	87	0.00	1.50	101
HM 5135	76	0.00	1.33	90
HM Empire (7034)	74	0.00	1.67	112
HM Granite (7514)	91	0.00	2.33	157 +
HM Hector (2418)	96	0.00	2.17	146 +
HM Niagara (7505)	82	0.00	2.33	157 +
HM Shasta (2416)	101	0.00	1.33	90
HM Thunder (7035)	89	0.00	2.00	134 +
KW 1800	90	0.00	1.17	78
KW 2249 (Blend)	94	0.00	2.00	134 +
KW 2398 (Aphan. Spec.)	95	0.00	1.00	67
KW 3291	78	0.00	1.17	78
KW 6770	75	0.00	1.67	112
Maribo 875	83	0.29	1.50	101
Maribo 923	79	0.00	1.00	67
Maribo 9363	98	0.00	1.17	78
Maribo 9369 (NC)	86	0.00	1.50	101
Mitsui Monohikari	100	0.00	2.50	168 +
Seedex Laser (1004)	93	0.00	1.33	90
Seedex SX1006 (NC)	77	0.00	1.50	101
Van der Have H66140	81	0.00	1.17	78

General Mean	0.01	1.49
Coeff. of Var. (%)	1341.63	28.89
Variety Mean Square	0.02	1.16
Error Mean Square B	0.02	0.18
F Value	1.00	6.27 **
L.S.D. (.05)	ns	0.49
L.S.D. (.01)	ns	0.65

* 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. OLIVIA

1995 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/17/95
Harvest Date: 10/26/95

30 Entries **8 Replications** **2 Rows/Plot** **1 Sample/Plot**

ENTRY	CODE	REC/T LBS		REC/A LBS		LTM		SUGAR %		YIELD T/A	
ACH 194	88	256.1	98	5305	95	2.03	107 +	14.84	99	20.74	98
ACH 196	85	257.7	98	5400	97	1.91	101	14.80	99	20.96	99
ACH 198 (Aphan. Spec.)	102	265.6	101	5719	103	2.08	110 +	15.36	102	21.53	101
ACH 205 (Aphan. Spec.)	97	262.6	100	5708	103	1.89	100	15.02	100	21.76	103
ACH 302	80	274.0	104 +	5684	102	1.94	103	15.64	104 +	20.79	98
ACH 309	99	280.0	107 +	6065	109 +	1.83	97	15.84	105 +	21.65	102
Beta 1492	103	260.9	99	5593	101	1.98	105	15.03	100	21.45	101
Beta 2010	84	244.2	93 -	5540	100	1.90	101	14.11	94 -	22.68	107 +
Beta 3712	92	260.9	99	5398	97	1.88	99	14.93	99	20.70	98
Beta 6863	87	272.1	104 +	5426	98	1.81	96	15.42	103	19.98	94 -
HM 5135	76	258.6	99	5652	102	2.01	106 +	14.94	99	21.84	103
HM Empire (7034)	74	247.6	94 -	5506	99	1.87	99	14.25	95 -	22.24	105
HM Granite (7514)	91	253.2	96	5610	101	1.96	103	14.62	97	22.15	104
HM Hector (2418)	96	258.4	98	5567	100	1.96	103	14.88	99	21.54	101
HM Niagara (7505)	82	276.1	105 +	5515	99	1.83	97	15.64	104 +	20.01	94 -
HM Shasta (2416)	101	272.5	104 +	5748	103	1.76	93 -	15.39	102	21.13	100
HM Thunder (7035)	89	257.5	98	5118	92 -	1.89	100	14.76	98	19.90	94 -
KW 1800	90	261.7	100	5623	101	1.90	101	14.99	100	21.50	101
KW 2249 (Blend)	94	248.6	95 -	5347	96	1.83	97	14.26	95 -	21.59	102
KW 2398 (Aphan. Spec.)	95	282.0	107 +	5616	101	1.78	94 -	15.88	106 +	19.96	94 -
KW 3291	78	262.0	100	5558	100	1.91	101	15.01	100	21.22	100
KW 6770	75	265.8	101	5439	98	1.78	94 -	15.08	100	20.46	96
Maribo 875	83	267.6	102	5216	94	1.86	99	15.24	102	19.51	92 -
Maribo 923	79	259.5	99	5709	103	1.97	104	14.95	100	22.00	104
Maribo 9363	98	271.0	103	5475	98	1.89	100	15.45	103 +	20.19	95
Maribo 9369 (NC)	86	257.8	98	5875	106	1.92	102	14.81	99	22.80	107 +
Mitsui Monohikari	100	254.8	97	5752	103	1.81	96	14.55	97 -	22.61	107 +
Seedex Laser (1004)	93	274.1	104 +	6053	109 +	1.91	101	15.61	104 +	22.10	104
Seedex SX1006 (NC)	77	265.4	101	5302	95	1.73	92 -	15.00	100	19.99	94 -
Van der Have H66140	81	244.9	93 -	5326	96	1.93	102	14.18	94 -	21.77	103

General Mean	262.44	5561.54	1.89	15.01	21.23
Coeff. of Var. (%)	3.73	6.60	5.53	2.81	5.78
Variety Mean Square	779.34	390563.25	0.05	1.79	6.80
Error Mean Square B	95.90	134661.58	0.01	0.18	1.50
F Value	8.13 **	2.90 **	4.72 **	10.05 **	4.52 **
L.S.D. (.05)	9.65	361.77	0.10	0.42	1.21
L.S.D. (.01)	12.65	474.08	0.14	0.55	1.58

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

TABLE 13B. OLIVIA

1995 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/17/95
Harvest Date: 10/26/95

30 Entries **8 Replications** **2 Rows/Plot** **1 Sample/Plot**

ENTRY	CODE	NA ppm		K ppm		Am. N ppm		Gross/A lbs.		Emergence %	
ACH 194	88	408	125 +	2475	108 +	767	104	6150	97	73.1	102
ACH 196	85	392	120	2391	105	704	95	6202	97	69.9	97
ACH 198 (Aphan. Spec.)	102	265	81	2441	107 +	863	117 +	6611	104	70.8	99
ACH 205 (Aphan. Spec.)	97	279	85	2262	99	758	102	6530	103	77.2	107 +
ACH 302	80	276	85	2344	103	782	106	6495	102	70.8	99
ACH 309	99	236	72 -	2436	107 +	687	93	6856	108 +	75.6	105
Beta 1492	103	342	105	2292	100	799	108 +	6443	101	69.9	97
Beta 2010	84	338	104	2383	104	719	97	6402	101	74.4	104
Beta 3712	92	300	92	2157	94	775	105	6176	97	72.0	100
Beta 6863	87	270	83	2088	91 -	752	102	6152	97	68.8	96
HM 5135	76	385	118	2553	112 +	736	100	6527	103	74.5	104
HM Empire (7034)	74	364	111	2151	94	742	100	6337	100	74.3	103
HM Granite (7514)	91	435	133 +	2527	111 +	685	93	6475	102	65.6	91 -
HM Hector (2418)	96	363	111	2168	95	805	109 +	6409	101	75.4	105
HM Niagara (7505)	82	277	85	2239	98	725	98	6249	98	70.6	98
HM Shasta (2416)	101	332	102	2151	94	671	91 -	6492	102	74.2	103
HM Thunder (7035)	89	281	86	2293	100	751	102	5870	92 -	75.4	105
KW 1800	90	295	90	2230	98	773	105	6442	101	71.8	100
KW 2249 (Blend)	94	356	109	2312	101	676	91 -	6143	97	71.7	100
KW 2398 (Aphan. Spec.)	95	308	94	2124	93 -	700	95	6328	99	73.9	103
KW 3291	78	303	93	2170	95	791	107	6368	100	70.7	98
KW 6770	75	270	83	2346	103	660	89 -	6169	97	70.9	99
Maribo 875	83	335	103	2330	102	703	95	5944	93 -	69.3	96
Maribo 923	79	392	120	2338	102	765	103	6578	103	71.8	100
Maribo 9363	98	283	87	2282	100	756	102	6239	98	66.1	92 -
Maribo 9369 (NC)	86	366	112	2318	101	739	100	6753	106	70.9	99
Mitsui Monohikari	100	372	114	2154	94	694	94	6572	103	74.1	103
Seedex Laser (1004)	93	254	78 -	2278	100	779	105	6896	108 +	71.5	100
Seedex SX1006 (NC)	77	320	98	2099	92 -	667	90 -	5994	94	69.5	97
Van der Have H66140	81	399	122 +	2228	97	756	102	6167	97	71.2	99

General Mean	326.56	2285.29	739.42	6365.64	71.86
Coeff. of Var. (%)	22.17	6.45	7.89	6.20	5.92
Variety Mean Square	22324.78	124895.06	18544.36	498690.47	58.72
Error Mean Square B	5239.63	21748.20	3402.40	155758.39	18.10
F Value	4.26 **	5.74 **	5.45 **	3.20 **	3.24 **
L.S.D. (.05)	71.36	145.39	57.50	389.08	4.19
L.S.D. (.01)	93.51	190.52	75.36	509.86	5.50

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

TABLE 13C. OLIVIA

1995 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

Planting Date: 05/17/95
Harvest Date: 10/26/95

30 Entries **8 Replications** **2 Rows/Plot** **1 Samples/Plot**

ENTRY	CODE	BOLTERS %	VIGOR	
ACH 194	88	0.00	1.25	84
ACH 196	85	0.00	1.00	67 -
ACH 198 (Aphan. Spec.)	102	0.00	1.13	76
ACH 205 (Aphan. Spec.)	97	0.00	1.75	118
ACH 302	80	0.00	1.25	84
ACH 309	99	0.00	1.38	92
Beta 1492	103	0.00	1.88	126
Beta 2010	84	0.00	1.75	118
Beta 3712	92	0.00	1.13	76
Beta 6863	87	0.00	1.63	109
HM 5135	76	0.00	1.14	77
HM Empire (7034)	74	0.00	1.38	92
HM Granite (7514)	91	0.00	2.00	134 +
HM Hector (2418)	96	0.00	2.00	134 +
HM Niagara (7505)	82	0.00	2.25	151 +
HM Shasta (2416)	101	0.00	1.50	101
HM Thunder (7035)	89	0.00	1.75	118
KW 1800	90	0.00	1.50	101
KW 2249 (Blend)	94	0.00	1.75	118
KW 2398 (Aphan. Spec.)	95	0.00	1.25	84
KW 3291	78	0.00	1.38	92
KW 6770	75	0.00	1.75	118
Maribo 875	83	0.00	1.13	76
Maribo 923	79	0.00	1.13	76
Maribo 9363	98	0.00	1.63	109
Maribo 9369 (NC)	86	0.00	1.63	109
Mitsui Monohikari	100	0.00	2.00	134 +
Seedex Laser (1004)	93	0.00	1.00	67 -
Seedex SX1006 (NC)	77	0.00	1.25	84
Van der Have H66140	81	0.21	1.13	76

General Mean	0.01	1.49
Coeff. of Var. (%)	1549.17	29.94
Variety Mean Square	0.01	0.95
Error Mean Square B	0.01	0.20
F Value	1.00	4.78 **
L.S.D. (.05)	ns	0.44
L.S.D. (.01)	ns	0.58

* 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

1995 PERFORMANCE DATA OF SMBSC SEMI COMMERCIAL CODED ENTRIES
ALL LOCATIONS

DESCRIPTION	CODE	REC/T		REC/A		LOSS TO MOL		SUGAR		YIELD		VIGOR *	
		LBS./T	% MEAN	LBS./A	% MEAN	%	% MEAN	%	% MEAN	T/A	% MEAN	1-5	% MEAN
ACH 9100270	189	259.4	94	5723	97	1.79	108	14.77	96	22.02	102	2.4	141
ACH 9400029	223	267.9	97	6065	103	1.71	104	15.10	98	22.65	105	2.84	166
ACH 9400413	199	262.8	96	5636	95	1.78	108	14.93	97	21.42	100	1.97	115
ACH 9590001	218	273.6	100	5801	98	1.74	105	15.42	100	21.25	99	1.33	78
ACH 9590004	229	262.8	96	5370	91	1.75	106	14.91	97	20.44	95	2.08	122
Beta 1115	203	275.7	100	5609	95	1.59	96	15.37	100	20.31	95	1.92	113
Beta 1994	188	286.8	104	5982	101	1.60	97	15.93	103	20.88	97	1.51	88
Beta 2074	224	287.0	104	6568	111	1.61	97	15.96	104	22.87	106	1.64	96
Beta 2995	211	283.2	103	5751	97	1.66	100	15.83	103	20.32	95	1.94	114
Beta 3385 (Blend)	216	276.5	101	5700	97	1.62	98	15.44	100	20.61	96	1.51	88
Beta 5014 (Aphan. Spec)	193	293.4	107	6084	103	1.69	102	16.36	106	20.74	97	1.37	81
Beta 5335	200	305.7	111	6457	109	1.60	97	16.88	110	21.13	98	2.52	147
Beta 6045	221	291.8	106	5941	101	1.58	96	16.17	105	20.39	95	1.62	95
Beta 6904 (Aphan. Spec)	210	289.7	105	6474	110	1.53	93	16.02	104	22.33	104	1.55	91
Beta 6935	205	262.2	95	5823	99	1.64	99	14.75	96	22.19	103	1.51	88
HM 7040	220	274.9	100	5899	100	1.55	94	15.29	99	21.46	100	2.1	123
HM 7046	226	281.0	102	6071	103	1.53	93	15.59	101	21.61	101	1.62	95
HM 7047	208	279.7	102	5820	99	1.69	102	15.67	102	20.83	97	2.73	160
HM 7048	186	286.2	104	6371	108	1.58	96	15.89	103	22.28	104	2.24	131
HM 7049	202	288.9	105	6004	102	1.64	99	16.08	104	20.80	97	2.1	123
HM 7518	197	283.1	103	6140	104	1.62	98	15.77	102	21.63	101	1.57	92
HM Resist (7036)(Ahan Spec)	194	279.7	102	6124	104	1.52	92	15.50	101	21.92	102	2.18	128
HM RH3(Rhiz. Spec)	214	288.1	105	6281	106	1.60	97	16.00	104	21.81	102	2.42	142
Holly 94HX250	227	267.3	97	5741	97	1.61	97	14.98	97	21.40	100	1.11	65
Holly 95HX330	230	270.0	98	5632	95	1.68	102	15.19	99	20.88	97	1.05	61
Holly 95HX331	207	254.2	92	4984	84	1.74	105	14.46	94	19.62	91	1.11	65
Holly 95HX333	192	239.3	87	5668	96	1.78	108	13.75	89	23.71	110	1.19	69
Maribo 9581	198	275.8	100	5995	102	1.56	94	15.34	100	21.74	101	1.6	93
Maribo 9582	225	267.5	97	5545	94	1.75	106	15.13	98	20.74	97	1.71	100
Maribo 9584	190	293.0	107	6061	103	1.59	96	16.24	105	20.70	96	1.29	76
Maribo 9586	219	276.5	101	5783	98	1.70	103	15.53	101	20.90	97	2.64	155
Maribo 9587	196	269.3	98	6058	103	1.59	96	15.06	98	22.49	105	2.52	147
Seedex SX1008	204	265.8	97	5852	99	1.65	100	14.94	97	22.01	102	1.97	115
Seedex SX1009	191	277.8	101	5747	97	1.62	98	15.51	101	20.72	96	1.6	93
Seedex SX1010	213	268.0	97	5731	97	1.65	100	15.05	98	21.37	99	1.51	88
Van der Have H66157	195	267.7	97	6163	104	1.67	101	15.05	98	23.04	107	1.19	69
Van der Have H66183	212	267.5	97	6037	102	1.65	100	15.03	98	22.58	105	1.19	69
Van der Have H66184	209	271.1	99	5791	98	1.70	103	15.25	99	21.37	99	1.05	61
Van der Have H66186	228	276.9	101	6326	107	1.61	97	15.45	100	22.83	106	1.13	67
Van der Have H66189	201	257.7	94	5687	96	1.77	107	14.66	95	22.05	103	1.13	67
Van der Have H66240	217	276.4	101	5777	98	1.56	94	15.38	100	20.93	97	1.88	110
ACH 194 (Check #1)	222	271.4	99	5640	96	1.69	102	15.26	99	20.73	96	1.11	65
Beta 2010 (Check #2)	187	256.9	93	5842	99	1.70	103	14.55	95	22.80	106	1.82	106
Hilleshog 5135 (Check #3)	206	273.2	99	5722	97	1.75	106	15.41	100	20.96	98	1.05	61
Maribo 875 (Check #4)	215	285.9	104	6142	104	1.70	103	15.99	104	21.44	100	1.33	78
Mean	**45**	**274.9**	**100.0**	**5902.6**	**100.0**	**1.65**	**100.0**	**15.40**	**100.0**	**21.49**	**100.0**	**1.71**	**99.9**

