1997 Research Report

SMBSC

1/1/1997
Southern Minnesota Beet Sugar Company
SMBSC

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VARIETY EVALUATION

Nineteen varieties have full approval for planting in 1998 growing season. ACH 205 was the only specialty variety approved and there was not a test market variety approved that had seed available for sale.

The approved varieties for Southern Minnesota Beet Sugar Cooperative since 1982 are listed in Table 1. A comparison of average performance for all approved varieties is listed in Table 2. Tables 3 and 4 list the usage since 1991. Three and two year performance of the 19 fully approved varieties are in Tables 5 - 8. Specialty use variety ACH 205 comparison to approved varieties is in Tables 9 and 10.

The top ten most popular varieties grown in 1997 by SMSC growers are as follows:

ACH 302	Hilleshog Viking
ACH 205	Hilleshog Hector
ACH 309	Hilleshog Resist
Beta 6904	KW 6770
Beta 5014	
Beta 6863	

Use of mini and regular pellets has increased from 80% in 1996 to 92.5% in 1997. Seed treated with tachigaren was 48% and PAT was 9.8% in 1997.

SOUTHERN MINNESOTA SUGAR COOPERATIVE

List of Approved Varieties since 1980

Table 1.

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

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

SOUTHERN MINNESOTA SUGAR COOPERATIVE

List of Approved Varieties since 1980

Table 1. (cont.)

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

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

SOUTHERN MINNESOTA SUGAR COOPERATIVE

List of Approved Varieties since 1980

1996	1996 (cont.)	1997	1997 (cont.)	1998
ACH 194	KW 6770	ACH 196	KW 2398	ACH 302
ACH 196	Maribo 875	ACH 302	KW 6770	ACH 309
ACH 302	Maribo 923	ACH 309	Maribo 875	Beta 1994
ACH 309	Mitsui Monohikari	Beta 1492	Maribo 923	Beta 5014
Beta 1492	Seedex Laser (1004)	Beta 6963	Maribo 9363	Beta 6035
Beta 2010	VDH H66140	Beta 1994	SX Laser	Beta 6863
Beta 3712		Beta 2010	VDH 66140	Beta 6904
Beta 6863		Beta 2074		HM Viking
HM 5135		Beta 5014		HM Hector
HM Niagara (7505)		Beta 6904		HM Resist
HM Shasta (2416)		HM 5135		HM Tahoe
HM Hector (2418)		HM Hector		KW 2398
KW 1800		HM Niagara		KW 6770
KW 2398		HM Shasta		Maribo 923
KW 2249 (Blend)		HM Viking		Maribo 9363
KW 3291		HM Resist		Maribo 9584
				Seedex Laser

Table 2. Comparison of Approved Varieties for Southern Minnesota over a eighteen 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	6,724	264.5	25.7	15.40	4.43	2.18
1982 (79-80-81)	12	6,282	262.6	23.9	15.50	4.31	2.17
1983 (80-81-82)	9	7,053	261.9	26.9	15.60	4.84	2.37
1984 (81-82-83)	9	6,823	253.1	26.9	15.30	4.80	2.50
1985 (82-83-84)	11	7,682	269.7	28.6	15.90	4.87	2.64
1986 (83-84-85)	14	7,837	280.9	27.9	16.10	4.80	2.41
1987 (84-85-86)	18	7,764	300.4	25.9	16.70	4.68	1.68
1988 (85-86-87)	24	8,884	308.7	28.7	16.95	4.93	1.51
1989 (86-87-88)	19	8,689	318.6	27.2	17.40	4.70	1.47
1990 (87-88-89)	21	9,078	307.8	29.4	17.10	4.87	1.71
1991 (88-89-90)	19	7,554	294.1	25.7	16.39	4.56	1.59
1991 (89-90-91)	21	6,831	276.6	24.8	15.50	4.60	1.60
1991 (90-91-92)	19	6,943	296.2	23.5	16.30	4.83	1.49
1993 (91-92-93)	21	5,961	308.8	19.6	16.90	4.80	1.40
1994 (92-93-94)	29	6,783	323.0	20.9	17.48	5.02	1.32
1995 (93-94-95)	22	6,259	306.6	20.8	16.79	4.81	1.47
1996 (94-95-96)	24	7,234	304.6	23.5	16.65	4.52	1.42
1997 (95-96-97)	19	5,794	291.9	19.75	15.83	4.38	1.24

Table 3.

SEED USAGE PERCENTAGE
SMSC, 1991 - 1997

YEAR	SMALL	MEDIUM	LARGE	X-LARGE	MINI	REGULAR	JUMBO	TOTAL
1991	12.37	47.22	19.92	16.27	3.04	1.19	---	100.00
1992	17.27	31.79	26.15	15.04	8.75	1.00	---	100.00
1993	17.49	26.02	18.53	22.05	13.31	2.60	---	100.00
1994	14.90	20.96	12.06	22.97	24.50	3.43	---	100.00
1995	13.55	13.53	15.67	12.68	37.11	7.45	---	100.00
1996	3.67	6.79	9.44	4.05	37.80	38.25	---	100.00
1997	1.20	3.00	2.00	1.30	23.20	45.30	24.00	100.00
Average	**11.49**	**21.33**	**14.82**	**13.48**	**21.10**	**14.17**	**24.00**	**100.00**

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

Table 4.

SEED USAGE
POUNDS PLANTED PER ACRE
SMSC, 1991 - 1997

YEAR	ACRES PLANTED	ACRES REPLANTED	TOTAL ACRES
1991	82,284	7,600	89,884
1992	87,324	1,000	88,324
1993	101,781	8,814	110,595
1994	111,547	5,048	116,595
1995	109,738	425	110,163
1996	108,783	1,697	110,480
1997	107,715	1,143	108,950
AVERAGE	**101,310**	**3,675**	**104,999**

SMSC APPROVED VARIETIES - 1998

Table 5. Mean of Three Year Performance Summary of SMSC Commercial Coded Entries, 1995 - 1997

VARIETY	Rec S./ Ton 3 YR MEAN	Rec S./ Acre 3 YR MEAN	Percent LTM 3 YR MEAN	Leaf * Spot 3 YR MEAN	Percent Sugar 3 YR MEAN	Tons/ Acre 3 YR MEAN	Seedling** Vigor 3 YR MEAN	Field Emerg % 3 YR MEAN
ACH 302	291.6	5771	1.27	4.02	15.85	19.70	2.05	63.24
ACH 309	287.7	5772	1.28	3.98	15.66	19.93	2.11	67.71
Beta 1994	297.4	5655	1.22	4.53	16.09	18.94	2.17	61.89
Beta 2074	291.8	6010	1.22	4.78	15.81	20.48	2.24	61.86
Beta 5014	298.8	5682	1.25	3.88	16.19	18.90	2.08	65.54
Beta 6035	293.4	5720	1.21	4.12	15.88	19.35	2.12	
Beta 6863	294.2	5792	1.20	4.37	15.91	19.61	2.18	66.78
Beta 6904	298.5	5923	1.20	4.38	16.13	19.75	2.05	64.59
HM Viking	291.7	5810	1.25	4.47	15.84	19.80	2.20	
HM Hector	288.8	6012	1.23	4.67	15.68	20.70	2.50	59.79
HM Niagara	292.4	5773	1.26	4.19	15.88	19.62	2.80	62.57
HM Resist	288.3	5886	1.18	3.95	15.60	20.30	2.53	56.25
HM Tahoe	292.8	5771	1.22	4.67	15.86	19.62	2.64	
KW 2398	296.8	5649	1.24	4.52	16.07	18.90	2.16	65.00
KW 6770	286.5	5798	1.23	4.85	15.56	20.10	2.30	61.30
Maribo 923	283.2	5950	1.30	4.93	15.46	20.92	2.01	67.14
Maribo 9363	289.1	5741	1.28	4.73	15.73	19.80	2.25	61.83
Maribo 9584	295.0	5671	1.22	4.39	15.97	19.09	2.06	
Seedex SX Laser	288.6	5693	1.25	3.82	15.68	19.65	2.08	62.53
Mean	**291.9**	**5794**	**1.24**	**4.38**	**15.83**	**19.75**	**2.24**	**63.20**

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

** Lower numbers indicate better seed vigor (1=ex, 9=poor)

SMSC APPROVED VARIETIES - 1998

Table 6. Percent of Mean of Three Year Performance Summary of SMSC Commercial Coded Entries, 1995 - 1997

VARIETY	Rec S./ Ton % of MEAN	Rec S./ Acre % of MEAN	Percent LTM % of MEAN	Leaf * Spot % of MEAN	Percent Sugar % of MEAN	Tons/ Acre % of MEAN	Seedling Vigor % of MEAN	Field Emerg % % of MEAN	Revenue/ Ton % of MEAN	Revenue/ Acre % of MEAN
ACH 302	99.9	99.6	102.6	91.8	100.1	99.8	91.6	100.1	99.8	99.6
ACH 309	98.6	99.6	103.2	90.7	98.9	100.9	94.2	107.1	97.6	98.6
Beta 1994	101.9	97.6	98.3	103.4	101.6	95.9	97.1	97.9	103.1	98.9
Beta 2074	100.0	103.7	98.9	109.0	99.9	103.7	100.2	97.9	99.9	103.7
Beta 5014	102.4	98.1	100.8	88.6	102.2	95.7	92.9	103.7	103.8	99.4
Beta 6035	100.5	98.7	97.9	94.1	100.3	98.0	94.9		100.8	98.8
Beta 6863	100.8	100.0	96.7	99.7	100.5	99.3	97.5	105.7	101.3	100.6
Beta 6904	102.2	102.2	97.3	100.1	101.9	100.0	91.4	102.2	103.7	103.7
HM Viking	99.9	100.3	101.0	102.1	100.0	100.3	98.4		99.9	100.2
HM Hector	98.9	103.8	99.7	106.6	99.0	104.8	111.5	94.6	98.3	103.1
HM Niagara	100.2	99.6	101.6	95.6	100.3	99.4	124.9	99.0	100.3	99.7
HM Resist	98.8	101.6	95.6	90.2	98.5	102.8	112.9	89.0	98.0	100.8
HM Tahoe	100.3	99.6	98.6	106.6	100.1	99.4	118.0		100.4	99.9
KW 2398	101.7	97.5	100.0	103.1	101.5	95.7	96.6	102.8	102.7	98.4
KW 6770	98.1	100.1	99.4	110.7	98.3	101.8	102.6	97.0	97.0	98.8
Maribo 923	97.0	102.7	105.3	112.6	97.7	106.0	89.8	106.2	95.1	100.9
Maribo 9363	99.0	99.1	103.5	107.9	99.4	100.3	100.5	97.8	98.4	98.7
Maribo 9584	101.1	97.9	98.4	100.2	100.8	96.7	92.2		101.7	98.4
Seedex SX Laser	98.9	98.3	101.3	87.1	99.1	99.5	92.9	98.9	98.1	97.7
Mean	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

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

** Lower numbers indicate better seed vigor (1=ex, 9=poor)

SMSC TEST MARKET VARIETIES - 1998

Table 7. Mean of Two Year Performance Summary of SMSC Commercial Coded Entries, 1996 - 1997.

VARIETY	Rec S./ Ton 2 YR MEAN	Rec S./ Acre 2 YR MEAN	Percent LTM 2 YR MEAN	Leaf * Spot 2 YR MEAN	Percent Sugar 2 YR MEAN	Tons/ Acre 2 YR MEAN	Seedling Vigor 2 YR MEAN	Field Emerg % 2 YR MEAN
1998 APPROVED								
ACH 302	295.0	5597	1.04	4.06	15.80	18.81	2.47	58.31
ACH 309	287.9	5515	1.10	4.05	15.49	18.97	2.53	62.67
Beta 1994	302.6	5491	1.03	4.86	16.17	17.97	2.51	61.89
Beta 2074	294.2	5731	1.03	4.85	15.74	19.29	2.55	61.86
Beta 5014	301.5	5481	1.03	4.30	16.10	17.98	2.44	65.54
Beta 6035	294.2	5609	1.03	4.28	15.73	18.83	2.38	
Beta 6863	298.8	5758	1.01	4.51	15.95	19.14	2.50	64.77
Beta 6904	302.8	5648	1.04	4.46	16.18	18.47	2.30	64.59
HM Viking	296.0	5645	1.07	4.57	15.87	18.89	2.52	62.12
HM Hector	292.4	5891	1.02	4.68	15.64	19.98	2.71	51.34
HM Niagara	293.7	5608	1.08	4.32	15.77	18.94	3.05	58.56
HM Resist	292.7	5767	1.02	3.94	15.65	19.49	2.70	56.25
HM Tahoe	294.7	5655	1.01	4.81	15.74	19.03	2.91	
KW 2398	296.4	5488	1.06	4.53	15.88	18.32	2.68	60.55
KW 6770	289.8	5805	1.05	4.78	15.55	19.82	2.59	57.66
Maribo 923	287.1	5917	1.11	4.95	15.46	20.45	2.49	63.82
Maribo 9363	292.6	5767	1.07	4.72	15.71	19.61	2.68	60.34
Maribo 9584	296.0	5475	1.03	4.42	15.83	18.29	2.45	
Seedex SX Laser	289.0	5481	1.04	3.81	15.50	18.80	2.54	59.04
Mean	**294.6**	**5649**	**1.04**	**4.47**	**15.78**	**19.00**	**2.58**	**60.58**

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

** Lower numbers indicate better seed vigor (1=ex, 9=poor)

SMSC TEST MARKET VARIETIES - 1998

Table 8. Percent of Mean of Two Year Performance Summary of SMSC Commercial Coded Entries, 1996 - 1997.