*Vigor data collected from 2 locations

TABLE 15

1994 PERFORMANCE DATA OF SMBSC SEMI COMMERCIAL CODED ENTRIES
ALL LOCATIONS

DESCRIPTION	CODE	REC/T LBS./T	REC/T % MEAN	REC/A LBS./A	REC/A % MEAN	LOSS TO MOL. %	LOSS TO MOL. % MEAN	SUGAR %	SUGAR % MEAN	YIELD T/A	YIELD % MEAN	VIGOR * 1-5	VIGOR * % MEAN
ACH 310	190	317.3	99	8962	100	1.47	102	17.34	99	28.26	101	1.5	90
ACH 9100022	199	324.6	101	8474	94	1.40	98	17.63	101	26.16	93	2.13	128
ACH 9100270	192	321.6	100	8745	97	1.48	103	17.56	100	27.23	97	1.5	90
ACH 9100274	210	336.6	105	8335	93	1.41	98	18.24	104	24.77	88	1.78	107
ACH 9490001	214	316.4	99	9052	101	1.50	105	17.33	99	28.68	102	1.42	85
Beta 1154	196	324.6	101	8785	98	1.44	100	17.68	101	27.09	97	1.38	113
Beta 1724	216	321.2	100	8824	98	1.41	98	17.47	100	27.54	98	1.73	104
Beta 1994	189	322.1	100	8925	100	1.42	99	17.53	100	27.78	99	1.62	97
Beta 2074	204	325.6	102	9371	104	1.38	96	17.67	101	28.80	103	1.62	97
Beta 3863	183	325.0	101	8928	100	1.36	95	17.61	101	27.51	98	1.54	92
Beta 5014 (Aphan. Spec)	187	331.9	103	8560	95	1.30	91	17.9	102	25.83	92	1.35	81
Beta 6863	208	329.6	103	9040	101	1.38	96	17.86	102	27.43	98	1.7	147
Beta 6904 (Aphan. Spec)	219	330.3	103	9158	102	1.29	90	17.81	102	27.77	99	1.58	95
Hilleshog 7034	200	315.8	98	8864	99	1.48	103	17.27	99	28.09	100	1.42	85
Hilleshog 7035	213	316.0	99	8955	100	1.52	106	17.33	99	28.34	101	1.62	97
Hilleshog 7040	206	320.4	100	9579	107	1.33	93	17.36	99	29.94	107	1.78	107
Hilleshog 7514	191	322.9	101	9094	101	1.43	100	17.58	101	28.23	101	1.54	92
Hilleshog 7517	202	318.0	99	8878	99	1.47	102	17.38	99	27.98	100	1.93	116
Hilleshog 7518	218	330.8	103	9097	101	1.45	101	17.99	103	27.51	98	1.62	97
HM 2418	194	321.7	100	9190	102	1.43	100	17.52	100	28.59	102	1.97	118
HM 7036 (Aphan. Spec)	180	321.6	100	9119	102	1.37	95	17.46	100	28.40	101	2.49	149
Holly 94HX240	185	302.1	94	9487	106	1.55	108	16.66	95	31.48	112	1.5	90
Holly 94HX245	197	318.6	99	8691	97	1.49	104	17.42	100	27.35	98	1.78	107
Holly 94HX247	201	294.5	92	9320	104	1.57	109	16.31	93	31.70	113	1.62	97
Holly 94HX250	217	324.2	101	9347	104	1.39	97	17.6	101	28.86	103	1.62	97
Holly 94HX251	203	315.1	98	9408	105	1.45	101	17.21	98	29.89	107	1.5	90
Maribo 9360	205	317.2	99	8732	97	1.55	108	17.42	100	27.59	98	1.7	69
Maribo 9363	182	330.6	103	9063	101	1.37	95	17.9	102	27.42	98	1.46	93
Maribo 9364	212	319.4	100	8634	96	1.44	100	17.41	100	27.05	97	1.54	92
Maribo 9369	198	319.5	100	9372	104	1.43	100	17.41	100	29.36	105	1.38	83
Maribo 9470	220	315.5	98	8921	99	1.45	101	17.24	99	28.29	101	2.09	125
Maribo 9472	186	312.7	97	9466	106	1.42	99	17.06	98	30.31	108	1.66	147
Seedex SX1006	181	319.2	100	8558	95	1.41	98	17.37	99	26.88	96	1.9	114
Seedex SX1007	195	320.3	100	7638	85	1.46	102	17.47	100	23.95	85	2.26	93
Van der Have H66157	215	323.0	101	9223	103	1.43	100	17.59	101	28.54	102	1.7	102
Van der Have H66183	193	323.5	101	9234	103	1.38	96	17.56	100	28.57	102	1.66	69
Van der Have H66186	207	320.7	100	9190	102	1.42	99	17.47	100	28.65	102	1.7	69
ACH 194 (Check)	188	323.1	101	8836	99	1.46	102	17.62	101	27.38	98	1.35	81
Beta 2010 (Check)	211	315.3	98	9221	103	1.46	102	17.23	99	29.27	104	1.46	67
Hilleshog 5135 (Check)	184	320.2	100	8904	99	1.49	104	17.5	100	27.84	99	1.38	67
Maribo 875 (Check)	209	322.0	100	8568	96	1.48	103	17.59	101	26.65	95	1.78	107
Mean	41	320.7	100.0	8969.5	100.0	1.43	100.0	17.48	100.0	28.02	100.0	1.67	100.0

*Vigor data collected from 3 locations

TABLE 16

1993 PERFORMANCE DATA OF SMBSC SEMI COMMERCIAL CODED ENTRIES
ALL LOCATIONS

DESCRIPTION	CODE	REC/T		REC/A		LOSS TO MOL.		SUGAR		YIELD		VIGOR *	
		LBS./T	% MEAN	LBS./A	% MEAN	%	% MEAN	%	% MEAN	T/A	% MEAN	1-5	% MEAN
ACH 307	199	312.9	98	3817	99	1.33	100	16.97	98	12.13	100	1.27	70
ACH 310	188	310.0	97	3920	101	1.37	103	16.86	98	12.63	104	1.84	102
ACH 9100021	190	325.8	102	3725	96	1.31	99	17.60	102	11.42	94	1.41	78
ACH 9200085	175	317.2	100	3650	95	1.42	107	17.28	100	11.48	95	2.11	117
ACH 9301	181	318.6	100	3496	91	1.39	105	17.31	100	10.93	90	2.11	117
Beta 1492	205	316.2	99	3989	103	1.29	97	17.10	99	12.57	104	1.55	86
Beta 2633	207	326.8	103	3597	93	1.23	93	17.57	102	10.99	91	1.55	86
Beta 3712	187	323.3	102	3923	102	1.14	86	17.31	100	12.11	100	1.55	86
Beta 3863	192	321.1	101	3868	100	1.27	96	17.33	101	12.01	99	1.84	102
Beta 5823	179	315.4	99	3542	92	1.38	104	17.14	99	11.20	93	1.69	94
Beta 6002	176	317.8	100	3998	104	1.30	98	17.19	100	12.58	104	1.55	86
Beta 6532	194	317.1	100	4203	109	1.26	95	17.11	99	13.21	109	1.97	109
Beta 6863	198	329.2	103	4066	105	1.17	88	17.64	102	12.33	102	1.84	102
Bush Johnson 1340	182	302.4	95	3566	92	1.47	111	16.58	96	11.78	97	1.55	86
Hilleshog 7034	200	328.0	103	4052	105	1.31	99	17.71	103	12.31	102	1.97	109
Hillshog 7035	180	325.1	102	4249	110	1.35	102	17.60	102	13.03	108	1.84	102
Hilleshog 7036	193	314.9	99	3923	102	1.22	92	16.96	98	12.44	103	2.68	148
Hilleshog 7514	201	325.9	102	4128	107	1.32	100	17.61	102	12.64	104	1.84	102
HM 2416 (Shasta)	191	333.2	105	3773	98	1.26	95	17.93	104	11.30	93	2.11	117
HM 2418	204	322.2	101	4066	105	1.26	95	17.37	101	12.56	104	2.40	133
Holly 90N146-05	206	311.6	98	3718	96	1.41	107	16.98	98	11.90	98	1.69	94
Holly 91N150-013	178	311.6	98	3718	96	1.42	107	16.98	98	11.90	98	2.82	156
Holly 93HX102	195	308.1	97	3886	101	1.47	111	16.86	98	12.59	104	2.26	125
Maribo 9360	203	318.9	100	3823	99	1.40	106	17.34	101	11.96	99	2.11	117
Maribo 9364	177	314.8	99	3790	98	1.29	97	17.03	99	12.01	99	1.13	63
Maribo 9368	196	306.1	96	4025	104	1.40	106	16.71	97	13.09	108	0.99	55
Maribo 9369	209	311.6	98	4254	110	1.29	97	16.86	98	13.64	113	2.54	141
Maribo 9370	184	319.0	100	3560	92	1.33	100	17.28	100	11.15	92	1.69	94
Maribo 9371	189	309.6	97	3808	99	1.34	101	16.81	98	12.27	101	1.55	86
Seedex SX1006	185	318.6	100	3616	94	1.36	103	17.29	100	11.31	93	2.40	133
Van der Have H66168	202	318.6	100	3876	100	1.30	98	17.23	100	12.14	100	1.97	109
ACH 194 (Check)	197	325.4	102	4115	107	1.31	99	17.58	102	12.62	104	1.27	70
Hilleshog 5135 (Check)	183	314.8	99	3783	98	1.35	102	17.08	99	12.03	99	1.13	63
KW 2398 (Check)	186	325.9	102	3738	97	1.28	97	17.57	102	11.45	95	1.84	102
Maribo 875 (Check)	208	325.3	102	3915	101	1.33	100	17.60	102	12.03	99	1.13	63
Mean	**35**	**318.4**	**100.0**	**3862.2**	**100.0**	**1.32**	**100.0**	**17.24**	**100.0**	**12.11**	**100.0**	**1.80**	**100.1**

*Vigor data collected from 1 location

TABLE 17A

1995 CERCOSPORA READINGS FOR CODED TEST ENTRIES
BETASEED NURSERY - SHAKOPEE, MN

Average Rating at Each Date*

CODE	DESCRIPTION	7/26	7/28	8/1	8/7	8/10	1995 MEAN	2 YR MEAN	3 YR MEAN	3 YR % MEAN	1994 MEAN	1993 MEAN
5	ACH 192	3.00	3.00	3.75	6.25	7.00	4.60	4.88	4.88	99.2	5.15	4.88
36	ACH 194	3.00	3.00	3.50	6.50	7.25	4.65	4.89	4.91	100.0	5.12	4.97
8	ACH 196	3.00	3.25	4.00	6.25	7.75	4.85	4.93	4.94	100.5	5.00	4.97
102	ACH 198 (Aphan. Spec)	3.00	3.00	3.00	5.25	6.25	4.10	4.29	4.27	86.8	4.47	4.23
73	ACH 205 (Aphan. Spec)	2.50	2.00	2.50	4.25	5.50	3.35	3.86	3.96	80.5	4.37	4.15
33	ACH 214 (9000524)(NC)	3.00	3.25	4.00	6.25	7.75	4.85	5.07	5.06	103.0	5.28	5.05
132	ACH 216 (91000275)	3.00	3.00	3.25	6.50	7.75	4.70	4.97			5.23	
80	ACH 302	2.50	2.75	3.25	5.00	6.25	3.95	4.03	4.12	83.9	4.10	4.32
302	ACH 306 (Rhizoctonia)	3.25	3.75	4.00	6.50	7.50	5.00	4.85	4.80	97.7	4.70	4.70
99	ACH 309	2.50	2.50	3.00	5.25	6.00	3.85	4.14	4.23	86.0	4.43	4.40
15	ACH 310	3.00	3.00	4.00	5.75	7.00	4.55	4.80	4.78	97.3	5.05	4.75
56	ACH 324 (9100022)(NC)	3.00	3.00	3.75	6.25	7.00	4.60	4.98	5.00	101.8	5.35	5.05
64	ACH 325(9100097)	3.00	3.50	4.75	6.25	7.75	5.05	4.98	4.98	101.4	4.90	5.00
189	ACH 9100270	3.25	3.00	4.00	6.50	7.50	4.85	4.64			4.43	
223	ACH 9400029	3.00	3.25	4.00	6.25	7.75	4.85					
199	ACH 9400413	3.00	3.00	3.75	5.75	7.50	4.60					
143	ACH 9490002	3.00	3.25	4.25	6.50	7.25	4.85	5.25			5.65	
107	ACH 9590001	3.00	3.25	4.00	6.25	7.50	4.80					
120	ACH 9590002	3.00	3.75	4.50	6.25	7.75	5.05					
129	ACH 9590003	3.00	3.25	4.00	6.25	7.75	4.85					
229	ACH 9590004	3.50	3.25	4.75	6.50	8.00	5.20					
203	Beta 1115	2.75	2.75	3.50	5.75	6.75	4.30					
110	Beta 1125	2.50	2.75	4.00	5.25	6.75	4.25					
130	Beta 1144	3.00	3.00	3.75	5.75	7.00	4.50	4.94			5.37	
47	Beta 1252	3.25	3.50	3.75	6.25	7.75	4.90	4.92	4.84	98.6	4.93	4.70
32	Beta 1492	3.00	3.25	4.50	6.00	7.00	4.75	4.97	4.96	100.9	5.18	4.95
146	Beta 1524	3.00	3.00	4.50	6.75	7.75	5.00	5.09			5.18	
142	Beta 1794	2.50	3.00	3.25	5.50	6.75	4.20	4.60			5.00	
162	Beta 1795	3.00	3.00	4.00	6.50	7.50	4.80					
147	Beta 1845	3.00	3.50	4.50	6.75	8.25	5.20					
105	Beta 1885	3.25	3.75	4.75	7.75	8.00	5.50					
188	Beta 1994	2.50	2.50	3.25	4.75	6.50	3.90	4.72			5.53	
21	Beta 2010	3.25	3.00	3.75	6.50	7.50	4.80	5.01	5.02	102.1	5.22	5.03
224	Beta 2074	3.00	3.00	3.50	6.00	7.75	4.65	4.88			5.10	
124	Beta 2084	3.50	3.50	4.25	6.50	7.75	5.10	5.15			5.20	
135	Beta 2225(Blend)	3.00	3.00	3.75	6.75	7.75	4.85					
171	Beta 2245(Blend)	3.25	3.25	4.50	6.50	7.50	5.00					
211	Beta 2995	2.50	2.50	3.00	5.00	6.25	3.85					
114	Beta 3315(Blend)	3.00	3.25	4.25	6.25	7.00	4.75					
216	Beta 3385(Blend)	2.75	2.75	3.25	5.00	6.25	4.00					
182	Beeta 3555(Blend)	3.00	3.25	3.75	6.00	7.50	4.70					
3	Beta 3712	3.00	3.00	3.75	6.25	7.00	4.60	5.07	5.04	102.5	5.53	4.98
17	Beta 3843	3.25	3.50	3.75	6.75	7.50	4.95	5.10	5.04	102.6	5.25	4.93
193	Beta 5014(Aphan. Spec)	2.00	2.00	2.50	4.00	4.75	3.05	3.58			4.10	
200	Beta 5335	2.00	2.25	2.50	4.25	4.50	3.10					
139	Beta 6005	3.00	3.00	4.00	6.00	7.75	4.75					
221	Beta 6045	2.25	2.75	3.00	4.75	6.25	3.80					
122	Beta 6104	3.00	3.25	3.75	5.75	7.50	4.65	4.87			5.08	
87	Beta 6863	3.00	2.75	3.25	5.25	6.25	4.10	4.72	4.75	96.7	5.33	4.82
210	Beta 6904 (Aphan. Spec)	3.00	2.75	3.25	5.50	6.75	4.25	4.54			4.82	
131	Beta 6905	3.00	3.00	3.50	5.75	7.25	4.50					
205	Beta 6935	3.00	3.25	4.00	5.50	7.50	4.65					
176	Beta 6975	3.00	3.00	4.50	6.25	7.25	4.80					
22	Bush Johnson 1337	3.00	3.25	3.75	6.25	7.00	4.65	4.96	4.91	99.9	5.27	4.80
12	Bush Johnson 1340	3.25	3.00	3.75	6.00	7.25	4.65	4.99	4.95	100.8	5.33	4.88
27	Bush Johnson 1392	3.00	3.25	3.75	6.25	7.75	4.80	4.99	5.01	101.9	5.17	5.05

TABLE 17B

1995 CERCOSPORA READINGS FOR CODED TEST ENTRIES
BETASEED NURSERY - SHAKOPEE, MN

Average Rating at Each Date*

CODE	DESCRIPTION	7/26	7/28	8/1	8/7	8/10	1995 MEAN	2 YR MEAN	3 YR MEAN	3 YR % MEAN	1994 MEAN	1993 MEAN
117	Bush Johnson 1412	3.00	3.50	4.25	6.50	7.75	5.00	5.20			5.40	
106	Bush Johnson 1414	2.75	3.00	3.25	5.50	6.50	4.20					
140	Bush Johnson 1424	3.00	3.25	4.00	6.50	7.75	4.90					
9	HM 5315	2.75	3.00	3.50	5.75	7.50	4.50	4.88	4.93	100.4	5.25	5.05
112	HM 7037	3.00	3.25	4.25	6.50	7.75	4.95	5.33			5.70	
119	HM 7038	3.00	3.25	4.75	6.75	8.25	5.20	5.46			5.72	
104	HM 7040	2.25	2.50	3.25	5.25	6.50	3.95	4.29			4.62	
127	HM 7043	3.00	3.25	4.25	6.25	7.75	4.90					
136	HM 7044	3.00	2.75	4.25	6.00	6.75	4.55					
133	HM 7045	3.00	3.50	4.50	7.25	8.25	5.30					
160	HM 7046	2.75	2.75	3.50	5.25	6.75	4.20					
208	HM 7047	3.00	2.50	3.25	5.25	6.75	4.15					
156	HM 7048	3.00	3.25	3.50	6.00	6.75	4.50					
173	HM 7049	3.00	3.00	3.75	5.50	6.75	4.40					
144	HM 7516(Union)	3.25	3.00	4.00	6.50	7.00	4.75	5.13			5.50	
150	HM 7518	2.75	3.00	3.25	5.50	7.00	4.30	4.74			5.17	
38	HM 8277	3.00	3.00	4.25	6.75	8.00	5.00	5.01	5.10	103.8	5.02	5.28
145	HM Agate(7030)	3.00	3.25	4.25	6.50	8.00	5.00	5.37			5.73	
6	HM Empire(7034)	3.00	3.25	3.75	6.50	7.75	4.85	5.24	5.21	106.0	5.63	5.15
13	HM Glacier(7017)	3.00	3.25	4.00	6.50	8.00	4.95	5.32	5.31	108.1	5.68	5.30
91	HM Granite(7514)	3.00	3.00	4.00	6.25	7.50	4.75	4.95	4.99	101.6	5.15	5.07
96	HM Hector(2418)	3.00	3.00	4.00	6.00	7.25	4.65	4.94	4.89	99.5	5.22	4.80
1	HM Horizon(7033)(NC)	3.00	3.00	3.75	6.25	7.50	4.70	4.99	5.05	102.8	5.27	5.18
82	HM Niagara(7505)	2.75	2.75	3.00	5.00	6.25	3.95	4.24	4.39	89.3	4.53	4.68
163	HM Resist(7036)(Aphan. Spec)	2.25	2.75	3.25	5.25	6.50	4.00	4.30			4.60	4.40
170	HM RH3(Rhiz. Spec)	2.00	2.25	2.75	4.75	5.75	3.50					
25	HM Shasta(2416)	3.00	2.75	3.75	6.50	7.75	4.75	5.07	5.13	104.5	5.38	5.27
19	HM Summit(1117)	3.25	3.50	4.50	7.25	8.00	5.30	5.56	5.55	112.9	5.82	5.53
41	HM Thunder(7035)	2.75	3.50	4.00	6.00	7.25	4.70	5.09	5.08	103.3	5.48	5.05
16	HM Yukon(2412)	3.00	3.00	3.50	5.25	7.00	4.35	4.67	4.56	92.8	4.98	4.35
148	Holly 94HX240	3.00	3.50	3.75	5.75	7.25	4.65	4.86			5.07	
227	Holly 94HX250	3.00	3.25	4.50	6.25	7.50	4.90	5.09			5.28	
230	Holly 95HX330	3.00	3.00	3.75	6.50	7.25	4.70					
207	Holly 95HX331	3.25	3.25	4.25	6.50	7.75	5.00					
164	Holly 95HX333	3.00	3.25	3.75	6.50	7.50	4.80					
115	Holly 95HX334	3.25	3.00	4.25	6.75	7.50	4.95					
30	KW 1800	3.00	3.00	4.25	6.25	7.75	4.85	4.96	4.97	101.1	5.07	4.98
20	KW 2249(Blend)	2.75	2.75	3.75	6.00	7.25	4.50	4.77	4.84	98.4	5.03	4.98
65	KW 2262(Blend)	2.75	2.75	3.50	5.25	6.75	4.20	4.84	4.93	100.3	5.48	5.10
95	KW 2398(Aphan. Spec)	2.75	3.00	3.50	6.00	7.25	4.50	4.80	4.87	99.2	5.10	5.02
2	KW 3291	2.75	3.00	3.50	6.00	7.25	4.50	4.84	4.87	99.1	5.18	4.93
11	KW 3580	3.00	3.25	3.75	6.25	7.50	4.75	4.98	4.98	101.4	5.20	5.00
24	KW 6770	3.50	3.25	4.50	6.25	7.50	5.00	5.11	5.09	103.6	5.22	5.05
28	Maribo 410	3.00	3.00	3.25	6.00	7.00	4.45	4.82	4.87	99.0	5.18	4.97
31	Maribo 862	3.00	3.75	4.50	6.75	7.75	5.15	5.21	5.13	104.4	5.27	4.97
7	Maribo 875	3.00	3.25	3.50	5.75	7.00	4.50	4.74	4.77	97.0	4.97	4.83
50	Maribo 897	3.00	3.00	3.25	6.00	7.25	4.50	4.67	4.77	97.1	4.83	4.98
79	Maribo 923	3.00	3.25	4.25	6.50	7.50	4.90	5.09	5.05	102.8	5.28	4.97
10	Maribo 9360	3.25	3.00	4.00	6.75	8.00	5.00	5.39	5.35	108.9	5.77	5.28
34	Maribo 9363	3.00	3.00	4.25	6.25	7.25	4.75	4.87	4.90	99.7	4.98	4.97
175	Maribo 9364	3.00	3.25	3.50	6.25	7.25	4.65	5.04	5.03	102.3	5.43	5.00
51	Maribo 9368(NC)	3.00	3.25	4.00	6.50	7.25	4.80	5.11	5.03	102.4	5.42	4.88
42	Maribo 9369(NC)	3.00	3.25	4.00	6.25	8.00	4.90	5.09	5.06	102.9	5.27	5.00
109	Maribo 9580	2.75	3.25	3.50	6.25	7.50	4.65					
118	Maribo 9581	2.50	2.50	3.00	5.25	6.25	3.90					
126	Maribo 9582	3.00	3.25	4.00	6.75	8.00	5.00					

TABLE 17C

1995 CERCOSPORA READINGS FOR CODED TEST ENTRIES
BETASEED NURSERY - SHAKOPEE, MN

Average Rating at Each Date*

CODE	DESCRIPTION	7/26	7/28	8/1	8/7	8/10	1995 MEAN	2 YR MEAN	3 YR MEAN	3 YR % MEAN	1994 MEAN	1993 MEAN
137	Maribo 9583	3.00	3.00	4.00	6.00	7.50	4.70					
190	Maribo 9584	3.00	3.00	3.50	5.75	6.50	4.35					
219	Maribo 9586	3.00	3.00	4.00	6.25	7.25	4.70					
196	Maribo 9587	2.75	3.00	3.75	6.50	8.00	4.80					
35	Mitsui Monohikari	3.00	3.00	3.50	6.50	7.25	4.65	4.64	4.69	95.4	4.62	4.80
14	Seedex Gladiator (805 903)	3.00	3.00	3.75	6.50	7.00	4.65	4.94	5.03	102.3	5.23	5.20
69	Seedex Laser (SX0905 1004)	2.50	2.75	3.00	5.00	6.00	3.85	4.17	4.26	86.6	4.49	4.43
4	Seedex Monarch (0806 0904)	3.00	3.00	3.75	6.25	7.50	4.70	5.05	5.05	102.8	5.40	5.06
26	Seedex SX0808(nc)	3.00	3.00	3.75	5.75	6.75	4.45	4.81	4.86	99.0	5.17	4.97
166	Seedex SX0907	3.00	3.00	3.25	5.25	6.75	4.25	4.71			5.17	
151	Seedex SX0908	2.50	2.75	3.00	5.50	6.75	4.10					
179	Seedex SX0909	3.00	3.00	4.25	6.50	7.75	4.90					
77	Seedex SX1006(NC)	3.25	3.25	4.25	6.50	7.25	4.90	4.69	4.53	92.1	4.48	4.20
204	Seedex SX1008	3.00	3.00	3.00	6.00	7.00	4.40					
191	Seedex SX1009	2.75	2.75	3.00	4.75	6.50	3.95					
213	Seedex SX1010	3.00	3.50	4.50	6.25	7.50	4.95					
23	Van der Have H66140	3.00	3.75	4.50	6.75	7.75	5.15	5.33	5.27	107.2	5.50	5.15
18	Van der Have H66156	3.25	3.50	4.00	7.00	8.00	5.15	5.40	5.33	108.4	5.65	5.18
195	Van der Have H66157	3.00	3.00	3.75	6.00	7.50	4.65	5.05			5.45	
29	Van der Have H66168	3.25	2.75	3.75	6.25	7.25	4.65	5.24	5.23	106.5	5.83	5.22
59	Van der Have H66170	3.00	3.00	3.75	6.50	7.50	4.75	5.08	5.04	102.6	5.40	4.98
134	Van der Have H66183	3.00	3.00	3.75	6.00	7.00	4.55	4.90			5.25	
128	Van der Have H66184	3.50	3.75	4.75	7.00	8.50	5.50	5.50			5.50	
138	Van der Have H66186	3.00	3.25	4.75	7.00	7.75	5.15	5.17			5.18	
37	Van der Have H66189	3.00	3.50	4.25	6.25	7.75	4.95	5.29	5.32	108.2	5.62	5.38
108	Van der Have H66240	3.25	3.25	4.25	6.25	7.75	4.95					
116	Van der Have H66241	3.25	3.25	4.25	6.50	7.75	5.00					
125	Van der Have H66242	3.00	3.00	4.00	6.50	7.75	4.85					
	Test Mean	2.95	3.07	3.81	6.06	7.25	4.63	4.90	4.91	100.0	4.89	4.93
	LSD .05	0.44	0.58	0.82	0.88	0.84	0.51					
	CV %	10.84	13.58	15.57	10.49	8.30	7.93					

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

Table 18. 1995 American Crystal Root Rot - Shakopee

Table of Means

		R1*	%Chk R1	% Surv**	%Chk %Surv	Root***	%Chk Root
	Check	**3.9**		**80**		**4.0**	
	LSD 5	**1.4**		**17**		**0.8**	
	Mw Ch	**3.8**		**78**		**3.5**	
1	AC401	3.3	86	79	99	3.6	90
2	AC402	3.6	93	80	100	3.9	97
3	AC403	4.5	118	67	84	4.3	109
4	AC404	4.0	103	94	118	4.1	104
5	AC405	2.7	69	87	109	2.4	62
6	AC406	3.1	81	79	99	3.5	87
7	AC407	2.1	55	87	109	3.4	87
8	AC408	3.6	94	82	102	3	76
9	AC409	4.1	105	75	93	3.5	89
10	AC410	4.7	121	71	89	3.4	87
11	AC411 (No emergence)	0.0	0	0	0	0	0
12	AC412 (No emergence)	0.0	0	0	0	0	0
13	APHCHK1 (Tolerant)	3.1	81	82	102	3.1	78
14	APHCHK2 (Susceptible)	5.3	137	70	88	4.6	117
15	APHCHK3 (Susceptible)	5.9	154	62	77	5	127
16	APHCHK4 (Tolerant)	3.5	90	86	107	2.9	73

* R1 ratings were based on visual scale of 1-9. This scale factors in plant stand and plant health, where 1 is healthiest and 9 is dead.