VARIETY	Rec S./ Ton % of MEAN	Rec S./ Acre % of MEAN	Percent LTM % of MEAN	Leaf * Spot % of MEAN	Percent Sugar % of MEAN	Tons/ Acre % of MEAN	Seedling Vigor % of MEAN	Field Emerg % % of MEAN	Revenue/ Ton % of MEAN	Revenue/ Acre % of MEAN
1998 APPROVED										
ACH 302	100.1	99.1	100.0	91.0	100.1	99.0	95.9	96.3	100.2	99.2
ACH 309	97.7	97.6	104.8	90.5	98.2	99.8	98.2	103.4	96.3	96.1
Beta 1994	102.7	97.2	98.1	108.7	102.5	94.6	97.2	102.2	104.5	98.9
Beta 2074	99.9	101.4	98.6	108.4	99.8	101.5	98.8	102.1	99.8	101.3
Beta 5014	102.4	97.0	98.1	96.3	102.1	94.6	94.5	108.2	103.8	98.3
Beta 6035	99.9	99.3	98.2	95.9	99.7	99.1	92.3		99.7	98.9
Beta 6863	101.4	101.9	96.7	100.9	101.1	100.7	96.8	106.9	102.3	103.1
Beta 6904	102.8	100.0	99.5	99.8	102.6	97.2	89.1	106.6	104.5	101.6
HM Viking	100.5	99.9	101.9	102.2	100.6	99.4	97.8	102.5	100.8	100.3
HM Hector	99.2	104.3	97.6	104.8	99.1	105.1	105.0	84.7	98.8	103.9
HM Niagara	99.7	99.3	103.4	96.6	99.9	99.6	118.4	96.7	99.5	99.2
HM Resist	99.3	102.1	97.1	88.1	99.2	102.5	104.8	92.8	98.9	101.5
HM Tahoe	100.0	100.1	96.7	107.6	99.8	100.2	113.0		100.0	100.2
KW 2398	100.6	97.2	101.9	101.4	100.7	96.4	104.0	99.9	100.9	97.4
KW 6770	98.4	102.8	100.5	107.1	98.5	104.3	100.5	95.2	97.4	101.7
Maribo 923	97.4	104.7	105.8	110.9	98.0	107.6	96.4	105.3	95.9	103.2
Maribo 9363	99.3	102.1	102.9	105.7	99.6	103.2	103.8	99.6	98.9	102.1
Maribo 9584	100.5	96.9	98.7	98.8	100.3	96.3	95.1		100.7	97.0
Seedex SX Laser	98.1	97.0	99.5	85.3	98.2	98.9	98.4	97.5	97.0	96.0
Mean	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

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

** Lower numbers indicate better seed vigor (1=ex, 9=poor)

Table 9. Mean of Specialty Varieties to Commercial Varieties 1995 - 1997

Description	Rec./ Ton 3 Yr Mean	Rec./ Acre 3 Yr Mean	Percent LTM 3 Yr Mean	Leaf * Spot 3 Yr Mean	Percent Sugar 3 Yr Mean	Tons/ Acre 3 Yr Mean	Seedling Vigor ** 3 Yr Mean	Field Emerg % 3 Yr Mean
1998 APPROVED								
ACH 302	291.6	5771	1.27	4.02	15.85	19.70	2.05	63.24
ACH 309	287.7	5772	1.28	3.98	15.66	19.93	2.11	67.71
Beta 1994	297.4	5655	1.22	4.53	16.09	18.94	2.17	61.89
Beta 2074	291.8	6010	1.22	4.78	15.81	20.48	2.24	61.86
Beta 5014	298.8	5682	1.25	3.88	16.19	18.90	2.08	65.54
Beta 6035	293.4	5720	1.21	4.12	15.88	19.35	2.12	
Beta 6863	294.2	5792	1.20	4.37	15.91	19.61	2.18	66.78
Beta 6904	298.5	5923	1.20	4.38	16.13	19.75	2.05	64.59
HM Viking	291.7	5810	1.25	4.47	15.84	19.80	2.20	
HM Hector	288.8	6012	1.23	4.67	15.68	20.70	2.50	59.79
HM Niagara	292.4	5773	1.26	4.19	15.88	19.62	2.80	62.57
HM Resist	288.3	5886	1.18	3.95	15.60	20.30	2.53	56.25
HM Tahoe	292.8	5771	1.22	4.60	15.86	19.62	2.64	
KW 2398	296.8	5649	1.24	4.52	16.07	18.90	2.16	65.00
KW 6770	286.5	5798	1.23	4.85	15.56	20.10	2.30	61.30
Maribo 923	283.2	5950	1.30	4.93	15.46	20.92	2.01	67.14
Maribo 9363	289.1	5741	1.28	4.73	15.73	19.80	2.25	61.83
Maribo 9584	295.0	5671	1.22	4.41	15.97	19.09	2.06	
Seedex SX Laser	288.6	5693	1.25	3.82	15.68	19.65	2.08	62.53
Mean	**291.92**	**5794**	**1.24**	**4.38**	**15.83**	**19.75**	**2.24**	**63.20**
SPECIALTY								
ACH 205(Aphan.Spec.)	275.8	5691	1.25	3.72	15.04	20.54	2.30	68.48

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

** Lower numbers indicate better seed vigor (1=ex, 9=poor)

Table 10. Percent of Mean of Specialty Varieties to Commercial Varieties 1995 - 1997

Description	Rec./ Ton % of Mean	Rec./ Acre % of Mean	Percent LTM % of Mean	Leaf * Spot % of Mean	Percent Sugar % of Mean	Tons/ Acre % of Mean	Seedling Vigor % of Mean	Field Emerg % % of Mean	Revenue/ Ton % of MEAN	Revenue/ Acre % of MEAN
1998 APPROVED										
ACH 302	99.9	99.6	102.6	91.8	100.1	99.8	91.6	100.1	99.8	99.6
ACH 309	98.6	99.6	103.2	90.8	98.9	100.9	94.2	107.1	97.6	98.6
Beta 1994	101.9	97.6	98.3	103.5	101.6	95.9	97.1	97.9	103.1	98.9
Beta 2074	100.0	103.7	98.9	109.1	99.9	103.7	100.2	97.9	99.9	103.7
Beta 5014	102.4	98.1	100.8	88.6	102.2	95.7	92.9	103.7	103.8	99.4
Beta 6035	100.5	98.7	97.9	94.1	100.3	98.0	94.9		100.8	98.8
Beta 6863	100.8	100.0	96.7	99.8	100.5	99.3	97.5	105.7	101.3	100.6
Beta 6904	102.2	102.2	97.3	100.1	101.9	100.0	91.4	102.2	103.7	103.7
HM Viking	99.9	100.3	101.0	102.1	100.0	100.3	98.4		99.9	100.2
HM Hector	98.9	103.8	99.7	106.6	99.0	104.8	111.5	94.6	98.3	103.1
HM Niagara	100.2	99.6	101.6	95.7	100.3	99.4	124.9	99.0	100.3	99.7
HM Resist	98.8	101.6	95.6	90.3	98.5	102.8	112.9	89.0	98.0	100.8
HM Tahoe	100.3	99.6	98.6	104.9	100.1	99.4	118.0		100.4	99.9
KW 2398	101.7	97.5	100.0	103.2	101.5	95.7	96.6	102.8	102.7	98.4
KW 6770	98.1	100.1	99.4	110.8	98.3	101.8	102.6	97.0	97.0	98.8
Maribo 923	97.0	102.7	105.3	112.6	97.7	106.0	89.8	106.2	95.1	100.9
Maribo 9363	99.0	99.1	103.5	108.0	99.4	100.3	100.5	97.8	98.4	98.7
Maribo 9584	101.1	97.9	98.4	100.7	100.8	96.7	92.2		101.7	98.4
Seedex SX Laser	98.9	98.3	101.3	87.2	99.1	99.5	92.9	98.9	98.1	97.7
Mean	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
SPECIALTY										
ACH 205(Aphan.Spec.)	94.5	98.2	101.3	84.9	95.0	104.0	102.7	108.4	91.0	94.7

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

** Lower numbers indicate better seed vigor (1=ex, 9=poor)

11 A. COMBINED COMMERCIAL

1997 SOUTHERN MINNESOTA COMBINED COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

ENTRY	CODE	REC/T LBS			REC/A LBS			LTM			SUGAR %			YIELD T/A		
		MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	283.83	103	0.00	4566	99	0.76	0.93	101	0.66	15.13	103	0.00	16.04	96	0.06
BETA 2074 (APH SPEC)	83	279.23	101	0.12	4608	100	0.91	0.89	96	0.04	14.85	101	0.19	16.45	99	0.52
BETA 5014 (APH SPEC)	74	282.20	102	0.01	4224	92	0.00	0.90	97	0.11	15.01	102	0.01	14.98	90	0.00
BETA 6035 NC (APH SPEC)	77	276.13	100	0.82	4553	99	0.66	0.90	97	0.12	14.71	100	0.99	16.41	99	0.44
BETA 6863 (APH SPEC)	71	285.20	103	0.00	4704	102	0.27	0.87	94	0.00	15.13	103	0.00	16.46	99	0.53
BETA 6904 (APH SPEC)	87	283.55	103	0.00	4583	100	0.89	0.92	99	0.51	15.09	103	0.00	16.11	97	0.09
CRYSTAL 205 (APH SPEC)	81	262.31	95	0.00	4432	96	0.10	0.93	100	0.99	14.04	95	0.00	16.90	101	0.44
CRYSTAL 302 (APH SPEC)	89	275.61	100	1.00	4432	96	0.10	0.94	102	0.36	14.72	100	0.88	16.13	97	0.10
CRYSTAL 309 (APH SPEC)	69	268.03	97	0.00	4342	94	0.01	0.98	106	0.00	14.38	98	0.00	16.22	97	0.17
CRYSTAL 9603 NC (APH SPEC)	86	274.42	100	0.61	4589	100	0.94	1.01	109	0.00	14.73	100	0.82	16.76	101	0.74
HM HECTOR	72	275.93	100	0.89	4886	106	0.00	0.90	97	0.16	14.70	100	0.95	17.67	106	0.00
HM NIAGARA	85	277.72	101	0.36	4513	98	0.40	0.95	103	0.12	14.84	101	0.24	16.24	97	0.19
HM RESIST (APH SPEC)	82	274.05	99	0.50	4566	99	0.76	0.88	95	0.00	14.58	99	0.24	16.64	100	0.95
HM RH3 (RHIZ SPEC)	67	271.73	99	0.10	4210	92	0.00	0.90	97	0.06	14.48	98	0.04	15.40	92	0.00
HM TAHOE (7049)	73	277.48	101	0.42	4587	100	0.93	0.90	97	0.07	14.77	100	0.56	16.52	99	0.67
HM VICTORY (7048)	79	270.61	98	0.03	4843	105	0.01	0.94	101	0.43	14.47	98	0.03	17.87	107	0.00
HM VIKING (7518)	88	278.79	101	0.17	4539	99	0.56	0.93	101	0.72	14.88	101	0.13	16.25	98	0.20
KW 2398 (APH SPEC)	80	277.33	101	0.46	4343	94	0.01	0.94	101	0.57	14.80	101	0.38	15.65	94	0.00
KW 6770	91	268.82	98	0.00	4642	101	0.64	0.93	101	0.65	14.38	98	0.00	17.25	104	0.07
MARIBO 923	76	269.10	98	0.01	4882	106	0.01	0.98	105	0.00	14.43	98	0.01	18.13	109	0.00
MARIBO 9363	84	280.70	102	0.03	4809	105	0.03	0.94	101	0.62	14.97	102	0.02	17.17	103	0.11
MARIBO 9584 NC	68	278.29	101	0.25	4439	97	0.11	0.91	98	0.28	14.82	101	0.29	15.85	95	0.01
SEEDEX SX 1009	70	277.75	101	0.36	5359	117	0.00	0.94	102	0.30	14.83	101	0.26	19.20	115	0.00
SEEDEX SX LASER	78	273.42	99	0.35	4468	97	0.19	0.91	98	0.23	14.58	99	0.24	16.30	98	0.26
VAN DER HAVE H66140	90	268.11	97	0.00	4790	104	0.05	0.96	104	0.04	14.37	98	0.00	17.82	107	0.00

GENERAL MEAN		275.6			4596			0.93			14.71			16.66		
COEFF. OF VAR (%)		3.44			8.46			6.57			3.07			7.68		
F VALUE		6			6.23			4.04			6.25			8.88		
L.S.D. (.05)		0.05			6.66			2			0.91			0.05		
L.S.D. (.01)		0.01			8.87			3			1.22			0.01		

* Significant at 5%
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

11 B. COMBINED COMMERCIAL

1997 SOUTHERN MINNESOTA COMBINED COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		NA ppm			K ppm			Am. N ppm			Tare %			Emergence %		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	255.3	92	0.14	1684	97	0.10	184.09	117	0.00	1.50	85	0.03	69.16	107	0.00
BETA 2074 (APH SPEC)	83	256.9	93	0.17	1671	96	0.04	154.33	98	0.56	1.30	74	0.00	67.85	105	0.01
BETA 5014 (APH SPEC)	74	246.0	89	0.04	1748	101	0.60	144.55	92	0.03	1.85	105	0.49	66.69	104	0.08
BETA 6035 NC (APH SPEC)	77	261.8	94	0.29	1695	98	0.20	154.06	98	0.53	2.41	136	0.00	40.13	62	0.00
BETA 6863 (APH SPEC)	71	254.0	92	0.11	1545	89	0.00	167.81	106	0.10	1.25	71	0.00	67.77	105	0.01
BETA 6904 (APH SPEC)	87	308.1	111	0.03	1680	97	0.07	153.15	97	0.43	1.56	88	0.09	67.14	104	0.04
CRYSTAL 205 (APH SPEC)	81	252.9	91	0.10	1704	98	0.32	173.72	110	0.01	1.82	103	0.66	69.95	109	0.00
CRYSTAL 302 (APH SPEC)	89	266.1	96	0.45	1796	104	0.04	158.51	100	0.91	1.02	58	0.00	67.57	105	0.02
CRYSTAL 309 (APH SPEC)	69	258.1	93	0.19	1843	106	0.00	174.99	111	0.01	1.12	63	0.00	66.81	104	0.06
CRYSTAL 9603 NC (APH SPEC)	86	295.0	106	0.22	1830	106	0.00	191.75	121	0.00	2.24	127	0.00	67.30	105	0.03
HM HECTOR	72	241.9	87	0.02	1688	97	0.13	164.53	104	0.27	2.38	135	0.00	65.19	101	0.53
HM NIAGARA	85	288.1	104	0.44	1818	105	0.01	150.95	96	0.25	2.27	129	0.00	61.50	96	0.03
HM RESIST (APH SPEC)	82	272.3	98	0.74	1632	94	0.00	147.65	94	0.09	2.50	141	0.00	66.03	103	0.20
HM RH3 (RHIZ SPEC)	67	256.1	92	0.15	1717	99	0.58	144.43	91	0.03	2.33	132	0.00	64.64	100	0.85
HM TAHOE (7049)	73	273.5	99	0.81	1620	94	0.00	165.22	105	0.22	2.19	124	0.00	67.67	105	0.01
HM VICTORY (7048)	79	254.1	92	0.12	1779	103	0.12	164.79	104	0.25	1.75	99	0.87	54.19	84	0.00
HM VIKING (7518)	88	280.3	101	0.82	1792	103	0.05	147.14	93	0.08	2.06	117	0.02	68.97	107	0.00
KW 2398 (APH SPEC)	80	318.6	115	0.01	1712	99	0.49	154.97	98	0.63	1.99	112	0.08	65.27	101	0.49
KW 6770	91	295.3	107	0.21	1824	105	0.00	133.78	85	0.00	2.50	141	0.00	66.30	103	0.14
MARIBO 923	76	347.4	125	0.00	1796	104	0.03	153.16	97	0.43	1.22	69	0.00	68.24	106	0.00
MARIBO 9363	84	289.3	104	0.40	1781	103	0.11	146.90	93	0.07	1.64	93	0.29	67.72	105	0.01
MARIBO 9584 NC	68	273.1	99	0.78	1705	98	0.35	152.27	96	0.35	1.82	103	0.63	56.72	88	0.00
SEEDEX SX 1009	70	281.7	102	0.75	1759	102	0.37	161.49	102	0.54	1.05	59	0.00	59.11	92	0.00
SEEDEX SX LASER	78	272.2	98	0.74	1725	100	0.79	146.67	93	0.07	1.26	71	0.00	64.30	100	0.94
VAN DER HAVE H66140	90	328.1	118	0.00	1778	103	0.13	155.29	98	0.67	1.14	65	0.00	63.46	99	0.47