** % surv. is the percent of plants surviving after an initial stand count is taken. This sytem does not factor the health of the remaining plants.

*** Each plot was scored for root damage and stand loss. Ratings were based on visual score of 1 - 5 where a score of 1 is healthy and 5 is dead.

Table 19

Rhizoctonia Resistance Evaluation
of American Crystal Lines (John Kern/Russ Steen)
Experiment 11R, 1995

Entry	DI Mean	%Healthy Mean	%Harvest Mean	Z% Healthy Mean	Z % Healthy Mean
ACS 9400477	2.93	29.21	76.79	31.00	64.23
ACS 9400478	1.32	66.01	97.21	55.53	83.88
502 HM RH3	2.04	49.23	94.05	44.59	79.17
501 ACH 306	3.36	17.83	76.81	24.14	62.41
Susceptible check	5.26	7.64	33.95	13.72	35.20
Highly resistant che	3.18	20.50	80.78	26.59	65.73
Resistant check	2.62	36.55	86.08	36.63	68.75
LDS (P = 0.05)	0.92			15.91	12.75

DI = disease index on a scale of 0 - 7, with 0 = no rot and 7 plant dead.

% Healthy & Z% Healthy (DIs 0 + 1/total plants x 100) and square root arcsin transformation, respectively.

% Harvest & Z% Harvest = DIs 0 - 3/total plants x 100 and square root arcsin transformation, respectively.

THE EFFECT OF CROP RESIDUE AND TILLAGE ON SUGARBEET PRODUCTION - 1994 AND 1995

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Introduction

A trend has developed in agriculture the past ten years toward conservation tillage or no-till farming. This is due to current and future government programs trying to reduce the amount of soil erosion from wind and water occurring in fields. Research has been done to establish what effect crop residue has on soil erosion. Residue effects on stand establishment and production of crops has been studied much less.

Sugarbeet is a very important crop in the Red River Valley. Little research has been done to determine how different types and amounts of crop residue affect stands and production of sugarbeet. Sugarbeet farmers and industry personnel would benefit from this type of research.

The purpose of this research was to determine how sugarbeet stands and production are affected by different types and levels of crop residue (wheat and corn) in the field.

The objectives of this research were:

1. To determine a correlation between different levels of wheat residue and sugarbeet production.
2. To determine the effects between different types of fall tillage on corn residue and sugarbeet production.
3. To determine whether residue management wheels improve stand establishment, quality, and sugarbeet yields.

Procedure

Wheat Residue Study

Studies were conducted at Fargo, ND in 1994 on a Hegne silty clay (fine, frigid Typic Calciaquolls) and 1995 on a Fargo silty clay (fine, montmorillonite, frigid Vertic Haplaquolls) and near Glyndon, MN in 1995 on a Wheatville loam (coarse-silty over clayey, frigid Aeric Calciaquoll). Selected sites were fertilized according to soil test recommendations with surface applied ammonium

nitrate in the fall after wheat harvest. Surface residue levels of wheat were attained at each site by the following methods:

0% -	Residue was burned from the surface and soil tilled with a conser-till implement.
10% -	Surface residue was raked 3 times with a hay rake to remove residue and soil tilled with a conser-till implement.
20%-	Surface residue was raked 2 times with a hay rake to remove residue and soil tilled with a conser-till implement.
35% -	Surface residue was raked once with a hay rake to remove residue and soil tilled with a conser-till implement.
50% -	Surface residue was left on the surface and soil tilled with a conser-till implement.
70%-	Surface residue was left on the soil surface and no tillage done.

A harrow was used to spread residue evenly in the different residue levels. Soil was worked 8-9 inches deep with conser-till implement consisting of a row of disks, followed by three ranks of chisel plow shanks 30 inches apart, and two ranks of flex tine harrows.

Six replications of each surface residue level were conducted. Percent surface residue was determined before spring tillage and after planting using the line transect method.

Each treatment was worked in the spring with an Alloway Rau Tillage System (Danish tines with 3-4" sweeps and rolling baskets) except for the 70% residue levels. A John Deere Maxiemerge II and a John Deere 71 Flex planter at 3 and 5 mph (six rows of each) were used. A John Deere Maxiemerge II planter at 3 mph equipped with Yetter and Dawn residue management wheels (three rows of each) were also used.

Fargo sites were planted on May 15, 1994 and May 17, 1995 and the Glyndon site was planted May 12, 1995. Sugarbeet seed was space planted at 4.1 inches apart in 22 inch rows and 1.25 inches deep. Counter 15G was applied at a rate of 11.9 lb/A in a three inch band over the row. Post emergence herbicides, cultivation (using an Alloway cultivator with rolling shields), and hand labor were used as needed to maintain the experiments free of weeds.

Sugarbeet stand counts were taken as follows:

Fargo 1994 - May 20, May 23, June 2
Fargo 1995 - June 2, June 9
Glyndon 1995 - May 23, May 30, June 12

Sugarbeet roots were counted and harvested on September 28, 1994 and September 19, 1995 at the Fargo sites, and September 28, 1995 at the

Glyndon site. The middle four of the six residue management wheel rows were harvested in each level. The middle two rows of each of the other six rows were harvested in each level. Yield determinations were made and quality analysis performed at American Crystal Sugar Tare Lab, East Grand Forks, MN.

Corn Residue Study

Studies were conducted in 1994 and 1995 near Colfax, ND on Ulen fine sandy loam soils (sandy, frigid Aeric Calciaquolls) and in southern Minnesota near Gluek, MN on Bearden silty clay loam soils (fine-silty, frigid, Aeric Calciaquolls). Selected sites were fertilized according to soil test recommendations after fall corn harvest. The following primary fall tillage treatments were performed at each site:

Colfax, ND site:

1. Stalk chop, tandem disk, moldboard plow
2. Stalk chop, moldboard plow
3. Stalk chop, chisel plow
4. Stalk chop, tandem disk, chisel plow
5. No stalk chop, tandem disk, chisel plow
6. Stalk chop, tandem disk

Gluek, MN site:

1. Stalk chop, tandem disk, moldboard plow
2. Stalk chop, moldboard plow
3. Stalk chop, DMI chisel
4. Stalk chop, tandem disk, DMI chisel
5. Stalk chop, offset disk
6. No stalk chop, offset disk, DMI chisel
7. Stalk chop, tandem disk, regular chisel

Four replications of each treatment were conducted. Percent surface residue was determined in the fall before and after primary tillage, before spring tillage, and after planting using the line transect method.

Each treatment was worked in the spring with a field cultivator before planting. Colfax sites were planted May 3, 1994 and May 24, 1995. Gluek sites were planted May 15, 1994 and May 21, 1995. Sugarbeet seed was planted in 22 inch rows and 1.25 inches deep with a 4 inch spacing at Gluek and 5 inch spacing at Colfax.

Each treatment at both locations was planted with a John Deere Maxiemerge II planter. At the Colfax sites, each treatment received an additional pass with the Maxiemerge II planter equipped with Yetter and Dawn residue management wheels (three rows of each). Post emergence herbicides,

cultivation, and hand labor were used to maintain the experiments free of weeds.

Sugarbeet stand counts were taken as follows:

Colfax 1994 - May 16, May 18, May 23
Colfax 1995 - June 5, June 8, June 15, June 21
Gluek 1994 - May 27, June 22
Gluek 1995 - June 1, June 16, June 23

Sugarbeet roots were counted and harvested on September 14, 1994 and September 24, 1995 at Colfax and September 26, 1994 and September 20, 1995 at the Gluek sites. At the Colfax sites, the middle two rows of every six rows were harvested. The middle four rows were harvested where the residue management wheels were used. Yield determinations were made and quality analysis performed on the Colfax samples at the American Crystal Sugar Quality Tare Lab, East Grand Forks, MN and on the Gluek samples at the Southern Minnesota Beet Sugar Cooperative Quality Lab, Renville, MN.

Results and Discussion

Wheat Residue Study

Actual residue levels before and after planting are shown in Table 1 and Table 2 from the Fargo and Glyndon sites. Due to a record late killing frost in the fall of 1994, volunteer grain and weed growth increased residue levels in 1995. At the Fargo location (Table 3 and 4), the John Deere Maxiemerge II at both speeds was able to maintain uniform levels of yield, percent sugar, recoverable sugar, and harvest population at the different residue levels except for a reduction at the 70% residue level. Yield, percent sugar, recoverable sugar, and harvest population decreased with the John Deere 71 Flex planter at both speeds as the amount of residue increased. The Flex planter at five miles per hour was the poorest of the two speeds. No significant difference was seen between the two types of residue management wheels but they tended to improve initial stands as percent surface residue increased (Table 5).

At the Glyndon site (Table 6 and 7), the John Deere Maxiemerge II (at both speeds) was able to maintain consistent levels of yield, percent sugar, recoverable sugar, and harvest population as residue increased with a slight reduction in harvest population at the 70% residue level. The John Deere 71 Flex at three miles per hour maintained uniform levels of yield, percent sugar, recoverable sugar, and harvest population with an increase in residue except at the 70% residue level. The levels with the Flex planter were lower than the John Deere Maxiemerge II planter. Yield, percent sugar, recoverable sugar, and harvest populations with the Flex planter at five miles per hour gradually decreased with an increase in residue with a drop off in the 70% residue level. Dawn residue management wheels had higher harvest populations at higher

residue levels than the Yetters. Overall, there seemed to be little difference in using residue management wheels at this site (Table 8).

The John Deere Maxiemerge II was able to work better at both sites because it is a heavier planter and able to obtain better seed placement. Because of its heavier weight, there is less bouncing which enables it to cut residue better even at higher speeds. The Maxiemerge II also has better press wheels to aid in closing the seed furrow. The John Deere Flex planter is lighter and more susceptible to bouncing which results in poor seed placement especially at five miles per hour. Residue management wheels appeared to aid more in heavier soil by being able to establish better stands in higher residue levels and reduce residue entering the seed furrow. In lighter soil, the John Deere Maxiemerge II was able to cut through the residue better so residue management wheels didn't show as great a response.

Corn Residue Study

Results for the Colfax locations are shown in Table 9 and 10. There was no significant difference between treatments, but there tended to be about 200 lbs. of sugar per acre decrease with the stalk chop, tandem disk, chisel treatment. Residue management wheels were able to improve stand establishment in higher residue treatments (Table 11).

Results for the Gluek locations are shown in Table 12 and 13. There was no significant difference in yield and recoverable sugar between treatments. The stalk chop, tandem disk, regular chisel and stalk chop, moldboard plow treatments were significantly higher in percent sugar from the stalk chop, offset disk treatment but not from other treatments.

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TABLE 1

SUGARBEET IN WHEAT RESIDUE - FARGO, ND 1994-1995
PERCENT RESIDUE LEVELS

1994

Treatment	% Before Planting 4/24/94	% After Planting 5/19/94
0	23.50	22.50
10	42.33	29.33
20	43.83	40.67
35	44.17	36.00
50	55.00	44.83
70	98.33	85.83

1995

Treatment	% Before Planting 4/26/95	% After Planting 5/19/95
0	59.00	11.56
10	70.33	24.11
20	69.33	27.11
35	71.22	29.44
50	80.80	42.67
70	98.67	84.78

TWO YEAR AVERAGE

Treatment	% Before Planting	% After Planting
0	41.25	17.03
10	56.33	26.72
20	56.58	33.89
35	57.70	32.72
50	67.90	43.75
70	98.50	85.31

TABLE 2

SUGARBEET IN WHEAT RESIDUE - GLYDON, MN 1995
PERCENT RESIDUE LEVELS

1995

Treatment	% Before Planting 5/1/95	% After Planting 5/19/95
0	56.33	16.11
10	66.11	25.11
20	67.00	25.11
35	70.11	29.33
50	72.00	34.67
70	99.33	88.00

TABLE 3

SUGARBEET IN WHEAT RESIDUE - FARGO, ND 1994-1995
SUGARBEET YIELD & QUALITY RESULTS - 2 YEAR AVERAGE

Residue Level	Planter/ Speed	Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A	Harvest Beet/ 100' Row
0	Flex 3	23.50	14.70	6131	125
	Maxi 3	23.70	14.70	6133	154
	Dawn 3	23.50	14.90	6212	159
	Yetter 3	24.00	14.90	6313	159
	Flex 5	23.00	14.50	5886	120
	Maxi 5	23.80	14.90	6333	148
10	Flex 3	21.90	14.60	5618	124
	Maxi 3	23.20	14.50	5857	144
	Dawn 3	23.60	14.60	6092	157
	Yetter 3	22.40	14.40	5669	156
	Flex 5	20.70	14.50	5325	108
	Maxi 5	22.70	14.80	5928	139
20	Flex 3	22.40	14.50	5727	134
	Maxi 3	23.50	14.50	5981	149
	Dawn 3	24.00	14.80	6267	160
	Yetter 3	23.60	14.70	6101	158
	Flex 5	21.30	14.60	5456	114
	Maxi 5	23.20	15.00	6138	145
35	Flex 3	22.70	14.20	5667	129
	Maxi 3	23.10	14.70	5942	146
	Dawn 3	23.70	14.80	6182	148
	Yetter 3	23.10	14.50	5907	151
	Flex 5	21.50	14.20	5310	112
	Maxi 5	22.80	14.70	5886	136
50	Flex 3	22.30	14.20	5528	124
	Maxi 3	24.10	14.50	6129	161
	Dawn 3	23.60	14.60	6096	147
	Yetter 3	23.70	14.00	5784	152
	Flex 5	20.80	14.50	5277	109
	Maxi 5	23.20	14.60	5961	145
70	Flex 3	20.90	14.20	5145	92
	Maxi 3	23.00	14.30	5744	139
	Dawn 3	23.70	14.60	6107	153
	Yetter 3	23.50	14.40	5998	148
	Flex 5	19.10	13.90	4654	84
	Maxi 5	23.60	14.80	6153	129