GENERAL MEAN		277.04			1733			157.85			1.77			64.39		
COEFF. OF VAR (%)		21.4			5.54			13.82			24.83			8.84		
F VALUE		3.35			6			4.9			16.12			23.65		
L.S.D. (.05)		5			0.05			84.92			0.05			0.36		
L.S.D. (.01)		7			0.01			113.2			0.01			0.47		

* Significant at 5%
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

11 C. COMBINED COMMERCIAL

1997 SOUTHERN MINNESOTA COMBINED COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		BOLTERS %			VIGOR		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	0.22			3.47	104	0.51
BETA 2074 (APH SPEC)	83	0.08			3.05	92	0.22
BETA 5014 (APH SPEC)	74	0.00			3.21	96	0.59
BETA 6035 NC (APH SPEC)	77	0.00			2.95	89	0.10
BETA 6863 (APH SPEC)	71	0.00			2.84	85	0.03
BETA 6904 (APH SPEC)	87	0.00			3.75	113	0.07
CRYSTAL 205 (APH SPEC)	81	0.00			3.47	104	0.52
CRYSTAL 302 (APH SPEC)	89	0.00			3.68	111	0.12
CRYSTAL 309 (APH SPEC)	69	0.00			3.71	111	0.09
CRYSTAL 9603 NC (APH SPEC)	86	0.00			3.39	102	0.77
HM HECTOR	72	0.00			3.57	107	0.28
HM NIAGARA	85	0.00			3.38	102	0.82
HM RESIST (APH SPEC)	82	0.00			3.37	101	0.85
HM RH3 (RHIZ SPEC)	67	0.00			3.39	102	0.79
HM TAHOE (7049)	73	0.00			3.47	104	0.54
HM VICTORY (7048)	79	0.00			3.03	91	0.18
HM VIKING (7518)	88	0.00			3.29	99	0.88
KW 2398 (APH SPEC)	80	0.00			2.97	89	0.12
KW 6770	91	0.00			3.10	93	0.31
MARIBO 923	76	0.00			3.19	96	0.54
MARIBO 9363	84	0.00			3.14	94	0.41
MARIBO 9584 NC	68	0.00			3.68	111	0.12
SEEDEX SX 1009	70	0.00			2.99	90	0.14
SEEDEX SX LASER	78	0.00			3.82	115	0.03
VAN DER HAVE H66140	90	0.00			3.27	98	0.79

GENERAL MEAN					3.33		
COEFF. OF VAR (%)					30.52		
F VALUE					1.5		
L.S.D. (.05)					20		
L.S.D. (.01)					27		

* Significant at 5%
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

12A. CLARA CITY COMMERCIAL

1997 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		REC/T LBS			REC/A LBS			LTM			SUGAR %			YIELD T/A		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	281.23	104	0.01	4045	102	0.64	0.95	99	0.75	15.01	103	0.01	14.41	98	0.55
BETA 2074 (APH SPEC)	83	277.78	102	0.08	4025	101	0.75	0.93	97	0.28	14.82	102	0.10	14.44	98	0.59
BETA 5014 (APH SPEC)	74	279.61	103	0.02	3709	93	0.04	0.93	97	0.21	14.92	103	0.03	13.38	91	0.01
BETA 6035 NC (APH SPEC)	77	271.30	100	0.99	3824	96	0.23	0.95	99	0.83	14.52	100	0.98	14.10	96	0.22
BETA 6863 (APH SPEC)	71	282.75	104	0.00	4005	101	0.87	0.88	92	0.00	15.01	103	0.01	14.12	96	0.23
BETA 6904 (APH SPEC)	87	277.65	102	0.09	3766	95	0.10	0.96	100	0.89	14.86	102	0.06	13.61	93	0.03
CRYSTAL 205 (APH SPEC)	81	258.24	95	0.00	3867	97	0.38	0.96	100	0.87	13.87	95	0.00	15.04	102	0.51
CRYSTAL 302 (APH SPEC)	89	276.56	102	0.15	4003	101	0.88	0.95	99	0.82	14.79	102	0.13	14.59	99	0.81
CRYSTAL 309 (APH SPEC)	69	267.19	98	0.25	3710	93	0.04	0.97	101	0.59	14.34	99	0.27	13.86	94	0.09
CRYSTAL 9603 NC (APH SPEC)	86	271.24	100	0.98	4267	107	0.03	1.06	110	0.00	14.60	101	0.67	15.87	108	0.02
HM HECTOR	72	271.71	100	0.92	4510	113	0.00	0.91	95	0.06	14.51	100	0.92	16.60	113	0.00
HM NIAGARA	85	277.95	102	0.07	3836	96	0.27	0.99	103	0.31	14.87	102	0.05	13.81	94	0.07
HM RESIST (APH SPEC)	82	272.02	100	0.85	3975	100	0.95	0.91	94	0.04	14.50	100	0.88	14.62	99	0.85
HM RH3 (RHIZ SPEC)	67	264.73	98	0.07	3520	88	0.00	0.90	94	0.03	14.15	97	0.03	13.19	90	0.00
HM TAHOE (7049)	73	274.90	101	0.33	4108	103	0.35	0.93	97	0.24	14.69	101	0.36	14.93	102	0.65
HM VICTORY (7048)	79	261.41	96	0.01	4076	102	0.49	0.98	102	0.53	14.05	97	0.01	15.64	106	0.06
HM VIKING (7518)	88	276.17	102	0.19	4068	102	0.52	0.92	96	0.14	14.74	101	0.22	14.69	100	0.97
KW 2398 (APH SPEC)	80	275.34	101	0.27	3601	90	0.00	0.98	102	0.40	14.74	101	0.23	13.13	89	0.00
KW 6770	91	265.05	98	0.09	4103	103	0.37	0.97	101	0.60	14.23	98	0.09	15.55	106	0.09
MARIBO 923	76	265.39	98	0.10	4463	112	0.00	1.03	107	0.01	14.30	98	0.20	16.86	115	0.00
MARIBO 9363	84	272.75	101	0.70	4479	112	0.00	1.02	106	0.03	14.65	101	0.49	16.54	112	0.00
MARIBO 9584 NC	68	272.77	101	0.70	3687	93	0.03	0.93	97	0.31	14.58	100	0.78	13.35	91	0.01
SEEDEX SX 1009	70	268.49	99	0.43	4347	109	0.01	0.99	103	0.21	14.41	99	0.49	16.17	110	0.00
SEEDEX SX LASER	78	265.67	98	0.12	3659	92	0.02	0.96	100	0.86	14.24	98	0.10	13.77	94	0.06
VAN DER HAVE H66140	90	255.87	94	0.00	3924	99	0.66	1.02	107	0.02	13.82	95	0.00	15.43	105	0.15

GENERAL MEAN		271.4			3983			0.96			14.53			14.71		
COEFF. OF VAR (%)		3.02			7.65			6.25			2.71			7.61		
F VALUE		3.99			4.3			2.62			3.95			5.31		
L.S.D. (.05)		0.05			10.37			4			1.41			0.05		
L.S.D. (.01)		0.01			13.72			5			1.87			0.01		

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

12B. CLARA CITY COMMERCIAL

1997 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		NA ppm			K ppm			Am. N ppm			Tare %			Emergence %		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	245.39	89	0.29	1953	98	0.31	129.26	113	0.02	2.71	98	0.90	65.05	109	0.12
BETA 2074 (APH SPEC)	83	240.68	88	0.22	1964	98	0.45	114.93	101	0.93	2.54	92	0.58	58.58	99	0.80
BETA 5014 (APH SPEC)	74	243.24	89	0.25	1982	99	0.72	105.92	93	0.18	2.49	90	0.50	60.23	101	0.83
BETA 6035 NC (APH SPEC)	77	270.05	98	0.87	1992	100	0.88	116.32	102	0.75	2.60	94	0.70	39.30	66	0.00
BETA 6863 (APH SPEC)	71	265.64	97	0.74	1752	88	0.00	118.50	104	0.51	2.21	80	0.17	60.03	101	0.87
BETA 6904 (APH SPEC)	87	320.28	117	0.10	1976	99	0.63	109.39	96	0.42	2.84	103	0.84	61.51	103	0.57
CRYSTAL 205 (APH SPEC)	81	277.45	101	0.92	1939	97	0.18	130.45	114	0.01	2.60	94	0.70	62.30	105	0.43
CRYSTAL 302 (APH SPEC)	89	217.02	79	0.04	2053	103	0.23	117.05	102	0.67	3.40	123	0.11	62.13	104	0.46
CRYSTAL 309 (APH SPEC)	69	224.97	82	0.07	2087	104	0.05	119.70	105	0.39	3.30	120	0.18	62.08	104	0.46
CRYSTAL 9603 NC (APH SPEC)	86	288.13	105	0.62	2157	108	0.00	138.40	121	0.00	2.51	91	0.54	58.96	99	0.89
HM HECTOR	72	224.34	82	0.07	1957	98	0.36	110.26	96	0.51	3.20	116	0.27	62.86	106	0.34
HM NIAGARA	85	252.51	92	0.42	2074	104	0.09	120.03	105	0.36	2.72	99	0.94	55.89	94	0.32
HM RESIST (APH SPEC)	82	304.57	111	0.28	1845	92	0.00	104.10	91	0.10	3.16	115	0.32	66.67	112	0.05
HM RH3 (RHIZ SPEC)	67	266.74	97	0.77	1938	97	0.18	92.72	81	0.00	2.35	85	0.31	61.17	103	0.63
HM TAHOE (7049)	73	291.62	106	0.54	1865	93	0.00	121.92	107	0.23	2.53	92	0.57	63.87	107	0.22
HM VICTORY (7048)	79	266.00	97	0.75	2074	104	0.09	110.09	96	0.49	2.40	87	0.38	49.27	83	0.01
HM VIKING (7518)	88	256.22	93	0.50	1963	98	0.43	102.39	90	0.06	2.98	108	0.58	67.45	113	0.03
KW 2398 (APH SPEC)	80	322.33	117	0.08	1987	99	0.80	113.92	100	0.94	2.76	100	1.00	59.32	100	0.97
KW 6770	91	265.85	97	0.75	2111	106	0.01	96.85	85	0.01	2.59	94	0.69	61.26	103	0.62
MARIBO 923	76	367.91	134	0.00	2072	104	0.10	114.55	100	0.98	2.23	81	0.19	62.90	106	0.34
MARIBO 9363	84	297.30	108	0.41	2136	107	0.00	114.27	100	0.99	2.55	92	0.60	63.86	107	0.22
MARIBO 9584 NC	68	275.68	100	0.97	1928	96	0.12	112.37	98	0.75	3.59	130	0.04	52.80	89	0.07
SEEDEX SX 1009	70	254.52	93	0.46	2083	104	0.06	121.47	106	0.25	2.29	83	0.25	51.46	87	0.03
SEEDEX SX LASER	78	291.99	106	0.53	1981	99	0.70	109.82	96	0.47	3.10	112	0.40	57.99	98	0.68
VAN DER HAVE H66140	90	335.73	122	0.03	2091	105	0.04	114.32	100	0.99	3.28	119	0.19	59.66	100	0.96

GENERAL MEAN	274.6	1998	114.4	2.76	59.46
COEFF. OF VAR (%)	22.58	5.21	12.34	36.49	11.8
F VALUE	1.88	4.43	2.6	0.91	2.77
L.S.D. (.05)	10	0.05	128.1	33	0.58
L.S.D. (.01)	13	0.01	169.4	44	0.77

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

12C. CLARA CITY COMMERCIAL

1997 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

ENTRY	CODE	BOLTERS % MEAN	%	P-VAL	VIGOR MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	0.55			1.66	95	0.67
BETA 2074 (APH SPEC)	83	0.00			1.35	78	0.06
BETA 5014 (APH SPEC)	74	0.00			1.7	98	0.84
BETA 6035 NC (APH SPEC)	77	0.00			2.14	123	0.05
BETA 6863 (APH SPEC)	71	0.00			1.47	84	0.17
BETA 6904 (APH SPEC)	87	0.00			1.44	82	0.13
CRYSTAL 205 (APH SPEC)	81	0.00			2.02	116	0.17
CRYSTAL 302 (APH SPEC)	89	0.00			0.98	56	0.00
CRYSTAL 309 (APH SPEC)	69	0.00			1.13	65	0.00
CRYSTAL 9603 NC (APH SPEC)	86	0.00			2.26	129	0.01
HM HECTOR	72	0.00			1.96	112	0.30
HM NIAGARA	85	0.00			2.27	130	0.01
HM RESIST (APH SPEC)	82	0.00			2.17	124	0.04
HM RH3 (RHIZ SPEC)	67	0.00			2.38	136	0.00
HM TAHOE (7049)	73	0.00			2.34	134	0.00
HM VICTORY (7048)	79	0.00			1.89	108	0.48
HM VIKING (7518)	88	0.00			2.02	116	0.18
KW 2398 (APH SPEC)	80	0.00			1.84	106	0.63
KW 6770	91	0.00			1.92	110	0.38
MARIBO 923	76	0.00			1.44	83	0.14
MARIBO 9363	84	0.00			1.52	87	0.27
MARIBO 9584 NC	68	0.00			1.76	101	0.92
SEEDEX SX 1009	70	0.00			1.28	74	0.03
SEEDEX SX LASER	78	0.00			1.32	76	0.04
VAN DER HAVE H66140	90	0.00			1.34	77	0.05

GENERAL MEAN				1.74	
COEFF. OF VAR (%)				24.3	
F VALUE				3.95	
L.S.D. (.05)				0.05	
L.S.D. (.01)				0.01	

* Significant at 5% ** Significant at 1%
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

TABLE 13A. DANUBE COMMERCIAL

1997 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		REC/T LBS			REC/A LBS			LTM			SUGAR %			YIELD T/A		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	276.59	104	0.00	4271	95	0.04	0.89	100	0.95	14.72	104	0.00	15.42	91	0.00
BETA 2074 (APH SPEC)	83	270.77	102	0.10	4410	98	0.39	0.83	94	0.00	14.37	101	0.20	16.32	96	0.10
BETA 5014 (APH SPEC)	74	267.32	101	0.64	4057	90	0.00	0.88	99	0.73	14.25	100	0.67	15.13	89	0.00
BETA 6035 NC (APH SPEC)	77	265.64	100	0.90	4355	97	0.18	0.86	96	0.11	14.14	100	0.72	16.39	97	0.14
BETA 6863 (APH SPEC)	71	271.60	102	0.05	4693	104	0.10	0.86	97	0.13	14.44	102	0.07	17.26	102	0.40
BETA 6904 (APH SPEC)	87	275.75	104	0.00	4489	100	0.88	0.87	98	0.45	14.66	103	0.00	16.25	96	0.06
CRYSTAL 205 (APH SPEC)	81	253.39	95	0.00	4343	96	0.15	0.88	99	0.68	13.55	96	0.00	17.20	102	0.50
CRYSTAL 302 (APH SPEC)	89	265.27	100	0.80	4481	99	0.82	0.90	102	0.38	14.17	100	0.89	16.86	99	0.81
CRYSTAL 309 (APH SPEC)	69	255.82	96	0.00	4416	98	0.43	1.00	112	0.00	13.79	97	0.00	17.24	102	0.44
CRYSTAL 9603 NC (APH SPEC)	86	263.79	99	0.44	4530	101	0.83	0.93	105	0.04	14.12	100	0.63	17.19	101	0.52
HM HECTOR	72	266.18	100	0.95	4649	103	0.21	0.88	100	0.84	14.19	100	0.97	17.45	103	0.18
HM NIAGARA	85	263.16	99	0.32	4492	100	0.90	0.92	104	0.11	14.08	99	0.43	17.09	101	0.71
HM RESIST (APH SPEC)	82	267.17	100	0.68	4586	102	0.48	0.87	98	0.35	14.23	100	0.77	17.16	101	0.57
HM RH3 (RHIZ SPEC)	67	261.13	98	0.09	4109	91	0.00	0.88	99	0.74	13.94	98	0.08	15.70	93	0.00
HM TAHOE (7049)	73	268.64	101	0.35	4660	103	0.17	0.86	97	0.11	14.29	101	0.47	17.37	103	0.26
HM VICTORY (7048)	79	258.96	97	0.02	4645	103	0.22	0.93	105	0.03	13.88	98	0.03	17.94	106	0.01
HM VIKING (7518)	88	273.84	103	0.01	4521	100	0.90	0.90	101	0.63	14.59	103	0.00	16.52	97	0.25
KW 2398 (APH SPEC)	80	267.75	101	0.54	4374	97	0.24	0.88	99	0.81	14.27	101	0.55	16.33	96	0.10
KW 6770	91	259.23	97	0.02	4462	99	0.69	0.86	97	0.18	13.83	97	0.01	17.23	102	0.45
MARIBO 923	76	260.81	98	0.07	4660	103	0.18	0.94	106	0.01	13.98	99	0.14	17.88	106	0.01
MARIBO 9363	84	274.90	103	0.00	4679	104	0.13	0.82	93	0.00	14.57	103	0.01	17.02	100	0.84
MARIBO 9584 NC	68	270.77	102	0.10	4386	97	0.29	0.88	100	0.85	14.42	102	0.09	16.21	96	0.05
SEEDEX SX 1009	70	271.52	102	0.05	5275	117	0.00	0.88	99	0.56	14.45	102	0.06	19.39	114	0.00
SEEDEX SX LASER	78	259.97	98	0.04	4348	96	0.16	0.87	98	0.47	13.87	98	0.02	16.79	99	0.67
VAN DER HAVE H66140	90	259.67	98	0.03	4769	106	0.02	0.92	103	0.14	13.90	98	0.04	18.35	108	0.00

GENERAL MEAN	265.99	4506	0.89	14.19	16.95
COEFF. OF VAR (%)	3.08	7.11	6.13	2.82	6.18
F VALUE	4.74	4.35	3.48	4.44	5.98
L.S.D. (.05)	0.05	8.14	3	1.07	0.05
L.S.D. (.01)	0.01	10.75	4	1.41	0.01

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is significant

TABLE 13B. DANUBE COMMERCIAL

1997 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		NA ppm			K ppm			Am. N ppm			Tare %			Emergence %		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	187.26	92	0.14	1526	98	0.34	214.84	107	0.11	4.70	101	0.90	66.45	106	0.07
BETA 2074 (APH SPEC)	83	196.36	96	0.49	1450	93	0.00	188.11	94	0.19	4.22	91	0.30	70.07	112	0.00
BETA 5014 (APH SPEC)	74	209.83	103	0.62	1607	103	0.13	178.96	89	0.02	4.57	98	0.84	66.24	106	0.09
BETA 6035 NC (APH SPEC)	77	187.03	92	0.13	1548	99	0.78	184.77	92	0.09	4.25	91	0.34	38.31	61	0.00
BETA 6863 (APH SPEC)	71	179.79	88	0.03	1445	93	0.00	215.57	108	0.09	3.97	85	0.11	67.81	108	0.01
BETA 6904 (APH SPEC)	87	215.53	106	0.32	1500	96	0.08	199.96	100	0.99	5.35	115	0.10	68.49	109	0.01
CRYSTAL 205 (APH SPEC)	81	187.89	92	0.15	1486	95	0.03	218.99	109	0.04	5.28	114	0.13	68.46	109	0.01
CRYSTAL 302 (APH SPEC)	89	204.81	100	0.96	1592	102	0.30	203.85	102	0.68	4.99	107	0.42	66.80	107	0.05
CRYSTAL 309 (APH SPEC)	69	198.71	97	0.63	1742	112	0.00	237.47	119	0.00	4.80	103	0.73	61.93	99	0.74
CRYSTAL 9603 NC (APH SPEC)	86	224.68	110	0.07	1550	100	0.81	226.53	113	0.00	5.26	113	0.15	66.17	106	0.09
HM HECTOR	72	189.80	93	0.21	1494	96	0.06	218.84	109	0.04	5.42	117	0.07	60.96	97	0.43
HM NIAGARA	85	230.41	113	0.02	1668	107	0.00	185.05	92	0.10	4.17	90	0.25	59.52	95	0.14
HM RESIST (APH SPEC)	82	209.20	102	0.66	1512	97	0.17	195.93	98	0.65	4.50	97	0.72	64.21	103	0.45
HM R113 (RHIZ SPEC)	67	209.55	103	0.64	1541	99	0.61	197.10	99	0.74	5.31	114	0.11	62.54	100	0.97
HM TAHOE (7049)	73	195.84	96	0.46	1451	93	0.00	208.28	104	0.37	5.13	110	0.26	65.54	105	0.17
HM VICTORY (7048)	79	201.52	99	0.81	1595	102	0.26	223.39	112	0.01	4.77	103	0.77	51.21	82	0.00
HM VIKING (7518)	88	199.19	98	0.66	1640	105	0.01	188.64	94	0.21	4.20	90	0.29	66.52	106	0.07
KW 2398 (APH SPEC)	80	209.49	103	0.64	1546	99	0.74	197.01	98	0.74	3.53	76	0.01	62.28	99	0.87
KW 6770	91	210.14	103	0.60	1618	104	0.07	162.31	81	0.00	4.37	94	0.51	64.40	103	0.40
MARIBO 923	76	230.84	113	0.02	1649	106	0.01	204.10	102	0.66	4.41	95	0.57	64.09	102	0.49
MARIBO 9363	84	185.60	91	0.10	1499	96	0.08	172.18	86	0.00	4.56	98	0.83	66.77	107	0.05
MARIBO 9584 NC	68	199.97	98	0.71	1580	101	0.49	193.54	97	0.47	4.96	107	0.46	56.02	89	0.00
SEEDEX SX 1009	70	205.14	100	0.93	1539	99	0.58	194.97	97	0.57	4.05	87	0.16	58.26	93	0.04
SEEDEX SX LASER	78	204.01	100	0.99	1553	100	0.90	191.58	96	0.35	5.21	112	0.18	60.46	97	0.31
VAN DER HAVE H66140	90	232.37	114	0.01	1602	103	0.18	199.95	100	0.99	4.27	92	0.36	62.06	99	0.79

GENERAL MEAN	204.2	1557	200.1	4.65	62.62
COEFF. OF VAR (%)	15.23	5.79	12.88	25.97	9.66
F VALUE	1.63	4.91	3.68	1.43	9.48
L.S.D. (.05)	6	0.05	93.71	26	0.45
L.S.D. (.01)	8	0.01	123.7	34	0.59

* Significant at 5%
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

TABLE 13C. DANUBE COMMERCIAL

1997 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		BOLTERS %			VIGOR		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	0.20			1.24	72	0.00
BETA 2074 (APH SPEC)	83	0.00			1.11	65	0.00
BETA 5014 (APH SPEC)	74	0.00			1.99	116	0.09
BETA 6035 NC (APH SPEC)	77	0.00			2.52	146	0.00
BETA 6863 (APH SPEC)	71	0.00			1.01	58	0.00
BETA 6904 (APH SPEC)	87	0.00			1.39	81	0.03
CRYSTAL 205 (APH SPEC)	81	0.00			1.76	102	0.80
CRYSTAL 302 (APH SPEC)	89	0.00			1.00	58	0.00
CRYSTAL 309 (APH SPEC)	69	0.00			1.13	65	0.00
CRYSTAL 9603 NC (APH SPEC)	86	0.00			2.23	130	0.00
HM HECTOR	72	0.00			2.50	145	0.00
HM NIAGARA	85	0.00			2.22	129	0.00
HM RESIST (APH SPEC)	82	0.00			2.36	137	0.00
HM RH3 (RHIZ SPEC)	67	0.00			2.01	117	0.07
HM TAHOE (7049)	73	0.00			2.26	131	0.00
HM VICTORY (7048)	79	0.00			1.51	88	0.17
HM VIKING (7518)	88	0.00			1.89	110	0.28
KW 2398 (APH SPEC)	80	0.00			2.13	124	0.01
KW 6770	91	0.00			2.63	153	0.00
MARIBO 923	76	0.00			1.24	72	0.00
MARIBO 9363	84	0.00			1.85	108	0.41
MARIBO 9584 NC	68	0.00			1.64	95	0.61
SEEDEX SX 1009	70	0.00			1.00	58	0.00
SEEDEX SX LASER	78	0.00			1.27	74	0.00
VAN DER HAVE H66140	90	0.00			1.13	65	0.00

GENERAL MEAN		1.72
COEFF. OF VAR (%)		25.5
F VALUE		11.54
L.S.D. (.05)		0.05
L.S.D. (.01)		0.01

* Significant at 5%
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

TABLE 14A. DEGRAFF COMMERCIAL

1997 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		REC/T LBS			REC/A LBS			LTM			SUGAR %			YIELD T/A		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	293.47	101	0.33	5416.26	102	0.49	0.96	102	0.33	15.63	101	0.25	18.49	101	0.73
BETA 2074 (APH SPEC)	83	290.45	100	0.81	5366.99	101	0.69	0.91	98	0.38	15.44	100	0.89	18.46	101	0.77
BETA 5014 (APH SPEC)	74	297.32	103	0.06	4940.20	93	0.04	0.88	94	0.03	15.76	102	0.07	16.62	91	0.00
BETA 6035 NC (APH SPEC)	77	292.20	101	0.51	5463.75	103	0.34	0.90	97	0.18	15.51	101	0.62	18.63	102	0.54
BETA 6863 (APH SPEC)	71	302.61	105	0.00	5370.16	101	0.67	0.87	93	0.01	16.00	104	0.00	17.80	97	0.36
BETA 6904 (APH SPEC)	87	295.89	102	0.12	5471.62	103	0.31	0.92	99	0.65	15.71	102	0.12	18.49	101	0.72
CRYSTAL 205 (APH SPEC)	81	277.51	96	0.00	5123.98	97	0.31	0.94	100	0.92	14.81	96	0.00	18.41	101	0.85
CRYSTAL 302 (APH SPEC)	89	283.98	98	0.18	4872.02	92	0.01	0.96	102	0.35	15.16	98	0.20	17.10	93	0.03
CRYSTAL 309 (APH SPEC)	69	280.37	97	0.03	4852.86	92	0.01	0.95	102	0.39	14.98	97	0.03	17.35	95	0.08
CRYSTAL 9603 NC (APH SPEC)	86	290.16	100	0.87	5066.99	96	0.18	1.06	113	0.00	15.56	101	0.42	17.45	95	0.12
HM HECTOR	72	288.33	100	0.78	5552.19	105	0.14	0.92	98	0.49	15.33	100	0.70	19.28	105	0.07
HM NIAGARA	85	294.43	102	0.23	5225.48	99	0.67	0.95	102	0.46	15.67	102	0.18	17.75	97	0.31
HM RESIST (APH SPEC)	82	283.84	98	0.17	5159.37	97	0.42	0.87	93	0.00	15.05	98	0.07	18.18	99	0.83
HM RH3 (RHIZ SPEC)	67	288.43	100	0.80	4935.72	93	0.04	0.91	97	0.32	15.33	99	0.68	17.17	94	0.04
HM TAHOE (7049)	73	288.00	99	0.72	4982.33	94	0.07	0.90	97	0.17	15.31	99	0.60	17.31	95	0.07
HM VICTORY (7048)	79	290.16	100	0.87	5791.90	109	0.00	0.90	97	0.20	15.42	100	0.97	19.89	109	0.00
HM VIKING (7518)	88	286.00	99	0.40	5026.54	95	0.12	0.98	104	0.09	15.28	99	0.50	17.57	96	0.18
KW 2398 (APH SPEC)	80	291.29	101	0.66	5045.10	95	0.14	0.94	101	0.71	15.50	101	0.62	17.33	95	0.07
KW 6770	91	282.57	98	0.09	5414.39	102	0.50	0.97	104	0.11	15.10	98	0.11	19.10	104	0.14
MARIBO 923	76	280.94	97	0.04	5592.05	106	0.09	0.97	104	0.17	15.02	97	0.04	19.89	109	0.00
MARIBO 9363	84	292.95	101	0.40	5348.61	101	0.77	0.96	103	0.23	15.62	101	0.29	18.21	100	0.87
MARIBO 9584 NC	68	291.06	101	0.70	5119.73	97	0.30	0.92	98	0.43	15.47	100	0.75	17.63	96	0.22
SEEDEX SX 1009	70	292.91	101	0.40	6334.62	120	0.00	0.97	104	0.12	15.62	101	0.28	21.73	119	0.00
SEEDEX SX LASER	78	295.06	102	0.18	5319.55	100	0.90	0.89	96	0.08	15.65	102	0.22	18.00	98	0.58
VAN DER HAVE H66140	90	287.11	99	0.56	5653.93	107	0.04	0.95	102	0.43	15.31	99	0.60	19.70	108	0.01

GENERAL MEAN	289.48		5297.85		0.93		15.41		18.30	
COEFF. OF VAR (%)	3.95		9.2		7.36		3.49		8.45	
F VALUE	2.03		3.74		3.02		2.14		4.32	
L.S.D. (.05)	0.05		11.7		4		1.54		0.05	
L.S.D. (.01)	0.01		15.44		5		2.03		0.01	