TABLE 4

SUGARBEET IN WHEAT RESIDUE - FARGO, ND 1994-1995
SUGARBEET YIELD & QUALITY RESULTS

Residue Level	Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A	Harvest Beet/ 100' Row
0	23.60	14.80	6168	145
10	22.40	14.60	5745	138
20	23.00	14.70	5941	143
35	22.80	14.50	5812	137
50	22.90	14.40	5794	140
70	22.30	14.40	5633	124

Planter	Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A	Harvest Beet/ 100' Row
Flex 3	22.20	14.40	5621	121
Maxi 3	23.50	14.50	5971	149
Dawn 3	23.70	14.70	6155	154
Yetter 3	23.40	14.50	5953	154
Flex 5	21.00	14.40	5305	108
Maxi 5	23.20	14.80	6061	140

Flex 3 = JD Flex at 3 mph
Flex 5 = JD Flex at 5 mph
Yetter = Yetter Residue Management Wheels
Dawn = Dawn Residue Management Wheels
Maxi 3 = JD Maxiemerge 2 at 3 mph
Maxi 3 = JD Maxiemerge 2 at 5 mph

TABLE 5

SUGARBEET IN WHEAT RESIDUE - FARGO, ND 1994-1995
STAND COUNTS PLANTS/100 FEET OF ROW

Residue Level	Planter	1994 5/23/94	1994 6/2/94	1994 6/21/94	*	1995 6/2/95	1995 6/9/95
0	Flex 3	23	51	125	*	134	162
	Flex 5	14	40	123	*	101	137
	Maxi 3	70	122	162	*	180	211
	Maxi 5	55	88	157	*	165	203
	TW	102	161	174	*	178	212
10	Flex 3	24	33	125	*	116	154
	Flex 5	15	25	126	*	88	145
	Maxi 3	60	74	148	*	167	196
	Maxi 5	46	60	147	*	168	196
	TW	101	122	203	*	178	211
20	Flex 3	18	43	143	*	120	153
	Flex 5	13	20	128	*	105	130
	Maxi 3	53	67	171	*	169	193
	Maxi 5	54	70	165	*	161	179
	TW	96	130	195	*	164	191
35	Flex 3	15	35	116	*	107	142
	Flex 5	13	24	109	*	96	142
	Maxi 3	37	65	146	*	192	205
	Maxi 5	40	69	144	*	161	191
	TW	85	139	161	*	178	193
50	Flex 3	16	39	108	*	120	158
	Flex 5	13	28	99	*	94	120
	Maxi 3	61	70	147	*	158	209
	Maxi 5	53	66	122	*	164	190
	TW	105	117	167	*	181	207
70	Flex 3	16	40	117	*	105	132
	Flex 5	25	43	103	*	73	90
	Maxi 3	63	97	161	*	158	200
	Maxi 5	58	71	168	*	157	196
	TW	102	123	168	*	187	198

TABLE 6

SUGARBEET IN WHEAT RESIDUE - GLYNDON, MN 1995
SUGARBEET YIELD & QUALITY RESULTS - 2 YEAR AVERAGE

Residue Level	Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A	Harvest Beet/ 100' Row
0	23.30	17.20	7183	173
10	23.70	17.30	7391	176
20	23.00	17.50	7248	170
35	22.90	17.50	7202	174
50	23.20	17.40	7240	167
70	20.70	17.80	6681	131

Residue Level	Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A	Harvest Beet/ 100' Row
Flex 3	21.80	17.60	6925	148
Maxi 3	22.80	17.50	7219	182
Dawn 3	23.20	17.40	7275	187
Yetter 3	23.50	17.00	7115	174
Flex 5	22.10	17.40	6938	123
Maxi 5	23.40	17.60	7472	177

Flex 3 = JD Flex at 3 mph
Flex 5 = JD Flex at 5 mph
Yetter = Yetter Residue Management Wheels
Dawn = Dawn Residue Management Wheels
Maxi 3 = JD Maxiemerge 2 at 3 mph
Maxi 3 = JD Maxiemerge 2 at 5 mph
TW = Residue Management Wheels

TABLE 7

SUGARBEET IN WHEAT RESIDUE - GLYNDON, MN 1995
SUGARBEET YIELD & QUALITY RESULTS

Residue Level	Planter/ Speed	Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A	Harvest Beet/ 100' Row
0	Flex 3	22.00	17.20	6792	161
	Maxi 3	23.00	17.60	7286	184
	Dawn 3	23.20	16.70	6911	198
	Yetter 3	24.30	16.70	7225	173
	Flex 5	23.30	17.50	7387	131
	Maxi 5	24.00	17.30	7495	190
10	Flex 3	22.20	17.60	7110	161
	Maxi 3	23.50	17.20	7303	191
	Dawn 3	24.20	17.30	7572	196
	Yetter 3	25.00	16.90	7552	182
	Flex 5	22.80	17.40	7147	135
	Maxi 5	24.60	17.30	7665	191
20	Flex 3	22.20	17.60	7124	146
	Maxi 3	23.30	17.70	7521	190
	Dawn 3	22.80	17.50	7236	189
	Yetter 3	23.00	17.10	7018	184
	Flex 5	23.10	17.20	7133	131
	Maxi 5	23.20	17.70	7453	181
35	Flex 3	22.30	17.60	7160	156
	Maxi 3	22.80	17.80	7320	192
	Dawn 3	23.30	17.60	7416	194
	Yetter 3	23.50	16.90	7075	187
	Flex 5	22.10	17.20	6843	123
	Maxi 5	23.10	17.70	7396	193
50	Flex 3	22.40	17.30	6966	154
	Maxi 3	23.10	17.40	7231	195
	Dawn 3	23.50	17.50	7455	181
	Yetter 3	24.30	16.80	7251	176
	Flex 5	22.40	17.30	6996	117
	Maxi 5	23.40	17.80	7543	180
70	Flex 3	19.40	18.10	6397	112
	Maxi 3	21.10	17.50	6655	138
	Dawn 3	21.80	17.80	7062	165
	Yetter 3	21.10	17.30	6571	145
	Flex 5	18.90	17.90	6119	101
	Maxi 5	22.10	18.10	7280	137

Flex 3 = JD Flex at 3 mph, Maxi 3 = JD Maxiemerge 2 at 3 mph
Flex 5 = JD Flex at 5 mph, Maxi 5 = JD Maxiemerge 2 at 5 mph
Yetter = Yetter Residue Management Wheels
Dawn = Dawn Residue Management Wheels

TABLE 8

SUGARBEET IN WHEAT RESIDUE - GLYNDON, MN 1995
STAND COUNTS PLANTS/100 FEET

Residue Level	Planter	5/23/95	5/30/95	6/12/95
0	Flex 3	86	190	183
	Flex 5	90	149	137
	Maxi 3	106	168	201
	Maxi 5	118	213	223
	TW	117	194	203
10	Flex 3	99	178	186
	Flex 5	78	125	138
	Maxi 3	121	208	213
	Maxi 5	117	212	216
	TW	127	215	223
20	Flex 3	72	157	171
	Flex 5	66	133	131
	Maxi 3	112	201	206
	Maxi 5	130	193	208
	TW	103	197	202
35	Flex 3	83	149	167
	Flex 5	68	140	144
	Maxi 3	110	195	200
	Maxi 5	124	199	195
	TW	118	196	203
50	Flex 3	85	163	171
	Flex 5	59	115	138
	Maxi 3	101	193	207
	Maxi 5	109	191	199
	TW	106	187	197
70	Flex 3	18	96	112
	Flex 5	20	88	98
	Maxi 3	22	123	139
	Maxi 5	23	107	120
	TW	41	140	160

Flex 3 = JD Flex Planter at 3 mph
Flex 5 = JD Flex Planter at 5 mph
Maxi 3 = JD Maxiemerge II Planter at 3 mph
Maxi 5 = JD Maxiemerge II Planter at 5 mph
TW = Residue Management Wheels

TABLE 9

SUGARBEET IN CORN RESIDUE - COLFAX, ND 1994-1995
SUGARBEET YIELD & QUALITY RESULTS - 2 YEAR AVERAGE

Primary Tillage	% Residue Before Planting	% Residue After Planting	PLTR	Root Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A	Harvest Beets/ 100' Row
C/TD/MP	10.30	10.20	A	28.40	12.90	6036	121
			B	28.80	12.60	5908	113
			C	28.20	13.00	6123	114
C/MP	11.50	8.10	A	28.40	12.90	6031	127
			B	29.60	12.80	6263	114
			C	28.90	12.90	6206	122
C/CH	46.70	31.50	A	28.80	12.70	6056	118
			B	28.90	12.80	6091	108
			C	29.20	12.60	6065	115
C/TD/CH	42.00	27.80	A	27.60	12.50	5632	109
			B	28.10	12.70	5828	113
			C	28.40	12.90	6075	116
NC/TD/CH	45.60	31.60	A	28.30	12.70	5918	116
			B	28.30	12.90	6018	112
			C	28.80	12.80	6087	114
C/TD	55.6	37.70	A	28.20	13.00	6111	114
			B	28.70	12.70	6013	111
			C	29.00	12.80	6132	115

C = Stalk Chop
TD = Tandem Disk
A = No Trash Wheels
MP = Moldboard Plow
CH = Regular Chisel
B = Dawn
NC = No Stalk Chop
C = Yetter

TABLE 10

SUGARBEET IN CORN RESIDUE - COLFAX, ND 1994-1995
SUGARBEET YIELD & QUALITY RESULTS - 2 YEAR AVERAGE

Primary Tillage	Root Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A	Harvest Beets/ 100' Row
C/TD/MP	28.50	12.80	6022	116
C/MP	29.00	12.80	6167	121
C/CH	29.00	12.70	6071	114
C/TD/CH	28.00	12.70	5845	112
NC/TD/CH	28.50	12.80	6008	114
C/TD	28.60	12.80	6085	114

Planter	Root Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A	Harvest Beets/ 100' Row
Maxi	28.30	12.80	5964	118
Dawn	28.70	12.70	6020	112
Yetter	28.80	12.80	6115	116

TABLE 11

SUGARBEET IN CORN RESIDUE - COLFAX, ND 1994-1995
STAND COUNTS PLANTS/100 FEET OF ROW

		1994				1995		
	TRMT	5/16/94	5/18/94	5/23/94 *	6/5/95	6/8/95	6/15/95	6/21/95
1	A	99	123	144 *	176	173	176	181
	B	113	128	150 *	170	158	147	159
2	A	107	134	148 *	178	169	173	176
	B	118	131	164 *	167	157	164	173
3	A	86	104	125 *	150	141	151	153
	B	86	110	126 *	148	126	138	148
4	A	85	98	119 *	154	138	153	164
	B	92	98	131 *	169	153	159	168
5	A	91	111	130 *	151	138	140	147
	B	90	111	131 *	156	139	136	161
6	A	89	116	130 *	156	139	141	162
	B	86	89	126 *	160	148	134	158

1 = Stalk Chop, Tandem Disk, Moldboard Plow
2 = Stalk Chop, Moldboard Plow
3 = Stalk Chop, Regular Chisel
4 = Stalk Chop, Tandem Disk, Regular Chisel
5 = No Stalk Chop, Tandem Disk, Regular Chisel
6 = Stalk Chop, Tandem Disk
A = No Residue Management Wheels
B = Residue Management Wheels

TABLE 12

SUGARBEET IN CORN RESIDUE - GLUEK, MN 1994-1995
SUGARBEET YIELD & QUALITY RESULTS - 2 YEAR AVERAGE

Primary Tillage	% Residue Before Planting	% Residue After Planting	Yield Tons/A	Percent Sucrose	Recover Sugar lbs/A
C/TD/MP	12.00	11.00	16.10	14.30	4171
C/MP	16.80	11.70	15.60	14.10	3963
C/DMI	39.10	16.30	16.80	14.60	4451
C/TD/DMI	38.50	23.30	15.80	14.70	4190
C/OD	39.40	31.10	16.20	15.50	4634
NC/OD/DMI	38.30	26.00	15.60	14.40	4090
C/TD/CH	49.20	31.20	16.40	14.20	4237

C = Stalk Chop
DMI = DMI Chisel
CH = Regular Chisel
NC = No Stalk Chop
TD = Tandem Disk
OD = Offset Disk
MP = Moldboard Plow

TABLE 13

SUGARBEET IN CORN RESIDUE - GLUEK, MN 1994-1995
STAND COUNTS PLANTS/100 FEET

	1994		1995		
Trmt	5/27/94	6/22/94 *	6/1/95	6/16/95	6/23/95
1	64	149 *	146	254	239
2	51	156 *	143	240	244
3	49	155 *	113	241	223
4	81	152 *	141	227	229
5	90	157 *	116	223	230
6	69	141 *	106	250	241
7	62	154 *	108	228	213

1 = Stalk Chop, Tandem Disk, Moldboard Plow
2 = Stalk Chop, Moldboard Plow
3 = Stalk Chop, DMI Chisel
4 = Stalk Chop, Tandem Disk, DMI Chisel
5 = Stalk Chop, Offset Disk
6 = No Stalk Chop, Offset Disk, DMI Chisel
7 = Stalk Chop, Tandem Disk, Regular Chisel

TRIPHENYL TIN HYDROXIDE
TOLERANT CERCOSPORA LEAF SPOT EXPERIMENT

Objective: Evaluate fungicides for control of tolerant cercospora leaf spot.

Experimental Procedures:

Sugarbeets were planted on May 5, 1995 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. Production practices and spray information are presented in Tables 2 and 3, repsectively. Experimental units were hand harvested on September 16, 1995. The middle two treated rows were harvested and analyzed for yield and quality.

Results and Discussion:

The results discussed here are from trials conducted at Southern Minnesota Sugar growing area. This trial was conducted in an area where triphenyltin hydroxide tolerance was identified in 1994 by SMSC Ag staff. The fungicides tested were subjected to high levels of triphenyltin hydroxide tolerant cercospora leaf spot. Testing in 1995 showed how wide spread the tolerance has become when many of the field tests were positively tested for tolerance.

Tolerance

Tolerance to 1 or 0.2 ppm of tripheynltin hydroxide (Supertin) or 5 ppm thiophanate methyl (Topsin) are reported as a percent of all leaf spots from which spores were transferred that showed growth (Table 1). There was a large amount of tolerance found to either tripheynltin hydroxide and thiophanate methyl. The treatment of different fungicides and combination of fungicides did not influence the amount of tolerance. Therefore, these data indicate the use of different fungicides will not control or hinder the presence of tolerant fungicide strains.

Efficacy

Supertin plus Bravo 720 and RH-7592 and Bravo 720 were the best treatments for control of cercospora leaf spot. Supertin on a 7-10 spray interval at 3.75 oz./A gave the next best cercospora leaf spot control at 4.8.