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

TABLE 14B. DEGRAFF COMMERCIAL

1997 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		NA ppm			K ppm			Am. N ppm			Tare %			Emergence %		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	328.87	93	0.39	1572.27	96	0.04	205.61	129	0.00	2.96	115	0.16	76.22	107	0.00
BETA 2074 (APH SPEC)	83	335.92	95	0.55	1599.31	97	0.21	159.19	100	0.98	2.38	93	0.49	72.46	102	0.35
BETA 5014 (APH SPEC)	74	286.83	81	0.02	1646.53	100	0.94	150.82	95	0.31	2.55	99	0.94	72.68	102	0.29
BETA 6035 NC (APH SPEC)	77	335.18	95	0.53	1548.34	94	0.01	162.32	102	0.68	2.06	80	0.06	44.56	63	0.00
BETA 6863 (APH SPEC)	71	319.28	91	0.23	1438.00	87	0.00	167.64	105	0.28	2.34	91	0.39	74.07	104	0.06
BETA 6904 (APH SPEC)	87	395.50	112	0.11	1570.96	96	0.04	151.65	95	0.37	2.98	116	0.14	70.94	100	0.99
CRYSTAL 205 (APH SPEC)	81	292.57	83	0.03	1686.41	103	0.23	170.78	107	0.14	2.47	96	0.69	77.53	109	0.00
CRYSTAL 302 (APH SPEC)	89	359.40	102	0.79	1742.90	106	0.01	156.71	99	0.78	2.74	107	0.54	73.44	104	0.13
CRYSTAL 309 (APH SPEC)	69	344.02	98	0.76	1698.55	103	0.12	166.51	105	0.35	3.08	120	0.07	76.52	108	0.00
CRYSTAL 9603 NC (APH SPEC)	86	371.10	105	0.49	1794.61	109	0.00	206.59	130	0.00	2.34	91	0.39	74.68	105	0.02
HM HECTOR	72	321.08	91	0.25	1613.30	98	0.38	163.74	103	0.55	2.14	83	0.12	72.82	103	0.25
HM NIAGARA	85	369.74	105	0.52	1708.63	104	0.07	147.35	93	0.15	3.21	125	0.02	68.36	96	0.12
HM RESIST (APH SPEC)	82	321.62	91	0.26	1529.03	93	0.00	142.09	89	0.04	2.52	98	0.85	69.56	98	0.41
HM RH3 (RHIZ SPEC)	67	305.76	87	0.09	1669.86	102	0.46	142.62	90	0.04	2.39	93	0.50	70.87	100	0.98
HM TAHOE (7049)	73	344.61	98	0.78	1539.83	94	0.00	165.93	104	0.39	2.65	103	0.79	74.09	104	0.05
HM VICTORY (7048)	79	291.54	83	0.03	1668.16	101	0.49	159.43	100	0.95	1.91	74	0.02	61.89	87	0.00
HM VIKING (7518)	88	378.80	108	0.33	1762.25	107	0.00	151.13	95	0.33	2.74	106	0.55	74.65	105	0.02
KW 2398 (APH SPEC)	80	414.09	118	0.02	1606.06	98	0.28	152.95	96	0.46	2.72	106	0.61	73.50	104	0.12
KW 6770	91	396.64	113	0.10	1752.53	107	0.00	143.62	90	0.06	2.35	91	0.41	73.10	103	0.19
MARIBO 923	76	450.09	128	0.00	1671.62	102	0.43	141.45	89	0.03	2.83	110	0.34	77.35	109	0.00
MARIBO 9363	84	387.37	110	0.20	1715.51	104	0.04	155.43	98	0.66	2.32	90	0.35	72.69	103	0.28
MARIBO 9584 NC	68	350.00	99	0.93	1603.97	98	0.26	151.40	95	0.35	2.58	100	0.97	61.95	87	0.00
SEEDEX SX 1009	70	375.44	107	0.39	1669.29	102	0.47	167.43	105	0.29	2.60	101	0.94	66.24	93	0.00
SEEDEX SX LASER	78	324.33	92	0.31	1638.34	100	0.87	139.38	88	0.02	3.11	121	0.05	73.64	104	0.10
VAN DER HAVE H66140	90	406.54	115	0.05	1653.19	101	0.79	151.91	96	0.38	2.38	93	0.48	69.12	97	0.28

GENERAL MEAN	352.25	1643.98	158.95	2.57	70.92
COEFF. OF VAR (%)	21.57	5.86	13.92	30.5	6.61
F VALUE	2.27	5.46	4.43	1.41	16.59
L.S.D. (.05)	8	0.05	100.1	25	0.45
L.S.D. (.01)	11	0.01	132.2	32	0.59

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

TABLE 14C. DEGRAFF COMMERCIAL

1997 SOUTHERN MINNESOTA COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

ENTRY	CODE	BOLTERS % MEAN	%	P-VAL	VIGOR MEAN	%	P-VAL
BETA 1994 (APH SPEC)	75	0.00			1.61	88	0.17
BETA 2074 (APH SPEC)	83	0.21			1.50	82	0.04
BETA 5014 (APH SPEC)	74	0.00			1.75	95	0.59
BETA 6035 NC (APH SPEC)	77	0.00			2.52	138	0.00
BETA 6863 (APH SPEC)	71	0.00			1.36	74	0.00
BETA 6904 (APH SPEC)	87	0.00			1.79	98	0.79
CRYSTAL 205 (APH SPEC)	81	0.00			1.74	95	0.57
CRYSTAL 302 (APH SPEC)	89	0.00			1.00	55	0.00
CRYSTAL 309 (APH SPEC)	69	0.00			1.11	60	0.00
CRYSTAL 9603 NC (APH SPEC)	86	0.00			2.25	123	0.01
HM HECTOR	72	0.00			2.53	138	0.00
HM NIAGARA	85	0.00			2.37	129	0.00
HM RESIST (APH SPEC)	82	0.00			2.91	159	0.00
HM RH3 (RHIZ SPEC)	67	0.00			2.64	144	0.00
HM TAHOE (7049)	73	0.00			2.00	109	0.28
HM VICTORY (7048)	79	0.00			1.86	102	0.85
HM VIKING (7518)	88	0.00			2.25	123	0.01
KW 2398 (APH SPEC)	80	0.00			1.98	108	0.36
KW 6770	91	0.00			2.75	151	0.00
MARIBO 923	76	0.00			1.00	55	0.00
MARIBO 9363	84	0.00			1.50	82	0.04
MARIBO 9584 NC	68	0.00			2.11	115	0.08
SEEDEX SX 1009	70	0.00			0.97	53	0.00
SEEDEX SX LASER	78	0.00			1.24	68	0.00
VAN DER HAVE H66140	90	0.00			0.99	54	0.00

GENERAL MEAN				1.83	
COEFF. OF VAR (%)				24.2	
F VALUE				13.66	
L.S.D. (.05)				0.05	
L.S.D. (.01)				0.01	

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

TABLE 15A. COMBINED SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA COMBINED SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		REC/T LBS			REC/A LBS			LTM			SUGAR %			YIELD T/A		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	262.24	99	0.33	4259	90	0.00	0.96	101	0.61	14.07	99	0.35	16.23	91	0.00
BETA 3456 (APHAN SPEC)	251	263.31	99	0.57	4550	96	0.15	0.93	98	0.38	14.10	99	0.47	17.28	97	0.17
BETA 3945 (APHAN SPEC)	236	283.40	107	0.00	4657	99	0.61	0.92	97	0.11	15.09	106	0.00	16.48	93	0.00
BETA 5296 (APHAN SPEC)	206	270.71	102	0.02	4547	96	0.14	0.98	103	0.13	14.52	102	0.01	16.77	94	0.01
BETA 6904 (CHECK #1)	231	271.66	103	0.01	4577	97	0.23	0.95	100	0.87	14.53	102	0.01	16.81	94	0.01
BETA M701 (APHAN SPEC)	230	276.53	104	0.00	4652	99	0.58	0.89	93	0.00	14.71	104	0.00	16.78	94	0.01
BETA M702 (APHAN SPEC)	200	266.02	100	0.63	4199	89	0.00	0.94	98	0.42	14.24	100	0.70	15.76	88	0.00
BETA M703 BLEND (APHAN SPE	220	271.72	103	0.01	4770	101	0.63	0.91	95	0.01	14.49	102	0.02	17.55	99	0.50
BETA M704 (APHAN SPEC)	243	268.04	101	0.21	4469	95	0.03	0.92	97	0.11	14.32	101	0.28	16.67	94	0.00
BETA M705 (RHIZOMANIA)	210	261.08	99	0.16	4761	101	0.69	0.97	102	0.21	14.03	99	0.19	18.26	103	0.25
BETA M706 (RHIZOMANIA)	225	261.43	99	0.20	4608	98	0.35	0.98	103	0.09	14.05	99	0.27	17.65	99	0.68
BETA M707 (RHIZOMANIA)	237	248.83	94	0.00	4265	90	0.00	0.99	104	0.05	13.43	95	0.00	17.11	96	0.07
CROPLAN EX103	213	269.47	102	0.07	5044	107	0.00	0.92	97	0.09	14.40	101	0.10	18.70	105	0.02
CRYSTAL 9601 (APHAN SPEC)	235	263.13	99	0.53	4590	97	0.28	0.99	104	0.04	14.15	100	0.73	17.42	98	0.32
CRYSTAL 9700 (APHAN SPEC)	246	258.78	98	0.02	4512	96	0.08	0.94	99	0.56	13.88	98	0.01	17.47	98	0.38
CRYSTAL 9708	201	272.66	103	0.00	4761	101	0.69	0.91	96	0.02	14.54	102	0.01	17.41	98	0.31
CRYSTAL 9711	198	266.65	101	0.47	5011	106	0.01	0.94	99	0.54	14.27	101	0.50	18.78	105	0.02
CRYSTAL 9712	217	266.60	101	0.48	4964	105	0.03	0.99	105	0.02	14.32	101	0.28	18.64	105	0.04
CRYSTAL 9720 (APHAN SPEC)	247	254.85	96	0.00	4677	99	0.74	0.94	99	0.54	13.68	96	0.00	18.37	103	0.16
CRYSTAL 9727	239	264.39	100	0.88	4801	102	0.45	0.93	97	0.16	14.14	100	0.71	18.17	102	0.37
CRYSTAL 9740 (APHAN SPEC)	223	270.73	102	0.02	4500	95	0.06	0.99	104	0.02	14.53	102	0.01	16.61	93	0.00
CRYSTAL 9744 (APHAN SPEC)	205	265.44	100	0.80	4466	95	0.03	0.90	95	0.01	14.18	100	0.90	16.81	94	0.01
FILLER #1	228	267.04	101	0.38	4216	89	0.00	0.97	102	0.21	14.33	101	0.27	15.76	88	0.00
FILLER #2	233	266.24	101	0.57	4248	90	0.00	0.94	99	0.70	14.26	100	0.59	15.98	90	0.00
FILLER #3	214	263.41	99	0.60	3896	83	0.00	0.96	101	0.50	14.14	100	0.66	14.81	83	0.00
HILLESHOG HECTOR (CHECK #3	219	265.11	100	0.90	4559	97	0.18	0.91	95	0.02	14.16	100	0.83	17.17	96	0.10
HM 7054	207	266.72	101	0.45	5028	107	0.01	0.91	96	0.03	14.25	100	0.65	18.86	106	0.01
HM 7057	245	268.49	101	0.15	4662	99	0.64	0.90	94	0.00	14.32	101	0.30	17.33	97	0.22
HM 7065	203	269.52	102	0.07	4678	99	0.74	0.94	99	0.71	14.42	102	0.07	17.31	97	0.20
HM 7066	227	266.90	101	0.41	5080	108	0.00	0.88	93	0.00	14.23	100	0.74	19.03	107	0.00
HM 7071 (RHIZOMANIA SPEC)	238	258.51	98	0.02	4914	104	0.09	1.05	111	0.00	13.98	99	0.09	18.99	107	0.00
HM 7072 (RHIZOMANIA SPEC)	221	261.35	99	0.19	4489	95	0.05	0.99	104	0.03	14.06	99	0.29	17.18	96	0.11
HM 7073 (RHIZOMANIA SPEC)	212	261.36	99	0.19	4765	101	0.66	0.95	100	0.81	14.02	99	0.16	18.23	102	0.29
HM 7076 (RHIZOMANIA SPEC)	218	259.03	98	0.03	5199	110	0.00	1.06	112	0.00	14.01	99	0.16	20.08	113	0.00
HOLLY 97HX708	209	263.97	100	0.76	5274	112	0.00	0.99	104	0.06	14.18	100	0.95	19.94	112	0.00
HOLLY 97HX712	202	269.43	102	0.07	4478	95	0.04	0.97	102	0.39	14.44	102	0.05	16.61	93	0.00
HOLLY 97HX713	232	271.20	102	0.01	4426	94	0.01	0.96	101	0.51	14.52	102	0.01	16.31	92	0.00
HOLLY 97HX714	242	256.95	97	0.00	5103	108	0.00	0.98	103	0.12	13.83	97	0.00	19.85	111	0.00
HOLLY 97HX721	248	248.60	94	0.00	4456	95	0.03	1.04	109	0.00	13.47	95	0.00	17.97	101	0.69
HOLLY 97HX722	197	260.06	98	0.07	4967	105	0.03	0.96	101	0.63	13.96	98	0.07	19.08	107	0.00
MARIBO 9767	250	271.22	102	0.01	4983	106	0.02	0.94	99	0.52	14.50	102	0.01	18.37	103	0.16
MARIBO 9363 (CHECK #4)	208	269.15	102	0.09	4852	103	0.24	0.99	104	0.03	14.45	102	0.04	18.02	101	0.60
MARIBO 9757	215	266.84	101	0.43	4684	99	0.79	0.95	99	0.76	14.29	101	0.43	17.54	98	0.49
MARIBO 9759	204	272.67	103	0.00	4509	96	0.08	0.98	103	0.18	14.61	103	0.00	16.51	93	0.00
MARIBO 9766	234	256.04	97	0.00	4656	99	0.61	0.96	101	0.74	13.76	97	0.00	18.14	102	0.40
SEEDEX 1015	199	269.27	102	0.09	5164	110	0.00	0.91	96	0.02	14.37	101	0.14	19.18	108	0.00
SEEDEX SX1011	240	263.74	100	0.69	4603	98	0.33	1.00	105	0.02	14.18	100	0.95	17.44	98	0.34
SEEDEX SX1012	244	266.33	101	0.55	4461	95	0.03	0.90	94	0.00	14.21	100	0.85	16.73	94	0.01
SEEDEX SX1013	224	251.70	95	0.00	5146	109	0.00	0.95	100	0.85	13.53	95	0.00	20.45	115	0.00
SEEDEX SX1014	211	259.09	98	0.03	5053	107	0.00	0.93	98	0.32	13.89	98	0.02	19.51	110	0.00
VAN DER HAVE H46109	222	270.27	102	0.04	4694	100	0.85	0.87	92	0.00	14.38	101	0.12	17.35	97	0.23
VAN DER HAVE H66287	229	263.74	100	0.69	5047	107	0.00	0.93	98	0.37	14.12	100	0.58	19.08	107	0.00
VAN DER HAVE H66339	252	266.82	101	0.43	5043	107	0.01	0.95	99	0.76	14.29	101	0.43	18.89	106	0.01
VAN DER HAVE H66340	241	262.19	99	0.32	5346	113	0.00	0.92	96	0.05	14.03	99	0.18	20.37	114	0.00
VAN DER HAVE H66341	226	260.10	98	0.07	5049	107	0.00	0.97	102	0.36	13.97	98	0.08	19.43	109	0.00
VAN DER HAVE H68108	216	256.50	97	0.00	4679	99	0.76	0.97	102	0.23	13.80	97	0.00	18.29	103	0.22