Supertin at 3.75 oz./A on a 14 day spray interval gave a 2.7 higher rating.

Yield

The untreated check was significantly lower for sucrose percent than all treatments except Supertin at 5 oz./A alternated with Dithane F-45 and Supertin at 3.75 oz./A plus Penncozeb at 2.0 lb./A. All other treatments were not significantly different from each other for sucrose percent. The fungicide treated treatments were not significantly different from each other for loss to molasses. Supertin at 3.75 oz./A plus Dithane at 1.6 qt./A and Supertin at 3.75 oz./A plus kocide at 2.67 pt./A were the only two that were significantly lower for loss to molasses compared to the untreated check. The general ranking of treatments did not directly relate to cercospora leaf spot. However, the untreated check which had the poorest control also gave the poorest quality of sucrose percent and loss to molasses. These same results become evident with recoverable sugar per ton, which would be expected.

Tons per acre had a better relationship to cercospora leaf spot control. The lower the cercospora leaf spot rating, the higher tons/acre tended to be. However, 6 of the 12 treatments gave tons per acre not significantly different from the treatment with the highest tons per acre. Among these seven treatments, the treatment with the highest and the lowest tons per acre both gave a 5.2 cercospora leaf spot rating.

The top seven ranked varieties for tons per acre were also the top seven for recoverable sugar per acre. Thus, recoverable sugar per acre had the same relationship to cercospora leaf spot as did tons per acre. Although the relationship was not direct for quality and yield, generally, as cercospora leaf spot rating increased quality and yield decreased. The untreated check had the poorest quality and yield. Thus, these data indicate that the lack of control will have a negative influence on quality and yield.

Applying Supertin at 3.75 oz./A on 7-10 day intervals instead of 14 gave better cercospora leaf spot control and tended to give better quality and yield. The highest recoverable sugar per acre was where Supertin and Penncozeb were applied on a 7 day interval. These data indicate that with shorter spray intervals and the right spray combination, cercospora leaf spot can be controlled and yield per acre of sugar is produced at a competitive and respectable level, even where cercospora leaf spot tolerance to fungicides are found.

Table 1. TPTH tolerance Cercospora leaf spot fungicide trial test for tolernce.

Treatment	Rate (form. prod.)/Acre	Spray Interval	CLS Rating	Triphenyl Tin 0.2 ppm	Triphenyl Tin 1 ppm	Topsin 5 ppm
		(days)	(0-9)	(%)	(%)	(%)
Super Tin 80WP	3.75 oz.	14	7.5	50	35	25
Super Tin 80WP + Dithane F-45	3.75 oz. 1.6 qt.	14	5.8	75 20	60	65
Super Tin 80WP + Kocide LF	3.75 oz. 2.67 pt.	14	7.3	20	25	10
Super Tin 80WP alternating with Dihtane F-45	5 oz. 1.6 qt.	14 7-10	7.8	43	7	17
Super Tin 80WP + Topsin M 70WP	3.75 oz. 0.375 lbs.	14	5.5	60	40	63
Untreated check	------	------	9	55	5	55
Super Tin 80WP + Bravo 720	3.75 oz. 1.5 pt.	14	3.8	45	48	32
Super Tin 80WP + Penncozeb 75DF	3.75 oz. 2.0 lbs.	7	5.2	68	11	34
Bravo 720	1.5 pt.	14	4.5	68	68	80
RH-7592 75WP	2.7 oz.	14	4.2	77	48	63
Penncozeb 75DF Topsin M 70WP + Super Tin 80WP	2.0 lbs. 0.375 lbs. 3.75 oz.	2@7* 14*	5.2	80	55	65
Super Tin 80WP	3.75 oz.	7-10	4.8	67	56	61
		Mean	5.9	59	38	48

* Applied 2 applications of Penncozeb 7 days apart, followed by the tank mix of Topsin + Super Tin on a 14 day interval for sequential applications.

Table 2. Cultural practice information

Planting Date	May 5
Previous Crop	Corn
Variety	Hill 5135
Weed Control	Betamix/Stinger Betanex Poast Hand Labor Cultivation
Insecticide	None
Plant Population	35,000 plants/A

Table 3. Spray dates and information.

1st	July 13
2nd	July 21
3rd	July 27
4th	Aug. 4
5th	Aug. 11
6th	Aug. 18
7th	Aug. 25
8th	Sept. 1
9th	Sept. 8
Spray volume (gpa)	20
Spray pressure (psi)	150
Harvest date	Sept.16

Table 4. TPTH tolerance Cercospora leaf spot fungicide trial at Southern Minnesota Sugar

Treatment	Rate (form. prod.)/Acre	Spray Interval	CLS Rating	Sucrose	Loss to Molasses	Tons/ Acre	Rec. Suc./ Ton	Rec. Suc./ Acre
		(days)	(0-9)	%	%			
Super Tin 80WP	3.75 oz.	14	7.5	12.50	1.53	15.2	219.4	3335
Super Tin 80WP + Dithane F-45	3.75 oz. 1.6 qt.	14	5.8	12.90	1.46	17.7	228.8	4050
Super Tin 80WP + Kocide LF	3.75 oz. 2.67 pt.	14	7.3	13.20	1.44	14.8	235.2	3481
Super Tin 80WP alternating with Dihtane F-45	5 oz. 1.6 qt.	14 7-10	7.8	12.10	1.71	15.1	207.8	3138
Super Tin 80WP + Topsin M 70WP	3.75 oz. 0.375 lbs.	14	5.5	12.70	1.67	18.2	220.6	4015
Untreated check	------	------	9	11.40	1.81	11.5	191.8	2206
Super Tin 80WP + Bravo 720	3.75 oz. 1.5 pt.	14	3.8	12.80	1.67	17.8	222.6	3962
Super Tin 80WP + Penncozeb 75DF	3.75 oz. 2.0 lbs.	7	5.2	12.20	1.64	19.2	211.2	4055
Bravo 720	1.5 pt.	14	4.5	12.70	1.75	18.4	219.0	4030
RH-7592 75WP	2.7 oz.	14	4.2	12.40	1.68	18.7	214.4	4009
Penncozeb 75DF Topsin M 70WP + Super Tin 80WP	2.0 lbs. 0.375 lbs. 3.75 oz.	2@7* 14*	5.2	13.00	1.71	17.6	225.8	3974
Super Tin 80WP	3.75 oz.	7-10	4.8	12.90	1.57	17.1	226.6	3875
		Mean	5.9	12.56	1.64	16.8	218.6	3677
		CV %	11.9	6.2	11.8	10.4	9.8	10.3
		LSD (0.05)	0.8	0.9	0.32	2	15.3	566

* Applied 2 applications of Penncozeb 7 days apart, followed by the tank mix of Topsin + Super Tin on a 14 day

EVALUATION OF FUNGICIDES FOR CERCOSPORA LEAF SPOT

Objective: To evaluate fungicide efficacy for cercospora leaf spot control, sugarbeets yield and quality.

Experimental Procedures:

Sugarbeets were planted on May 12, 1995 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. Production practices and spray information are presented in Tables 1 and 2, respectively. Experimental units were hand harvested on September 16, 1995. The middle two treated rows were harvested and analyzed for yield and quality.

Result and Discussion:

There are three parts to the results of this trial: 1) test for Supertin and Topsin tolerance, 2) disease control efficacy, 3) yield and quality analysis. This discussion will consider each part respectively, and then consider the interaction among efficacy and yield and quality.

Tolerance

Tolerance to 1 or 0.2 ppm of tripheynltin hydroxide (Supertin) or 5 ppm thiophanate methyl (Topsin) are reported as a percent of all leaf spots from which spores were transferred that showed growth (Table 1). There was a large amount of tolerance found to either tripheynltin hydroxide and thiophanate methyl. The treatment of different fungicides and combination of fungicides did not influence the amount of tolerance. Therefore, these data indicate the use of different fungicides will not control or hinder the presence of tolerant fungicide strains.

Efficacy

Efficacy of fungicides for cercospora leaf spot was evaluated on September 14, 1995. RH-7592 2F, RH-7592 75 WP applied 14 days apart and Supertin 80 WP at 3.75 oz. applied 10 days apart gave cercospora leaf spot control significantly lower than all other treatments. Increasing the spray interval for Supertin at 3.75 oz./A from 10 to 14 days increased cercospora leaf spot rating from 2.2 to 5.2. Adding Manex to the Supertin treatment or alternating Supertin and Manex did not aid either product in control of cercospora leaf spot. Alternating Manex at 1.6 qt./A with 5.0 oz./A Supertin gave significantly higher cercospora leaf spot rating than 3.75 oz./A Supertin mixed with 1.2 qt./A Manex. Thus, mixing the two products would be a better

option. All Bravo products and rates gave cercospora leaf spot rating of 3.0. Mixing Topsin at .375 lbs./A with Supertin at 3.75 oz./A gave cercospora leaf spot rating of 3.7. This rating was significantly lower than Supertin on the same spray interval of 14 days for both treatments. However, this was not as high a rating compared to Supertin on a 10 day interval. Spray mixes such as Penncozeb + Supertin, Topsin + Penncozeb or Topsin + Supertin alternated with Penncozeb had significantly higher ratings than Supertin + Topsin. These data indicate the best treatments are RH-7592 (2 for 75 WP) on 14 day intervals or Supertin at 3.75 oz./A on a 10 day interval. Supertin was best applied on a 10 day instead of a 14 day spray interval. The best choice, if a mix is desired, is Topsin + Supertin.

Yield

Sugar percent and loss to molasses data were significant but did not correlate directly to cercospora leaf spot control. Sugar percent for the untreated treatment was the only treatment that was significantly lower than the others. Recoverable sugar/ton is a function of sugar percent and loss to molasses. Treatments were significantly different for recoverable sugar/ton. However, recoverable sugar/ton did not relate directly to cercospora leaf spot control. The nontreated treatment was the lowest for recoverable sugar/ton but not significantly lower than Dithane M-45, RH-7592 2F at 8 oz./A and Bravo Ultrex. These treatments were 5.0, 2.0 and 3.0, respectively for cercospora leafs spot ratings. This indicates that sugar percent, loss to molasses and recoverable sugar/ton may be low in the above mentioned treatments due to experimental variability more so than the treatment itself.

Tons per acre was related to cercospora leaf rating. Lower cercospora leaf spot ratings gave higher tons per acre. Treatments in this test had to give 4.7 rating or lower for cercospora leaf spot to give tons/acre statistically the same. There were nine treatments that met these requirements.

Recoverable sugar/acre is a function of tons/acre, sugar percent and loss to molasses. Sugar percent and loss to molasses did not relate to cercospora leaf spot control. Tons/acre did relate to cercospora leaf spot rating. This resulted in recoverable sugar/acre being related to cercospora leaf spot rating. As was with tons/acre, sugar per acre was highest when cercospora leaf spot was 4.7 or lower. All treatments with cercospora leaf spot of 4.7 or above were not significantly different. RH-7592 2F and 75 wp was the only single fungicide treatment on a 14 day spray interval to be in the less than 4.7 rating category. Supertin at 3.75 oz./A needs to be applied every 10 days and Penncozeb at 2.0 lbs./A had to be applied every 7 days to give less than 4.7 rating. Mixtures of Topsin and Supertin on 14 day spray intervals alone or alternated with Penncozeb on a 7 day interval gave a 4.7 rating or less.

These data indicated that quality was not significantly different among fungicide treatments. Severe (8.8) cercospora leaf spot rating with the untreated treatment was required for quality to be significantly reduced. Tons/acre or quantity was significantly different among fungicide treatment. This carried over into recoverable sugar per acre. There were nine treatments that statistically gave the highest recoverable sugar/acre. These treatments gave cercospora leaf spot ratings of 4.7 or higher. Among these treatments, three treatments were labeled treatments. These are the treatments producers will have in their arsenal in 1996. Supertin will need to be applied at 3.75 oz./Acre on a 10 day interval or less. Topsin applied with Supertin, although it was a good treatment indicated by these data should not be used intensely. Topsin, like Supertin, is hindered by tolerance issues. However, Topsin has been hindered by tolerance for many years and the potential for increased cercospora leaf spot tolerance is great since Topsin is a systemic fungicide. However, with the use of cercospora leaf spot tolerant varieties and shorter spray intervals, Supertin will be an integrate part of sugarbeet production for many years. Its also important to note that Mancozeb products like Dithane and/or Penncozeb will work when used at the proper rates and spray intervals.

Table 1. Cercospora leaf spot fungicide screening trial test for tolernace.

Treatment	Rate (form. prod.)/Acre	Spray Interval (Days)	CLS Rating	Triphenyl Tin 0.2 ppm (%)	Triphenyl Tin 1 ppm (%)	Topsin 5 ppm (%)
Dithane F-45	1.6 qt.	7	5	60	43	53
RH-7592 2F	8.0 oz.	14	2	77	92	77
RH-7592 75WP	2.7 oz.	14	2	80	86	51
Super Tin 80WP	3.75 oz.	10	2.2	67	53	73
Super Tin 80WP	3.75 oz.	14	5.2	80	57	73
Super Tin 80WP + Manex	3.75 oz. +1.2 qt	14	5.2	71	57	77
Super Tin 80WP alt. Manex	5.0 oz. + 1.6 qt	7-10 & 14	6.2	87	67	67
Bravo 720	1.5 pt.	10-14	3	46	37	66
Bravo Ultrex	1.4 lbs.	10-14	3	47	38	79
Bravo 720	1.0 pt.	10-14	3	42	28	82
Nontreated Check	------	------	8.8	40	40	80
Penncozeb 75DF	2.0 lbs.	7	4	80	60	75
Topsin M 70WP + Super Tin 80WP	0.375 lbs. + 3.75 oz.	14	3.7	64	48	72
Penncozeb 75DF + Super Tin 80WP	2.0 lbs. + 3.75 oz.	14	5.5	88	80	95
Topsin M 70WP + Penncozeb 75DF	0.375 lbs. + 2.0 lbs.	14	5	72	44	84
Penncozeb 75DF / Topsin M 70WP + Super Tin 80WP	2.0 lbs. / 0.375 lbs. + 3.75 oz.	7 / 14	4.7	78	85	80
		Mean	4.3	67	57	74.0

Table 2. Cultural practice information

Planting Date	May 5
Previous Crop	Corn
Variety	VDH 66140
Weed Control	Betamix/Stinger Betanex Poast Hand Labor Cultivation
Insecticide	None
Plant Population	35,000 plants/A

Table 3. Spray dates and information.