GENERAL MEAN	264.77		4715		0.95		14.19		17.81	
COEFF. OF VAR (%)	3.88		8.93		7.55		3.41		7.86	
F VALUE	6.23		7.32		4.75		6.21		10.75	
L.S.D. (.05)	0.05		7.33		3		1.1		0.05	
L.S.D. (.01)	0.01		9.69		4		1.46		0.01	

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

TABLE 15B. COMBINED SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA COMBINED SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		NA ppm			K ppm			Am. N ppm			Tare %		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	295.99	94	0.34	1728	103	0.14	177.70	100	0.97	4.90	115	0.02
BETA 3456 (APHAN SPEC)	251	314.27	100	0.95	1580	94	0.01	190.08	107	0.15	4.84	113	0.04
BETA 3945 (APHAN SPEC)	236	270.66	86	0.03	1686	101	0.74	169.72	96	0.39	4.16	97	0.68
BETA 5296 (APHAN SPEC)	206	298.36	95	0.40	1695	101	0.57	199.46	112	0.01	4.05	95	0.40
BETA 6904 (CHECK #1)	231	315.84	100	0.99	1647	98	0.45	181.41	102	0.65	4.35	102	0.79
BETA M701 (APHAN SPEC)	230	233.76	74	0.00	1599	95	0.03	178.38	101	0.91	4.19	98	0.75
BETA M702 (APHAN SPEC)	200	290.45	92	0.22	1642	98	0.36	183.40	103	0.49	4.66	109	0.16
BETA M703 BLEND (APHAN SPE	220	291.27	92	0.24	1599	95	0.04	171.50	97	0.51	4.22	99	0.84
BETA M704 (APHAN SPEC)	243	278.30	88	0.07	1673	100	0.97	168.90	95	0.34	4.24	99	0.90
BETA M705 (RHIZOMANIA)	210	309.62	98	0.77	1752	105	0.03	176.04	99	0.88	3.36	79	0.00
BETA M706 (RHIZOMANIA)	225	337.47	107	0.29	1695	101	0.57	188.40	106	0.21	4.12	96	0.58
BETA M707 (RHIZOMANIA)	237	298.32	95	0.40	1694	101	0.57	206.85	117	0.00	5.22	122	0.00
CROPLAN EX103	213	309.50	98	0.77	1649	98	0.48	161.83	91	0.08	3.88	91	0.15
CRYSTAL 9601 (APHAN SPEC)	235	341.18	108	0.21	1661	99	0.71	201.28	113	0.01	4.14	97	0.61
CRYSTAL 9700 (APHAN SPEC)	246	257.26	82	0.01	1701	102	0.45	184.07	104	0.45	3.92	92	0.19
CRYSTAL 9708	201	270.17	86	0.03	1610	96	0.07	177.46	100	0.99	4.07	95	0.45
CRYSTAL 9711	198	345.25	109	0.15	1603	96	0.05	176.31	99	0.91	4.15	97	0.66
CRYSTAL 9712	217	320.99	102	0.79	1759	105	0.02	185.84	105	0.34	4.36	102	0.76
CRYSTAL 9720 (APHAN SPEC)	247	286.27	91	0.16	1665	99	0.79	182.63	103	0.55	4.53	106	0.35
CRYSTAL 9727	239	350.05	111	0.10	1638	98	0.31	154.27	87	0.01	4.66	109	0.16
CRYSTAL 9740 (APHAN SPEC)	223	294.67	93	0.31	1643	98	0.38	225.61	127	0.00	5.26	123	0.00
CRYSTAL 9744 (APHAN SPEC)	205	254.75	81	0.00	1660	99	0.69	166.16	94	0.21	4.93	115	0.02
FILLER #1	228	264.42	84	0.01	1666	99	0.80	215.95	122	0.00	5.04	118	0.01
FILLER #2	233	327.98	104	0.55	1658	99	0.64	172.85	97	0.61	4.95	116	0.01
FILLER #3	214	279.13	88	0.08	1809	108	0.00	165.51	93	0.18	4.98	116	0.01
HILLESHOG HECTOR (CHECK #3	219	292.14	93	0.26	1600	96	0.04	171.25	97	0.49	4.26	100	0.95
HM 7054	207	358.75	114	0.04	1521	91	0.00	170.64	96	0.45	4.48	105	0.46
HM 7057	245	269.61	85	0.03	1523	91	0.00	190.03	107	0.15	4.48	105	0.46
HM 7065	203	249.53	79	0.00	1730	103	0.12	180.16	102	0.75	3.87	91	0.14
HM 7066	227	283.46	90	0.12	1529	91	0.00	176.46	99	0.92	3.85	90	0.12
HM 7071 (RHIZOMANIA SPEC)	238	356.07	113	0.05	1893	113	0.00	182.90	103	0.53	4.02	94	0.35
HM 7072 (RHIZOMANIA SPEC)	221	335.50	106	0.33	1799	107	0.00	167.73	95	0.28	4.43	104	0.57
HM 7073 (RHIZOMANIA SPEC)	212	303.45	96	0.56	1694	101	0.58	173.87	98	0.70	4.50	105	0.41
HM 7076 (RHIZOMANIA SPEC)	218	394.81	125	0.00	1899	113	0.00	174.83	99	0.78	3.95	92	0.24
HOLLY 97HX708	209	335.38	106	0.34	1650	99	0.49	202.87	114	0.00	4.01	94	0.33
HOLLY 97HX712	202	323.42	102	0.70	1691	101	0.64	181.45	102	0.64	4.52	106	0.36
HOLLY 97HX713	232	298.21	95	0.40	1689	101	0.69	190.67	108	0.13	4.65	109	0.18
HOLLY 97HX714	242	365.95	116	0.02	1724	103	0.17	166.64	94	0.23	3.55	83	0.01
HOLLY 97HX721	248	412.13	131	0.00	1801	108	0.00	176.02	99	0.88	4.15	97	0.64
HOLLY 97HX722	197	359.83	114	0.03	1720	103	0.20	155.38	88	0.01	3.66	86	0.02
MARIBO 9767	250	357.89	113	0.04	1642	98	0.36	162.28	92	0.09	3.53	83	0.01
MARIBO 9363 (CHECK #4)	208	339.94	108	0.24	1802	108	0.00	165.74	93	0.19	4.01	94	0.33
MARIBO 9757	215	349.31	111	0.10	1632	97	0.23	171.56	97	0.51	4.61	108	0.22
MARIBO 9759	204	333.86	106	0.37	1756	105	0.02	168.92	95	0.34	4.18	98	0.73
MARIBO 9766	234	320.35	102	0.82	1635	98	0.27	191.74	108	0.11	4.19	98	0.74
SEEDEX 1015	199	280.09	89	0.09	1586	95	0.01	179.88	101	0.77	4.38	102	0.72
SEEDEX SX1011	240	379.51	120	0.00	1754	105	0.03	167.55	94	0.27	3.64	85	0.02
SEEDEX SX1012	244	281.30	89	0.10	1578	94	0.01	173.65	98	0.68	4.31	101	0.91
SEEDEX SX1013	224	358.60	114	0.04	1654	99	0.57	163.08	92	0.11	3.97	93	0.27
SEEDEX SX1014	211	341.56	108	0.21	1649	99	0.48	160.99	91	0.07	3.53	82	0.01
VAN DER HAVE H46109	222	249.25	79	0.00	1616	97	0.10	154.98	87	0.01	4.12	96	0.57
VAN DER HAVE H66287	229	356.78	113	0.05	1602	96	0.04	168.77	95	0.33	4.72	110	0.10
VAN DER HAVE H66339	252	352.17	112	0.08	1656	99	0.61	164.65	93	0.15	4.37	102	0.73
VAN DER HAVE H66340	241	319.99	101	0.83	1651	99	0.51	154.36	87	0.01	3.57	84	0.01
VAN DER HAVE H66341	226	335.17	106	0.34	1706	102	0.37	175.45	99	0.83	4.44	104	0.54
VAN DER HAVE H68108	216	341.76	108	0.20	1673	100	0.96	185.25	104	0.37	4.30	101	0.92

GENERAL MEAN	315.57	1674	177.35	4.28
COEFF. OF VAR (%)	22.64	8.82	19.12	29.36
F VALUE	3.79	5.01	2.64	2.59
L.S.D. (.05)	6	0.05	100.3	0.35
L.S.D. (.01)	8	0.01	132.7	0.47

* Significant at 5% ** Significant at 1% NS - Not significant

2nd column for each trait is percent of check. General Mean used as check.

3rd column for each trait is prob. that detection of a diff. of this size is due to chance.

Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

TABLE 15C. COMBINED SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA COMBINED SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		BOLTERS %			VIGOR		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	0.00			1.41	81	0.01
BETA 3456 (APHAN SPEC)	251	0.00			1.69	97	0.69
BETA 3945 (APHAN SPEC)	236	0.00			2.51	144	0.00
BETA 5296 (APHAN SPEC)	206	0.00			2.22	127	0.00
BETA 6904 (CHECK #1)	231	0.00			1.54	88	0.11
BETA M701 (APHAN SPEC)	230	0.00			2.59	149	0.00
BETA M702 (APHAN SPEC)	200	0.00			2.23	128	0.00
BETA M703 BLEND (APHAN SPE	220	0.00			2.36	136	0.00
BETA M704 (APHAN SPEC)	243	0.00			2.08	119	0.01
BETA M705 (RHIZOMANIA)	210	0.00			1.83	105	0.50
BETA M706 (RHIZOMANIA)	225	0.00			2.05	118	0.02
BETA M707 (RHIZOMANIA)	237	0.00			1.19	68	0.00
CROPLAN EX103	213	0.00			1.45	83	0.02
CRYSTAL 9601 (APHAN SPEC)	235	0.00			2.33	134	0.00
CRYSTAL 9700 (APHAN SPEC)	246	0.00			1.65	95	0.46
CRYSTAL 9708	201	0.07			2.15	123	0.00
CRYSTAL 9711	198	0.00			2.01	115	0.04
CRYSTAL 9712	217	0.00			1.71	98	0.77
CRYSTAL 9720 (APHAN SPEC)	247	0.00			2.01	115	0.04
CRYSTAL 9727	239	0.00			1.86	107	0.34
CRYSTAL 9740 (APHAN SPEC)	223	0.00			2.01	115	0.04
CRYSTAL 9744 (APHAN SPEC)	205	0.00			1.61	93	0.31
FILLER #1	228	0.00			1.84	105	0.46
FILLER #2	233	0.00			1.49	86	0.05
FILLER #3	214	0.00			1.43	82	0.01
HILLESHOG HECTOR (CHECK #3	219	0.00			2.52	144	0.00
HM 7054	207	0.00			1.47	85	0.03
HM 7057	245	0.00			2.17	124	0.00
HM 7065	203	0.00			2.11	121	0.00
HM 7066	227	0.00			1.94	111	0.12
HM 7071 (RHIZOMANIA SPEC)	238	0.00			1.61	92	0.28
HM 7072 (RHIZOMANIA SPEC)	221	0.00			2.53	145	0.00
HM 7073 (RHIZOMANIA SPEC)	212	0.00			2.10	120	0.01
HM 7076 (RHIZOMANIA SPEC)	218	0.00			1.56	89	0.15
HOLLY 97HX708	209	0.00			1.37	78	0.00
HOLLY 97HX712	202	0.00			1.36	78	0.00
HOLLY 97HX713	232	0.00			1.94	111	0.11
HOLLY 97HX714	242	0.00			1.16	66	0.00
HOLLY 97HX721	248	0.00			1.41	81	0.01
HOLLY 97HX722	197	0.00			1.16	67	0.00
MARIBO 9767	250	0.00			1.17	67	0.00
MARIBO 9363 (CHECK #4)	208	0.00			1.48	85	0.04
MARIBO 9757	215	0.00			1.69	97	0.64
MARIBO 9759	204	0.00			2.31	133	0.00
MARIBO 9766	234	0.00			1.34	77	0.00
SEEDEX 1015	199	0.00			1.40	80	0.01
SEEDEX SX1011	240	0.00			1.47	85	0.03
SEEDEX SX1012	244	0.00			1.43	82	0.02
SEEDEX SX1013	224	0.00			1.37	79	0.00
SEEDEX SX1014	211	0.00			1.40	81	0.01
VAN DER HAVE H46109	222	0.00			1.94	111	0.11
VAN DER HAVE H66287	229	0.00			1.47	84	0.03
VAN DER HAVE H66339	252	0.00			1.35	78	0.00
VAN DER HAVE H66340	241	0.00			1.20	69	0.00
VAN DER HAVE H66341	226	0.00			1.15	66	0.00
VAN DER HAVE H68108	216	0.00			1.79	103	0.69