1st	July 13
2nd	July 21
3rd	July 27
4th	Aug. 4
5th	Aug. 11
6th	Aug. 18
7th	Aug. 25
8th	Sept. 1
9th	Sept. 8
Spray volume (gpa)	20
Spray pressure (psi)	150
Harvest date	Sept.16

Table 4. Cercospora leaf spot fungicide screening trial at Southern Minnesota Sugar

Treatment	Rate (form. prod.)/Acre	Spray Interval	CLS Rating	Loss to Sucrose	Loss to Molasses	Tons/ Acre	Rec. Suc./ Ton	Rec. Suc./ Acre
Dithane F-45	1.6 qt.	7	5	13.08	1.53	20.3	231.0	4689
RH-7592 2F	8.0 oz.	14	2	13.18	1.36	24.6	236.4	5815
RH-7592 75WP	2.7 oz.	14	2	13.69	1.42	24.8	245.4	6086
Super Tin 80WP	3.75 oz.	10	2.2	13.67	1.41	23.5	245.2	5762
Super Tin 80WP	3.75 oz.	14	5.2	13.37	1.38	20.5	239.8	4916
Super Tin 80WP + Manex	3.75 oz. +1.2 q	14	5.2	13.42	1.41	21.2	240.2	5092
Super Tin 80WP alt. Manex	5.0 oz. + 1.6 qt	7-10 & 14	6.2	13.48	1.38	20.2	242.0	4888
Bravo 720	1.5 pt.	10-14	3	13.62	1.36	24.5	245.2	6007
Bravo Ultrex	1.4 lbs.	10-14	3	13.26	1.36	24.3	238.0	5783
Bravo 720	1.0 pt.	10-14	3	13.44	1.33	24.5	242.2	5934
Nontreated Check	------	------	8.8	12.56	1.42	15.3	222.8	3409
Penncozeb 75DF	2.0 lbs.	7	4	13.49	1.33	23.6	243.2	5740
Topsin M 70WP + Super Tin 80WP	0.375 lbs. 3.75 oz.	14	3.7	13.80	1.38	23.3	248.4	5788
Penncozeb 75DF + Super Tin 80WP	2.0 lbs. 3.75 oz.	14	5.5	13.76	1.27	21.2	249.8	5296
Topsin M 70WP + Penncozeb 75DF	0.375 lbs. 2.0 lbs.	14	5	13.57	1.30	22.3	245.4	5472
Penncozeb 75DF Topsin M 70WP + Super Tin 80WP	2.0 lbs. 0.375 lbs. 3.75 oz.	7 14	4.7	13.51	1.51	23.3	240.0	5592
		Mean	4.3	13.43	1.384	22.3	376.1	5392
		LSD (0.05)	0.7	0.72	0.15	1.8	16.3	567
		CV %	14.5	4.62	9.40	7.2	5.9	9

VARIETIES EVALUATED FOR HIGH SUGAR AND CERCOSPORA LEAF SPOT TOLERANCE

Objective: Evaluate varieties for early sugar accumulation and cercospora leaf spot tolerance.

Experimental Procedure:

Trials were planted at four locations in 1995. Varieties were replicated eight times in a randomized complete block design. Entries were chosen by their abilities to produce high percent sugar and high tolerance to cercospora leaf spot. Both characteristics had to be apparent for the variety to be selected for testing. The trials were planted May 11, 17, 25 and 26. Varieties planted were as follows:

955 xsm-1	ACH 940500	Beta 5335
955 xsm-2	H-93060391	Beta BG5311
955 xsm-3	H-94060888	VDH 6042-93
955 xsm-4	H-93000571	VDH 6089-93
955 xsm-5	H-93000625	VDH 6061-93
ACH 197	Beta 5014	VDH 3547-93 Sirio
KW 6770	Beta 5931	
ACH 308	Beta BG6916	

Trials were harvested on September 6 and 7. Three of the four trials were harvested. The sugarbeets were analyzed for yield and quality.

Varieties were coded and sent to Beta Seed in Shakopee, MN for testing for tolerance to cercospora leaf spot. Sugarbeets were rated for cercospora leaf spot six times periodically from July 24 thru August 14. KWS scale of 1 - 9 was used for rating criteria. KW 6770 was used as an approved variety check and will be considered as such in the discussion.

Results and Discussion

The growing season of 1995 was challenged by many factors. The factor most evident was the level of cercospora leaf spot. Cercospora leaf spot is influenced by climatic conditions and varieties. Although we cannot control climatic conditions, variety is one factor we have control over. Choice of varieties with good cercospora leaf spot tolerance will aid in how cercospora leaf spot influences sugar production. Sugar production can also be influenced by variety in its ability to produce. The higher the sugar percent,

the greater the ability to produce sugar. The potential of losing fungicide due to environmental and/or social concerns and fungus tolerance to fungicides were considered in initiating this trial. Thus, the testing of varieties for tolerance to cercospora leaf spot. However, varietal needs for Southern Minnesota Sugar does not end at cercospora leaf spot tolerance. A major concern for varieties at SMSC is high sugar production and at an early time within the sugarbeet harvest. Therefore, testing for varieties for early sugar accumulation and cercospora leaf spot tolerance were combined into one test. The cercospora leaf spot tolerance of varieties will be discussed first.

Cercospora leaf spot (CLS) increased over time (Table 1). The tested variety average CLS rating was 3.8, with the low at 2.7 with the resistant check and the high at 5.26 with the susceptible check. Varieties with high CLS early were also high late. The lowest average of the test varieties was VDH 6093-93 at 3.35. This variety was significantly higher than the resistant check. VDH 6093-93 was not significantly lower than 15 of the tested varieties. Sixteen of the 24 tested varieties gave a statistically similar average cercospora leaf spot rating. The one approved variety tested in this trial was KW 6770 which gave a 4.46 in this trial. KW 6770 would represent a slightly higher than average of the approved varieties. The majority of the varieties have a significant lower CLS rating than KW 6770. This indicates there are varieties available that would provide better protection against cercospora leaf spot than those available as approved varieties. The next question is how do they produce.

Sugarbeet production is different from many crops produced by southern Minnesota farmers. Quality, as well as quantity, is considered in sugarbeet production. Sugar percent was nonsignificant for 22 of the 24 varieties tested. Loss to molasses was nonsignificant among all varieties tested. This indicates that a large number of the tested varieties could meet qualifications as early sugar varieties. This conclusion could be made since KW 6770 is an early sugar type variety and KW 6770 is an above average variety on all factors considered in sugar production in the coded trials.

There was greater separation in quantity or yield components. ACH 308 gave the highest tons/A at 22.3, but not significantly higher than six other varieties. Tons/A ranged from 22.3 to 18.3, a 4 ton variance. KW 6770 yielded 22.0 ton/A, .3 ton/A lower than ACH 308, but not significantly lower.

The lack of separation in sugar percent and loss to molasses resulted in the same separation occurring with recoverable sugar per ton. Twenty three of the twenty four varieties produced recoverable sugar per ton statistically the same. VDH 6061-93 was the only variety that produced significantly lower recoverable sugar/ton at 218.2, than the variety with the highest recoverable sugar/ton at 229.7 with Beta 5335.

Recoverable sugar per acre was highest with KW 6770 at 4955. KW 6770 was not significantly higher than 12 other varieties. All 12 varieties gave a significantly lower cercospora leaf spot rating than KW 6770. Ten of the twelve varieties gave cercospora rating non-significant in comparison and were the lowest cercospora leaf spot ratings among all varieties tested. This indicates that there are a good number of varieties from this test that could make good early sugar varieties, good producers of sugar per acre and have good tolerance to cercospora leaf spot.

Table 1. Cercospora leaf spot evaluation of varieties,1995.

Treatment	RROT	C7/24	C7/28	C8/1	C8/7	C8/10	C8/14	CRAVG
1 955XSM-1	3.0	2.12	2.38	2.55	4.08	4.67	4.92	3.39
2 955XSM-2	3.0	2.55	2.55	2.55	4.92	5.35	5.52	3.78
3 955XSM-3	2.0	2.55	2.55	2.97	5.09	5.94	5.94	3.86
4 955XSM-4	2.5	1.70	2.38	2.38	4.50	5.09	5.52	3.44
5 955XSM-5	2.8	2.12	2.38	2.97	4.92	5.52	5.52	3.75
6 ACH 197	2.3	2.12	2.38	2.55	4.08	5.09	5.09	3.37
7. KW 6770	3.3	2.80	2.97	3.82	5.77	6.37	6.20	4.46
8 ACH 9400489	2.5	2.38	2.38	2.80	4.92	5.35	5.52	3.69
9 ACH 308	2.5	2.12	2.55	2.55	4.50	5.09	4.92	3.46
10 ACH 9400500	3.3	1.95	2.38	2.55	4.50	5.09	5.09	3.55
11 H-93060391	3.5	3.23	3.23	4.67	6.37	6.79	6.79	4.94
12 H-94060888	3.8	2.63	3.23	4.08	6.20	6.79	6.62	4.76
13 H-93000571	3.8	3.40	3.40	4.50	6.62	7.05	6.79	5.08
14 H-93000625	2.3	2.55	2.55	2.97	5.35	5.35	5.94	3.86
15 Beta 5014	2.3	2.55	2.55	2.80	4.50	5.09	5.09	3.55
16 Beta 5931	3.3	2.38	2.55	2.55	4.50	4.92	5.35	3.65
17 Beta BG6916	3.0	2.38	2.55	2.38	4.67	4.92	5.77	3.67
18 Beta 5335	3.4	2.12	2.55	2.55	4.41	4.75	4.75	3.51
19 Beta BG5311	2.5	2.38	2.55	2.55	4.25	4.67	4.67	3.37
20 VDH 6042-93	2.8	1.95	2.38	2.55	4.50	4.92	4.92	3.43
21 VDH 6089-93	3.3	2.38	2.55	2.55	4.50	4.92	5.09	3.61
22 VDH 6093-93	2.3	2.38	2.38	2.55	4.25	4.92	4.67	3.35
23 VDH 6061-93	2.8	2.12	2.55	2.80	4.92	5.09	5.52	3.69
24 VDH 3547-93 Sirio	3.0	2.55	2.55	2.80	5.09	5.35	5.52	3.84
25 CRCK1___ RESISTANT	2.5	2.12	2.55	2.97	4.92	5.52	5.94	3.79
26 CRCK2___ MODERATLEY SUSCEPTIBLE	3.3	2.97	2.97	4.25	5.94	6.79	6.79	4.72
27 CRCK3___ SUSCETIBLE	4.5	3.40	3.40	4.92	6.62	7.22	6.79	5.26
28 CRCK4___ RESISTANT	2.0	1.70	1.95	1.95	3.40	3.82	4.08	2.70
Mean	**2.9**	**2.4**	**2.6**	**3.0**	**4.9**	**5.4**	**5.5**	**3.8**
CHECK	**3.1**	**3.0**	**3.2**	**4.1**	**6.1**	**6.9**	**6.9**	**5.0**
LSD5	**1.0**	**0.6**	**0.5**	**0.6**	**0.7**	**0.7**	**0.7**	**0.4**
MwCh	**2.9**	**2.8**	**3.0**	**3.4**	**5.7**	**6.3**	**6.5**	**4.6**

Table 2. Varieties with high sugar and cercospora leaf spot tolerance evaluated for yield and quality,1995.

TREATMENT	SUCROSE	LTM	TON/AC	RST	RSA
955XSM-1	12.59	1.30	18.9	225.9	4266
955XSM-2	12.60	1.30	21.0	226.0	4737
955XSM-3	12.64	1.25	20.6	227.8	4695
955XSM-4	12.48	1.29	19.2	223.8	4289
955XSM-5	12.50	1.30	21.2	224.0	4760
ACH 197	12.50	1.30	20.6	224.0	4610
KW 6770	12.50	1.26	22.0	224.9	4955
ACH 9400489	12.43	1.26	22.1	223.3	4935
ACH 308	12.31	1.35	22.3	219.1	4889
ACH 9400500	12.59	1.29	18.3	226.0	4141
H-93060391	12.55	1.31	19.8	224.7	4441
H-94060888	12.61	1.23	20.0	227.6	4553
H-93000571	12.61	1.30	19.1	226.3	4324
H-93000625	12.68	1.31	19.5	227.3	4441
Beta 5014	12.59	1.31	20.8	225.5	4702
Beta 5931	12.69	1.30	20.9	227.7	4753
Beta BG6916	12.14	1.33	21.6	216.1	4677
Beta 5335	12.75	1.27	20.6	229.7	4739
Beta BG5311	12.55	1.29	20.6	225.3	4630
VDH 6042-93	12.46	1.30	20.4	223.3	4557
VDH 6089-93	12.65	1.28	20.2	227.4	4598
VDH 6093-93	12.52	1.32	20.5	224.0	4585
VDH 6061-93	12.19	1.28	21.7	218.2	4730
VDH 3547-93 Sirio	12.52	1.29	19.5	224.7	4375
LSD (0.05)	**0.46**	**0.08**	**1.3**	**10.1**	**349**
C.V. %	**6.54**	**10.33**	**11.22**	**7.9**	**13.38**

Table 1. Herbicide Guide

Common Name	Trade Name	Lb/Gal. Acid Equivalent
Desmedipham (Desm)	Betamix	1.3
Desm & Phen & Etho	Betamix Progress	1.8
Clopyralid (Clpy)	Stinger	3
Triflusulfuron (TFSU)	Upbeet	50% DF
Glyphosate	Roundup	3
Glufosinate	Liberty	1.67
Ethofumesate	Nortron SC	4
EPTC	Eptam	7
Cycloate	Ro-Neet	6

This table can be used as a reference to the following weed control articles.

COMMON LAMBSQUARTER CONTROL WITH SOIL APPLIED AND POSTEMERGENCE HERBICIDES, PRINSBURG, 1995

Experimental Procedure

Preplant incorporated herbicides were applied at 2:00 p.m., May 19 and incorporated with a rototiller set four inches deep. 'Hilleshog 5135' sugarbeet was seeded 1.25 inches deep in 22 inch rows May 19. Preemergence herbicides were applied May 19 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 May 19 when the air temperature was 77F, relative humidity was 33%, soil temperature at six inches was 58F, wind was 2 mph, cloud cover was 50% and soil moisture was good. The first postemergence herbicide application was 2:00 p.m., June 7 when the air temperature was 75F, relative humidity was 60%, wind was 0 mph, cloud cover was 50%, 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 postemergence herbicide application was 4:00 p.m., June 14 when the air temperature was 78F, relative humidity was 70%, wind was 10 mph, cloud cover was 30%, 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. The third postemergence herbicide application was 1:00 p.m., June 21 when the air temperature was 87F, relative humidity was 75%, wind was 5 mph, cloud cover was 20%, soil moisture was good, sugarbeet was in the 6 leaf stage, and common lambsquarters was in the cotyledon stage to 4 inch tall. All 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 three weeks after the third postemergence application. Sugarbeet injury was negligible and is not listed in the table.