GENERAL MEAN		1.74
COEFF. OF VAR (%)		27.12
F VALUE		10.55
L.S.D. (.05)		0.05
L.S.D. (.01)		0.01

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

TABLE 16A. CLARA CITY SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		REC/T LBS			REC/A LBS			LTM			SUGAR %			YIELD T/A		
CODE	ENTRY	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	260.32	98	0.36	3555	88	0.01	0.93	97	0.31	13.95	98	0.27	13.74	90	0.01
BETA 3456 (APHAN SPEC)	251	261.90	99	0.57	3904	97	0.50	0.96	99	0.82	14.05	99	0.52	14.88	98	0.56
BETA 3945 (APHAN SPEC)	236	282.54	107	0.00	3897	97	0.47	0.94	98	0.51	15.07	106	0.00	14.14	93	0.07
BETA 5296 (APHAN SPEC)	206	269.96	102	0.23	3711	92	0.07	0.99	103	0.39	14.49	102	0.16	13.74	90	0.01
BETA 6904 (CHECK #1)	231	269.08	102	0.31	4040	101	0.90	1.01	105	0.08	14.47	102	0.18	14.90	98	0.58
BETA M701 (APHAN SPEC)	230	267.37	101	0.52	3749	93	0.11	0.95	99	0.79	14.33	101	0.51	13.96	92	0.03
BETA M702 (APHAN SPEC)	200	269.23	102	0.29	3489	87	0.00	0.92	95	0.12	14.38	101	0.37	12.98	85	0.00
BETA M703 BLEND (APHAN SPE	220	266.80	101	0.61	3857	96	0.34	0.91	95	0.11	14.26	100	0.75	14.52	95	0.23
BETA M704 (APHAN SPEC)	243	264.97	100	0.91	3811	95	0.22	0.99	102	0.43	14.24	100	0.82	14.45	95	0.19
BETA M705 (RHIZOMANIA)	210	264.58	100	0.98	4132	103	0.50	0.93	97	0.34	14.17	100	0.93	15.54	102	0.59
BETA M706 (RHIZOMANIA)	225	263.25	100	0.79	4015	100	0.98	0.99	103	0.36	14.15	100	0.88	15.27	100	0.94
BETA M707 (RHIZOMANIA)	237	248.68	94	0.00	3777	94	0.16	1.00	104	0.20	13.43	95	0.00	15.33	101	0.86
CROPLAN EX103	213	267.76	101	0.47	4396	109	0.03	0.89	93	0.02	14.28	101	0.68	16.41	108	0.04
CRYSTAL 9601 (APHAN SPEC)	235	265.01	100	0.91	4047	101	0.87	0.97	101	0.70	14.22	100	0.87	15.42	101	0.74
CRYSTAL 9700 (APHAN SPEC)	246	263.40	100	0.81	3899	97	0.48	0.95	99	0.73	14.12	100	0.76	14.81	97	0.48
CRYSTAL 9708	201	271.54	103	0.12	4170	104	0.37	0.92	96	0.20	14.50	102	0.14	15.23	100	1.00
CRYSTAL 9711	198	269.69	102	0.25	4170	104	0.37	0.95	99	0.75	14.44	102	0.24	15.37	101	0.80
CRYSTAL 9712	217	264.31	100	0.97	4587	114	0.00	1.00	104	0.24	14.21	100	0.92	17.40	114	0.00
CRYSTAL 9720 (APHAN SPEC)	247	256.30	97	0.07	3970	99	0.77	0.96	100	0.98	13.78	97	0.06	15.57	102	0.55
CRYSTAL 9727	239	268.15	101	0.42	3892	97	0.46	0.93	96	0.22	14.33	101	0.49	14.48	95	0.20
CRYSTAL 9740 (APHAN SPEC)	223	267.78	101	0.47	4054	101	0.84	0.96	100	0.94	14.35	101	0.44	15.10	99	0.83
CRYSTAL 9744 (APHAN SPEC)	205	266.52	101	0.65	3672	91	0.04	0.90	93	0.03	14.23	100	0.84	13.79	91	0.01
FILLER #1	228	266.38	101	0.67	3662	91	0.04	0.98	102	0.46	14.31	101	0.58	13.73	90	0.01
FILLER #2	233	269.70	102	0.25	3518	88	0.00	0.96	100	0.99	14.44	102	0.23	13.28	87	0.00
FILLER #3	214	265.51	100	0.82	3272	81	0.00	0.95	99	0.77	14.22	100	0.86	12.48	82	0.00
HILLESHOG HECTOR (CHECK #3	219	263.06	99	0.76	3742	93	0.11	0.91	95	0.09	14.06	99	0.57	14.27	94	0.10
HM 7054	207	268.59	102	0.36	4417	110	0.02	0.92	95	0.15	14.35	101	0.44	16.55	109	0.02
HM 7057	245	265.51	100	0.82	3996	99	0.89	0.93	96	0.22	14.21	100	0.93	14.96	98	0.64
HM 7065	203	263.13	99	0.77	4068	101	0.77	0.93	97	0.28	14.09	99	0.65	15.35	101	0.83
HM 7066	227	266.63	101	0.63	4256	106	0.16	0.90	93	0.03	14.23	100	0.83	15.98	105	0.20
HM 7071 (RHIZOMANIA SPEC)	238	250.75	95	0.00	4206	105	0.27	1.05	110	0.00	13.59	96	0.01	16.91	111	0.00
HM 7072 (RHIZOMANIA SPEC)	221	263.15	99	0.77	3879	97	0.41	1.03	107	0.04	14.18	100	0.99	14.81	97	0.47
HM 7073 (RHIZOMANIA SPEC)	212	258.59	98	0.19	3964	99	0.75	0.94	98	0.46	13.86	98	0.13	15.49	102	0.65
HM 7076 (RHIZOMANIA SPEC)	218	256.24	97	0.07	4494	112	0.01	1.05	109	0.00	13.86	98	0.13	17.58	115	0.00
HOLLY 97HX708	209	260.96	99	0.44	4551	113	0.00	0.99	102	0.45	14.04	99	0.49	17.37	114	0.00
HOLLY 97HX712	202	277.01	105	0.01	4044	101	0.88	0.94	98	0.46	14.79	104	0.00	14.47	95	0.20
HOLLY 97HX713	232	269.14	102	0.30	3861	96	0.35	0.95	99	0.79	14.41	102	0.30	14.53	95	0.23
HOLLY 97HX714	242	254.95	96	0.04	4211	105	0.26	0.99	103	0.31	13.74	97	0.04	16.49	108	0.03
HOLLY 97HX721	248	252.39	95	0.01	3841	96	0.30	1.06	110	0.00	13.68	96	0.02	15.30	100	0.90
HOLLY 97HX722	197	258.73	98	0.21	4118	102	0.56	0.99	102	0.42	13.92	98	0.22	15.86	104	0.28
MARIBO 9767	250	267.47	101	0.51	3731	93	0.09	0.98	102	0.59	14.35	101	0.44	14.08	92	0.05
MARIBO 9363 (CHECK #4)	208	266.84	101	0.60	4167	104	0.38	1.01	105	0.10	14.36	101	0.43	15.56	102	0.57
MARIBO 9757	215	266.01	101	0.73	3948	98	0.68	0.98	102	0.52	14.27	101	0.68	14.81	97	0.47
MARIBO 9759	204	270.24	102	0.20	3834	95	0.28	1.00	104	0.22	14.51	102	0.13	14.21	93	0.08
MARIBO 9766	234	252.97	96	0.01	4274	106	0.13	0.99	102	0.44	13.63	96	0.01	17.00	112	0.00
SEEDEX 1015	199	272.95	103	0.06	4617	115	0.00	0.93	96	0.22	14.57	103	0.07	16.86	111	0.01
SEEDEX SX1011	240	263.87	100	0.89	3766	94	0.14	1.08	113	0.00	14.28	101	0.67	14.30	94	0.11
SEEDEX SX1012	244	266.09	101	0.72	3573	89	0.01	0.89	93	0.02	14.20	100	0.96	13.31	87	0.00
SEEDEX SX1013	224	250.66	95	0.00	4397	109	0.03	0.97	101	0.73	13.51	95	0.00	17.50	115	0.00
SEEDEX SX1014	211	262.26	99	0.63	4486	112	0.01	0.92	96	0.18	14.03	99	0.46	17.17	113	0.00
VAN DER HAVE H46109	222	273.51	103	0.05	3988	99	0.86	0.87	91	0.00	14.55	103	0.09	14.44	95	0.18
VAN DER HAVE H66287	229	263.34	100	0.80	4269	106	0.14	0.96	100	0.95	14.13	100	0.79	16.05	105	0.16
VAN DER HAVE H66339	252	266.67	101	0.63	4339	108	0.06	0.99	103	0.39	14.32	101	0.52	16.29	107	0.07
VAN DER HAVE H66340	241	258.28	98	0.17	4490	112	0.01	0.97	101	0.86	13.89	98	0.16	17.43	114	0.00
VAN DER HAVE H66341	226	261.14	99	0.46	4210	105	0.26	0.98	102	0.48	14.04	99	0.50	16.15	106	0.11
VAN DER HAVE H68108	216	268.73	102	0.35	4052	101	0.84	0.93	97	0.34	14.37	101	0.40	15.06	99	0.78

GENERAL MEAN		264.47			4018.47			0.96			14.19			15.23		
COEFF. OF VAR (%)		4.45			10.75			8.28			3.92			9.61		
F VALUE		2			3.22			2.16			2			4.81		
L.S.D. (.05)		0.05			12.71			5			1.64			0.05		
L.S.D. (.01)		0.01			16.73			6			2.16			0.01		

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

TABLE 16B. CLARA CITY SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		NA ppm			K ppm			Am. N ppm			Tare %		
CODE	ENTRY	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	243.64	93	0.53	1848	97	0.57	142.32	96	0.74	1.82	101	0.94
BETA 3456 (APHAN SPEC)	251	245.46	94	0.58	1864	98	0.70	156.03	106	0.63	2.20	122	0.09
BETA 3945 (APHAN SPEC)	236	230.17	88	0.28	1911	101	0.86	141.27	96	0.70	2.41	134	0.01
BETA 5296 (APHAN SPEC)	206	243.13	93	0.52	1922	101	0.76	169.42	115	0.20	2.59	144	0.00
BETA 6904 (CHECK #1)	231	260.98	100	0.98	2000	105	0.21	163.17	110	0.36	1.21	67	0.01
BETA M701 (APHAN SPEC)	230	213.42	82	0.09	1926	102	0.72	154.20	104	0.71	2.40	133	0.01
BETA M702 (APHAN SPEC)	200	244.87	94	0.56	1841	97	0.51	132.79	90	0.37	2.21	123	0.08
BETA M703 BLEND (APHAN SPE	220	273.85	105	0.67	1845	97	0.54	122.79	83	0.14	2.23	124	0.07
BETA M704 (APHAN SPEC)	243	263.44	101	0.95	1928	102	0.71	160.13	108	0.47	2.19	122	0.10
BETA M705 (RHIZOMANIA)	210	237.72	91	0.41	1885	99	0.90	139.28	94	0.61	2.19	121	0.10
BETA M706 (RHIZOMANIA)	225	264.41	101	0.92	1915	101	0.82	163.36	110	0.36	2.40	133	0.01
BETA M707 (RHIZOMANIA)	237	267.70	102	0.83	1927	102	0.71	165.69	112	0.29	1.21	67	0.01
CROPLAN EX103	213	240.53	92	0.46	1802	95	0.26	121.64	82	0.12	1.79	100	0.97
CRYSTAL 9601 (APHAN SPEC)	235	248.39	95	0.65	1845	97	0.54	173.44	117	0.13	2.22	123	0.08
CRYSTAL 9700 (APHAN SPEC)	246	213.37	82	0.09	1979	104	0.33	132.58	90	0.37	1.61	89	0.41
CRYSTAL 9708	201	227.91	87	0.24	1803	95	0.26	153.53	104	0.74	2.60	144	0.00
CRYSTAL 9711	198	267.56	102	0.84	1819	96	0.36	161.11	109	0.43	2.21	123	0.08
CRYSTAL 9712	217	278.82	107	0.55	1978	104	0.33	142.06	96	0.73	1.79	99	0.96
CRYSTAL 9720 (APHAN SPEC)	247	253.07	97	0.77	1833	97	0.45	167.95	114	0.23	1.79	99	0.95
CRYSTAL 9727	239	272.67	104	0.70	1874	99	0.79	119.71	81	0.10	1.99	110	0.43
CRYSTAL 9740 (APHAN SPEC)	223	216.49	83	0.12	1791	94	0.21	189.46	128	0.01	1.83	101	0.91
CRYSTAL 9744 (APHAN SPEC)	205	225.96	86	0.22	1894	100	0.97	118.10	80	0.08	1.79	99	0.94
FILLER #1	228	253.54	97	0.78	1874	99	0.79	176.10	119	0.10	1.81	100	0.97
FILLER #2	233	268.25	103	0.82	1846	97	0.55	157.78	107	0.56	1.39	77	0.07
FILLER #3	214	205.74	79	0.05	2069	109	0.04	113.55	77	0.04	1.79	99	0.95
HILLESHOG HECTOR (CHECK #3	219	236.19	90	0.38	1865	98	0.71	125.69	85	0.19	2.41	133	0.01
HM 7054	207	301.06	115	0.17	1763	93	0.11	139.25	94	0.61	1.39	77	0.07
HM 7057	245	240.95	92	0.47	1725	91	0.04	172.24	116	0.15	2.20	122	0.10
HM 7065	203	229.52	88	0.27	1879	99	0.84	136.75	92	0.51	2.02	112	0.36
HM 7066	227	221.73	85	0.17	1827	96	0.41	135.81	92	0.48	2.01	111	0.39
HM 7071 (RHIZOMANIA SPEC)	238	285.54	109	0.40	2117	112	0.01	150.23	102	0.89	1.81	101	0.97
HM 7072 (RHIZOMANIA SPEC)	221	279.68	107	0.53	2112	111	0.01	134.47	91	0.43	2.23	124	0.07
HM 7073 (RHIZOMANIA SPEC)	212	278.39	106	0.56	1808	95	0.29	143.69	97	0.81	1.96	109	0.49
HM 7076 (RHIZOMANIA SPEC)	218	348.48	133	0.00	2043	108	0.08	140.33	95	0.66	1.43	79	0.11
HOLLY 97HX708	209	291.38	111	0.30	1808	95	0.29	179.58	121	0.06	1.58	88	0.35
HOLLY 97HX712	202	243.11	93	0.52	1858	98	0.65	145.64	99	0.90	1.61	89	0.41
HOLLY 97HX713	232	222.12	85	0.17	1760	93	0.10	188.56	128	0.02	2.00	111	0.39
HOLLY 97HX714	242	315.66	121	0.06	2038	107	0.09	114.30	77	0.05	1.20	66	0.01
HOLLY 97HX721	248	370.39	142	0.00	2102	111	0.01	132.33	90	0.36	1.61	90	0.42
HOLLY 97HX722	197	325.66	125	0.03	1966	104	0.41	123.44	83	0.15	1.19	66	0.01
MARIBO 9767	250	307.85	118	0.11	1949	103	0.53	130.58	88	0.31	1.21	67	0.01
MARIBO 9363 (CHECK #4)	208	302.24	116	0.16	2098	111	0.02	119.98	81	0.10	1.17	65	0.01
MARIBO 9757	215	284.78	109	0.42	1855	98	0.63	160.06	108	0.47	1.97	109	0.48
MARIBO 9759	204	232.15	89	0.31	1999	105	0.22	160.11	108	0.47	2.38	132	0.01
MARIBO 9766	234	288.15	110	0.36	1820	96	0.36	179.02	121	0.07	1.41	78	0.09
SEEDEX 1015	199	175.96	67	0.00	1761	93	0.11	184.31	125	0.03	1.42	79	0.10
SEEDEX SX1011	240	339.99	130	0.01	2068	109	0.04	168.63	114	0.22	1.77	98	0.88
SEEDEX SX1012	244	226.77	87	0.23	1811	96	0.31	129.72	88	0.28	1.17	65	0.01
SEEDEX SX1013	224	298.85	114	0.20	1900	100	0.97	139.90	95	0.64	1.43	80	0.12
SEEDEX SX1014	211	257.97	99	0.90	1895	100	0.99	111.33	75	0.03	1.78	99	0.93
VAN DER HAVE H46109	222	192.01	73	0.02	1730	91	0.05	147.49	100	0.98	1.81	101	0.97
VAN DER HAVE H66287	229	293.80	112	0.26	1830	96	0.43	154.80	105	0.68	1.39	77	0.08
VAN DER HAVE H66339	252	303.66	116	0.14	1959	103	0.45	134.28	91	0.42	1.41	78	0.10
VAN DER HAVE H66340	241	302.98	116	0.15	1909	101	0.88	138.31	94	0.57	1.19	66	0.01
VAN DER HAVE H66341	226	262.55	100	0.97	1929	102	0.70	158.72	107	0.52	1.38	77	0.07
VAN DER HAVE H68108	216	227.41	87	0.24	1785	94	0.18	162.60	110	0.38	1.79	99	0.94