Results and Discussion

Nortron SC, applied alone, preemergence either tended or did give better control of common lambsquarter than ppi Eptam plus Ro-Neet applied alone. Nortron SC (pre) applied at 3.75 lb./A gave significantly higher common lambsquarter control than Nortron SC at 2 lb./A or Eptam plus Ro-Neet (ppi), regardless of the rate.

Betanex applied twice with Stinger or Upbeet gave common lambsquarter control similar to Nortron SC (pre) at 3.75 lb./A. However, spray mixture of Betanex, Stinger and Upbeet was significantly better for common lambsquarter control than Nortron SC (pre) when sprayed three times.

Betamix Progress gave significantly lower common lambsquarter control compared to Betanex. The results were the same regardless of the spray mixtures.

Nortron at 2.0 lb./A plus postemergence herbicides gave equal or better control of common lambsquarter than 3.75 lb./A applied alone. All combinations of Nortron SC (pre) plus postemergence herbicide gave common lambsquarter control above 90 percent, except Nortron SC (pre) plus Betanex.

The best control of common lambsquarter generally was achieved with Nortron SC (pre) with postemergence herbicides or Betanex, Stinger and Upbeet applied together.

Table 1. Postemergence Broadleaf Herbicides, Prinsburg, 1995

Treatment	Rate lb/A	Colq cntl %
Nortron SC (pre)	3.75	85
Nortron SC (pre)	2	68
Eptam + Ro-Neet	1.5+2.5	60
Eptam + Ro-Neet	0.88+1.5	53
Betanex/Betanex	0.25/0.33	63
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	84
Betanex + Upbeet/Betanex + Upbeet	0.25+0.0156/0.33+0.0156	79
Betanex + Stinger Upbeet/	0.25+0.09+0.0156	
Betanex + Stinger + Upbeet	0.33+0.09+0.0156	95
--/Betanex + Stinger + Upbeet/	0.25+0.09+0.0156	
Betanex + Stinger + Upbeet	0.33+0.09+0.0156	89
Betanex/Betanex + Stinger + Upbeet/	0.25/0.25+0.09+0.0156	
Betanex + Stinger + Upbeet	0.33+0.09+0.0156	94
Betanex + Stinger + Upbeet/	0.16+0.06+0.01	
Betanex + Stinger + Upbeet/	0.25+0.06+0.01	
Betanex + Stinger + Upbeet	0.25+0.06+0.01	98
Betamix Progress/Betamix Progress	0.25/0.33	39
Betamix Progress + Stinger/	0.25+0.09	
Betamix Progress + Stinger	0.33+0.09	56
Betamix Progress + Upbeet/	0.25+0.0156	
Betamix Progress + Upbeet	0.33+0.0156	48
Betamix Progress + Stinger + Upbeet/	0.25+0.09+0.0156	
Betamix Progress + Stinger + Upbeet	0.33+0.09+0.0156	51
Nortron sc (pre)/Betanex/Betanex	2/0.16/0.25	83
Nortron sc (pre)/Betanex + Stinger/Betanex + Stinger	2/0.16+0.09/0.25+0.09	96
Nortron sc (pre)/--/Betanex + Stinger/same	2/0.16+0.09/0.25+0.09	93
Nortron sc (pre)/Betanex + Upbeet/Betanex + Upbeet	2/0.16+0.0156/0.25+0.015	96
Nortron sc (pre)/Betanex + Stinger + Upbeet/	2/0.16+0.06+0.01	
Betanex + Stinger + Upbeet	0.25+0.06+0.01	100
Nortron sc (pre)/Betamix Progress/Betamix Progress	2/0.16/0.25	96
Nortron sc (pre)/--/Betamix Progress/Betamix Progress	2/0.16/0.25	93
Nortron sc (pre)/Betamix Progress + Stinger/	2/0.16+0.09	
Betamix Progress + Stinger	0.25+0.09	98
Nortron sc (pre)/Betamix Progress + Upbeet/	2/0.16+0.0156	
Betamix Progress + Upbeet	0.25+0.0156	100
Nortron sc (pre)/Betamix Progress + Stinger + Upbeet/	2/0.16+0.06+0.01	
Betamix Progress + Stinger + Upbeet	0.25+0.06+0.01	100
Eptam + Ro-Neet (ppi)/Betanex/Betanex	0.88+1.5/0.16/0.25	71
Eptam + Ro-Neet (ppi)/Betanex + Stinger/	0.88+1.5/0.16+0.09	
Betanex + Stinger	0.25+0.09	63

Eptam + Ro-Neet (ppi)/--/Betanex + Stinger/	0.88+1.5/0.16+0.09	
Betanex + Stinger	0.25+0.09	73
Eptam + Ro-Neet (ppi)/Betanex + Upbeet/	0.88+1.5/0.16+0.0156	
Betanex + Upbeet	0.25+0.0156	53
Eptam + Ro-Neet (ppi)/Betanex + Stinger + Upbeet/	0.88+1.5/0.16+0.06+0.01	
Betanex + Stinger + Upbeet	0.25+0.06+0.01	59
Etam + Ro-Neet (ppi)/--/	0.88+1.5	
Betanex + Stinger + Upbeet/	0.16+0.06+0.01	
Betanex + Stinger + Upbeet	0.25+0.06+0.01	58
Eptam + Ro-Neet (ppi)/Betamix Progress/	0.88+1.5/0.16	
Betamix Progress	0.25	84
Eptam + Ro-Neet (ppi)/--/Betamix Progress/	0.88+1.5/0.16	
Betamix Progress	0.25	69
Eptam + Ro-Neet (ppi)/Betamix Progress + Stinger/	0.88+1.5/0.16+0.09	
Betamix Progress + Stinger	0.25+0.09	84
Eptam + Ro-Neet (ppi)/Betamix Progress + Upbeet/	0.88+1.5/0.16+0.0156	
Betamix Progress + Upbeet	0.25+0.0156	85
Eptam + Ro-Neet (ppi)/	0.88+1.5	
Betamix Progress + Stinger + Upbeet/	0.16+0.06+0.01	
Betamix Progress + Stinger + Upbeet	0.25+0.06+0.01	100

EXP MEAN	78
C.V. %	10
LSD 5%	11
# OF REPS	4

PENNSYLVANIA SMARTWEED CONTROL WITH POSTEMERGENCE HERBICIDES, MILAN, 1995

Experimental Procedures

'ACH 198' sugarbeet was seeded May 2. The first herbicide application was 2:00 p.m. May 18 when the air temperature was 60F, relative humidity was 40%, wind was 5 mph, soil moisture was good and sugarbeet and Pennsylvania smartweed were in the cotyledon stage. The second herbicide application was 4:30 p.m., May 25 when the air temperature was 75F, relative humidity was 55%, wind was 0 mph, soil moisture was good, sugarbeet was in the 2 leaf stage and Pennsylvania smartweed was in the cotyledon stage to 2 inches tall. The third postemergence herbicide application was 3:00 p.m., June 1 when the air temperature was 80F, relative humidity was 60%, wind was 15 mph, soil moisture was good, sugarbeet was in the 4 leaf stage and Pennsylvania smartweed was 2 to 6 inches tall. All 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 Pennsylvania smartweed control were evaluated two weeks after the third herbicide application.

Results and Discussion

Sugarbeet injury was 10 percent or higher with all treatments except Betanex applied alone or with Stinger and Betamix Progress plus Betanex. The highest sugarbeet injury was 15 percent.

Research has shown that sugarbeet injury of this magnitude would not cause a negative effect on yield.

To obtain Pennsylvania smartweed control of 84 percent or greater, Upbeet and Stringer needed to be added to Betanex or Betamix Progress. Roundup and Liberty gave 100 and 99 percent control, respectively when applied twice. However, Roundup and Liberty did not give significantly lower control when applied only once and both were still above 90 percent control.

Table 1. Postemergence Broadleaf Herbicides, Milan, 1995

Treatment	Rate	Sgbt inj	Pesw cntl
	lb/A	%	%
Betamix/Betamix	0.25/0.33	3	13
Betamix Progress/Betamix Progress	0.25/0.33	10	61
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	3	40
Betamix Progress + Stinger/	0.25+0.09		
Betamix Progress + Stinger	0.33+0.09	11	73
Betanex + Upbeet/Betanex + Upbeet	0.25+0.0156/0.33+0.0156	15	60
Betamix Progress + Upbeet	0.25+0.0156		
Betamix Progress + Upbeet	0.33+0.0156	14	64
Betanex + Stinger + Upbeet	0.25+0.09+0.0156		
Betanex + Stinger + Upbeet	0.33+0.09+0.0156	11	61
Betanex + Stinger + Upbeet	0.16+0.06+0.01		
Betanex + Stinger + Upbeet	0.25+0.06+0.01		
Betanex + Stinger + Upbeet	0.25+0.06+0.01	13	85
--/Betanex + Stinger + Upbeet	0.25+0.09+0.0156		
Betanex + Stinger + Upbeet	0.33+0.09+0.0156	10	86
--/Betamix Progress + Stinger	0.25+0.09		
Betamix Progress + Stinger	0.33+0.09	11	84
Betamix Progress + Stinger + Upbeet	0.25+0.09+0.0156		
Betamix Progress + Stinger + Upbeet	0.33+0.09+0.0156	14	87
Betamix Progress + Stinger + Upbeet/	0.16+0.06+0.01		
Betamix Progress + Stinger + Upbeet/	0.25+0.06+0.01		
Betamix Progress + Stinger + Upbeet	0.25+0.06+0.01	14	94
Betamix Progress + Betanex/	0.17+0.08		
Betamix Progress + Betanex	0.22+0.11	5	51
Betamix Progress + Betanex/	0.13+0.12		
Betamix Progress + Betanex	0.17+0.16	15	47
Betanex/Betanex + Stinger + Upbeet/	0.25/0.25+0.09+0.0156		
Betanex + Stinger + Upbeet	0.33+0.09+0.0156	11	96
Betanex/Betamix Progress + Stinger/	0.25/0.25+0.09		
Betamix Progress + Stinger	0.33+0.09	14	83
--/--/Roundup	0.56	100	92
--/Roundup/Roundup	0.375/0.375	100	100
--/--/Liberty	0.36	100	98
--/Liberty/Liberty	0.18/0.18	100	99
C.V. %		21	16
LSD 5%		9	16
# OF REPS		4	4

VELVETLEAF AND REDROOT PIGWEED CONTROL WITH POSTEMERGENCE HERBICIDES, BENSON, 1995

Experimental Procedure:

'Hilleshog 5135' sugarbeet was seeded May 8. The first herbicide application was 2:00 p.m., May 23 when the air temperature was 65F, relative humidity was 40%, wind was 10-15 mph, soil moisture was good, cloud cover was 40%, sugarbeet was in the cotyledon stage, velvetleaf was in the cotyledon stage and redroot pigweed was in the cotyledon to 2 leaf stage. The second herbicide application was 4:00 p.m., May 30 when the air temperature was 70F, relative humidity was 60%, wind was 10 mph, soil moisture was good, cloud cover was 20%, sugarbeet was in the 2 leaf stage, velvetleaf was in the cotyledon stage to one inch tall and redroot pigweed was in the 2 to 4 leaf stage. The third herbicide application was 1:00 p.m., June 6 when the air temperature was 80F, relative humidity was 65%, wind was 0-5 mph, soil moisture was good, cloud cover was 50%, sugarbeet was in the 4 leaf stage, velvetleaf was 1 to 2 inches tall and redroot pigweed was in the 2 to 6 leaf stage. All 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 velvetleaf and redroot pigweed control were evaluated two weeks after the third herbicide application.

Results and Discussion:

Sugarbeet injury and velvetleaf and redroot pigweed control was nearly complete with Roundup and Liberty. Betamix Progress generally gave higher sugarbeet injury than Betanex with comparative treatments.

Velvetleaf control was significantly increased by adding Upbeet to Betanex or Betamix Progress. Spray mixture of Betamix Progress, Upbeet and Stinger tended to give the highest control, other than Roundup and Liberty.

Redroot pigweed was increased more by Upbeet than Stinger when added to Betanex or Betamix Progress. Mixing Stinger and Upbeet with Betanex or Betamix Progress generally gave the highest redroot pigweed control.

Table 1. Postemergence Broadleaf Herbicides, Benson, 1995

Treatment	Rate	Sgbt inj	Vele cntl	Rrpw cntl
	lb/A	%		%
Betamix/Betamix	0.25/0.33	0	30	56
Betamix Progress/Betamix Progress	0.25/0.33	16	50	65
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	3	43	74
Betamix Progress + Stinger/	0.25+0.09			
Betamix Progress + Stinger	0.33+0.09	16	58	61
Betanex + Upbeet/Betanex + Upbeet	0.25+0.0156/0.33+0.0156	14	68	80
Betamix Progress + Upbeet	0.25+0.0156			
Betamix Progress + Upbeet	0.33+0.0156	24	82	89
Betanex + Stinger + Upbeet	0.25+0.09+0.0156			
Betanex + Stinger + Upbeet	0.33+0.09+0.0156	9	88	88
Betanex + Stinger + Upbeet	0.16+0.06+0.01			
Betanex + Stinger + Upbeet	0.25+0.06+0.01			
Betanex + Stinger + Upbeet	0.25+0.06+0.01	18	91	98
--/Betanex + Stinger + Upbeet	0.25+0.09+0.0156			
Betanex + Stinger + Upbeet	0.33+0.09+0.0156	14	95	98
--/Betamix Progress + Stinger	0.25+0.09			
Betamix Progress + Stinger	0.33+0.09	16	70	81
Betamix Progress + Stinger + Upbeet	0.25+0.09+0.0156			
Betamix Progress + Stinger + Upbeet	0.33+0.09+0.0156	19	85	92
Betamix Progress + Stinger + Upbeet/	0.16+0.06+0.01			
Betamix Progress + Stinger + Upbeet/	0.25+0.06+0.01			
Betamix Progress + Stinger + Upbeet	0.25+0.06+0.01	25	98	98
Betamix Progress + Betanex/	0.17+0.08			
Betamix Progress + Betanex	0.22+0.11	13	58	89
Betamix Progress + Betanex/	0.13+0.12			
Betamix Progress + Betanex	0.17+0.16	9	54	89
Betanex/Betanex + Stinger + Upbeet/	0.25/0.25+0.09+0.0156			
Betanex + Stinger + Upbeet	0.33+0.09+0.0156	11	93	97
Betanex/Betamix Progress + Stinger/	0.25/0.25+0.09			
Betamix Progress + Stinger	0.33+0.09	18	84	95
--/--/Roundup	0.56	100	100	100
--/Roundup/Roundup	0.375/0.375	100	100	100
--/--/Liberty	0.36	100	100	99
--/Liberty/Liberty	0.18/0.18	100	100	99
C.V. %		20	15	8
LSD 5%		9	16	10
# OF REPS		4	4	4