GENERAL MEAN	261.57	1896.24	147.85	1.80
COEFF. OF VAR (%)	28.57	11.32	29.12	28.67
F VALUE	1.87	1.47	1.44	3.12
L.S.D. (.05)	11	0.05	234.9	0.05
L.S.D. (.01)	14	0.01	309.3	0.01

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

TABLE 16C. CLARA CITY SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

CODE	ENTRY	BOLTERS % MEAN	%	P-VAL	VIGOR MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	0.00			4.26	105	0.69
BETA 3456 (APHAN SPEC)	251	0.00			4.65	115	0.23
BETA 3945 (APHAN SPEC)	236	0.00			3.54	87	0.30
BETA 5296 (APHAN SPEC)	206	0.00			4.30	106	0.62
BETA 6904 (CHECK #1)	231	0.00			3.99	98	0.90
BETA M701 (APHAN SPEC)	230	0.00			5.23	129	0.02
BETA M702 (APHAN SPEC)	200	0.00			4.62	114	0.26
BETA M703 BLEND (APHAN SPE	220	0.00			3.96	98	0.84
BETA M704 (APHAN SPEC)	243	0.00			3.79	93	0.59
BETA M705 (RHIZOMANIA)	210	0.00			3.38	83	0.18
BETA M706 (RHIZOMANIA)	225	0.00			3.38	83	0.17
BETA M707 (RHIZOMANIA)	237	0.00			4.86	120	0.11
CROPLAN EX103	213	0.00			3.95	97	0.83
CRYSTAL 9601 (APHAN SPEC)	235	0.00			3.89	96	0.74
CRYSTAL 9700 (APHAN SPEC)	246	0.00			3.87	95	0.71
CRYSTAL 9708	201	0.00			3.18	78	0.08
CRYSTAL 9711	198	0.00			4.01	99	0.92
CRYSTAL 9712	217	0.00			3.76	93	0.55
CRYSTAL 9720 (APHAN SPEC)	247	0.00			4.51	111	0.37
CRYSTAL 9727	239	0.00			4.44	109	0.44
CRYSTAL 9740 (APHAN SPEC)	223	0.00			4.58	113	0.30
CRYSTAL 9744 (APHAN SPEC)	205	0.00			5.57	137	0.00
FILLER #1	228	0.00			5.18	127	0.03
FILLER #2	233	0.00			5.09	125	0.04
FILLER #3	214	0.00			4.74	117	0.18
HILLESHOG HECTOR (CHECK #3	219	0.00			4.71	116	0.19
HM 7054	207	0.00			3.77	93	0.57
HM 7057	245	0.00			4.37	108	0.53
HM 7065	203	0.00			3.96	98	0.85
HM 7066	227	0.00			2.94	72	0.03
HM 7071 (RHIZOMANIA SPEC)	238	0.00			3.75	92	0.54
HM 7072 (RHIZOMANIA SPEC)	221	0.00			3.75	92	0.53
HM 7073 (RHIZOMANIA SPEC)	212	0.00			4.35	107	0.56
HM 7076 (RHIZOMANIA SPEC)	218	0.00			3.86	95	0.69
HOLLY 97HX708	209	0.00			3.90	96	0.75
HOLLY 97HX712	202	0.00			4.04	100	0.97
HOLLY 97HX713	232	0.00			4.36	107	0.54
HOLLY 97HX714	242	0.00			3.11	77	0.06
HOLLY 97HX721	248	0.00			4.00	99	0.91
HOLLY 97HX722	197	0.00			3.76	93	0.55
MARIBO 9767	250	0.00			3.10	76	0.05
MARIBO 9363 (CHECK #4)	208	0.00			3.80	94	0.61
MARIBO 9757	215	0.00			4.67	115	0.22
MARIBO 9759	204	0.00			3.66	90	0.42
MARIBO 9766	234	0.00			4.40	109	0.49
SEEDEX 1015	199	0.00			4.87	120	0.11
SEEDEX SX1011	240	0.00			3.26	80	0.11
SEEDEX SX1012	244	0.00			3.39	84	0.18
SEEDEX SX1013	224	0.00			3.52	87	0.28
SEEDEX SX1014	211	0.00			3.65	90	0.41
VAN DER HAVE H46109	222	0.00			4.28	105	0.66
VAN DER HAVE H66287	229	0.00			4.81	119	0.13
VAN DER HAVE H66339	252	0.00			4.19	103	0.79
VAN DER HAVE H66340	241	0.00			2.91	72	0.02
VAN DER HAVE H66341	226	0.00			3.84	95	0.65
VAN DER HAVE H68108	216	0.00			3.58	88	0.34

GENERAL MEAN		4.06
COEFF. OF VAR (%)		31.58
F VALUE		1.49
L.S.D. (.05)		0.66
L.S.D. (.01)		0.87

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

TABLE 17A. DANUBE SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		REC/T LBS			REC/A LBS			LTM			SUGAR %			YIELD T/A		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	258.92	100	0.73	4692	94	0.01	0.93	102	0.50	13.88	100	0.81	18.15	94	0.01
BETA 3456 (APHAN SPEC)	251	258.00	99	0.53	4795	96	0.08	0.88	96	0.11	13.78	99	0.37	18.59	96	0.09
BETA 3945 (APHAN SPEC)	236	282.04	108	0.00	4889	98	0.31	0.88	97	0.21	14.99	108	0.00	17.31	90	0.00
BETA 5296 (APHAN SPEC)	206	261.56	101	0.63	4647	93	0.00	0.95	103	0.18	14.02	101	0.48	17.72	92	0.00
BETA 6904 (CHECK #1)	231	266.34	102	0.05	4704	94	0.01	0.92	100	0.88	14.23	102	0.04	17.66	92	0.00
BETA M701 (APHAN SPEC)	230	270.60	104	0.00	5057	101	0.71	0.83	91	0.00	14.36	103	0.00	18.63	97	0.11
BETA M702 (APHAN SPEC)	200	258.55	99	0.65	4478	89	0.00	0.94	103	0.33	13.86	100	0.74	17.32	90	0.00
BETA M703 BLEND (APHAN SPE	220	268.46	103	0.01	5038	101	0.83	0.88	96	0.14	14.30	103	0.01	18.74	97	0.18
BETA M704 (APHAN SPEC)	243	262.70	101	0.41	4743	95	0.03	0.88	97	0.18	14.02	101	0.50	18.08	94	0.00
BETA M705 (RHIZOMANIA)	210	253.41	97	0.04	4898	98	0.35	0.98	107	0.01	13.65	98	0.08	19.41	101	0.71
BETA M706 (RHIZOMANIA)	225	253.95	98	0.06	4880	97	0.28	0.98	107	0.00	13.68	98	0.12	19.21	100	0.88
BETA M707 (RHIZOMANIA)	237	242.14	93	0.00	4158	83	0.00	0.98	107	0.00	13.09	94	0.00	17.05	88	0.00
CROPLAN EX103	213	264.87	102	0.13	5359	107	0.00	0.88	97	0.21	14.13	102	0.17	20.20	105	0.02
CRYSTAL 9601 (APHAN SPEC)	235	254.66	98	0.10	4722	94	0.02	0.98	108	0.00	13.72	99	0.19	18.43	96	0.04
CRYSTAL 9700 (APHAN SPEC)	246	248.50	96	0.00	4745	95	0.03	0.91	99	0.72	13.33	96	0.00	19.15	99	0.76
CRYSTAL 9708	201	269.48	104	0.00	5021	100	0.93	0.84	92	0.00	14.32	103	0.01	18.59	96	0.09
CRYSTAL 9711	198	261.56	101	0.63	5585	111	0.00	0.89	97	0.24	13.96	100	0.75	21.33	111	0.00
CRYSTAL 9712	217	260.49	100	0.88	5094	102	0.50	0.95	104	0.14	13.97	100	0.70	19.60	102	0.40
CRYSTAL 9720 (APHAN SPEC)	247	250.97	97	0.01	5052	101	0.74	0.89	97	0.30	13.44	97	0.00	20.21	105	0.02
CRYSTAL 9727	239	259.11	100	0.78	5218	104	0.09	0.87	96	0.09	13.83	99	0.58	20.13	104	0.03
CRYSTAL 9740 (APHAN SPEC)	223	266.66	103	0.04	4873	97	0.25	0.99	108	0.00	14.32	103	0.01	18.23	95	0.01
CRYSTAL 9744 (APHAN SPEC)	205	259.33	100	0.83	4609	92	0.00	0.87	95	0.05	13.83	99	0.60	17.72	92	0.00
FILLER #1	228	253.54	98	0.05	4128	82	0.00	0.97	107	0.01	13.65	98	0.08	16.20	84	0.00
FILLER #2	233	258.47	99	0.63	4414	88	0.00	0.89	97	0.25	13.81	99	0.50	17.06	89	0.00
FILLER #3	214	256.48	99	0.27	4172	83	0.00	0.96	105	0.05	13.78	99	0.40	16.30	85	0.00
HILLESHOG HECTOR (CHECK #3	219	260.97	100	0.77	5070	101	0.63	0.88	96	0.16	13.93	100	0.91	19.43	101	0.69
HM 7054	207	258.33	99	0.60	5129	102	0.33	0.89	97	0.23	13.80	99	0.46	19.86	103	0.14
HM 7057	245	261.27	100	0.70	4911	98	0.41	0.86	94	0.02	13.92	100	0.96	18.83	98	0.27
HM 7065	203	271.08	104	0.00	5297	106	0.02	0.93	102	0.40	14.49	104	0.00	19.53	101	0.51
HM 7066	227	258.78	100	0.70	5346	107	0.01	0.88	96	0.11	13.81	99	0.51	20.60	107	0.00
HM 7071 (RHIZOMANIA SPEC)	238	257.79	99	0.49	5435	108	0.00	1.02	112	0.00	13.91	100	0.98	21.07	109	0.00
HM 7072 (RHIZOMANIA SPEC)	221	254.81	98	0.11	4705	94	0.01	0.90	98	0.50	13.64	98	0.07	18.46	96	0.04
HM 7073 (RHIZOMANIA SPEC)	212	256.59	99	0.29	5000	100	0.92	0.95	103	0.18	13.78	99	0.37	19.56	102	0.46
HM 7076 (RHIZOMANIA SPEC)	218	261.80	101	0.58	5617	112	0.00	1.01	110	0.00	14.10	101	0.24	21.45	111	0.00
HOLLY 97HX708	209	264.64	102	0.15	5747	115	0.00	0.96	105	0.04	14.19	102	0.07	21.69	113	0.00
HOLLY 97HX712	202	263.06	101	0.35	4636	93	0.00	0.92	101	0.70	14.07	101	0.30	17.56	91	0.00
HOLLY 97HX713	232	266.84	103	0.04	4645	93	0.00	0.95	104	0.12	14.29	103	0.01	17.36	90	0.00
HOLLY 97HX714	242	250.88	96	0.00	5508	110	0.00	0.92	101	0.81	13.46	97	0.00	21.91	114	0.00
HOLLY 97HX721	248	246.29	95	0.00	4741	95	0.03	0.96	105	0.05	13.28	95	0.00	19.25	100	0.96
HOLLY 97HX722	197	262.78	101	0.39	5699	114	0.00	0.89	98	0.37	14.03	101	0.45	21.73	113	0.00
MARIBO 9767	250	268.54	103	0.01	5390	108	0.00	0.86	94	0.02	14.29	103	0.02	20.13	104	0.03
MARIBO 9363 (CHECK #4)	208	258.40	99	0.61	5085	101	0.54	0.98	107	0.01	13.90	100	0.90	19.66	102	0.32
MARIBO 9757	215	262.96	101	0.36	4947	99	0.60	0.89	97	0.31	14.04	101	0.43	18.81	98	0.25
MARIBO 9759	204	275.18	106	0.00	5064	101	0.66	0.91	100	0.97	14.67	105	0.00	18.40	96	0.03
MARIBO 9766	234	252.23	97	0.02	4915	98	0.43	0.95	104	0.17	13.56	97	0.02	19.41	101	0.72
SEEDEX 1015	199	268.73	103	0.01	5443	109	0.00	0.86	94	0.03	14.30	103	0.01	20.18	105	0.02
SEEDEX SX1011	240	262.05	101	0.53	5082	101	0.56	0.92	101	0.68	14.03	101	0.46	19.43	101	0.69
SEEDEX SX1012	244	264.62	102	0.16	4794	96	0.07	0.87	95	0.05	14.10	101	0.24	18.09	94	0.00
SEEDEX SX1013	224	249.42	96	0.00	5475	109	0.00	0.88	96	0.14	13.35	96	0.00	21.96	114	0.00
SEEDEX SX1014	211	255.76	98	0.19	5467	109	0.00	0.90	98	0.48	13.68	98	0.13	21.44	111	0.00
VAN DER HAVE H46109	222	265.97	102	0.07	5084	101	0.55	0.85	93	0.00	14.14	102	0.14	19.06	99	0.60
VAN DER HAVE H66287	229	256.41	99	0.26	5284	105	0.03	0.87	96	0.09	13.69	98	0.15	20.55	107	0.00
VAN DER HAVE H66339	252	263.96	102	0.22	5416	108	0.00	0.89	98	0.37	14.09	101	0.25	20.52	106	0.00
VAN DER HAVE H66340	241	260.39	100	0.91	5703	114	0.00	0.86	94	0.02	13.88	100	0.82	21.88	114	0.00
VAN DER HAVE H66341	226	255.92	98	0.20	5267	105	0.04	0.92	100	0.94	13.71	99	0.19	20.64	107	0.00
VAN DER HAVE H68108	216	244.12	94	0.00	4766	95	0.04	0.94	103	0.21	13.15	94	0.00	19.54	101	0.50

GENERAL MEAN		260.02			5011			0.91			13.91			19.27		
COEFF. OF VAR (%)		3.38			6.48			7.04			3.01			5.59		
F VALUE		5.49			10.7			3.67			5.6			14.18		
L.S.D. (.05)		0.05			9.06			3			1.12			0.05		
L.S.D. (.01)		0.01			11.93			5			1.47			0.01		

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

TABLE 17B. DANUBE SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		NA ppm			K ppm			Am. N ppm			Tare %		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	186.57	84	0.02	1668	106	0.02	210.79	101	0.81	6.54	115	0.12
BETA 3456 (APHAN SPEC)	251	237.65	107	0.28	1443	91	0.00	209.32	101	0.91	6.03	106	0.54
BETA 3945 (APHAN SPEC)	236	176.71	80	0.00	1601	101	0.55	195.19	94	0.25	5.48	96	0.67
BETA 5296 (APHAN SPEC)	206	216.48	98	0.75	1581	100	0.97	234.13	113	0.02	5.22	92	0.37
BETA 6904 (CHECK #1)	231	237.76	107	0.28	1527	97	0.15	218.56	105	0.35	5.54	97	0.76
BETA M701 (APHAN SPEC)	230	171.62	78	0.00	1431	91	0.00	202.97	98	0.65	4.93	87	0.15
BETA M702 (APHAN SPEC)	200	212.70	96	0.57	1546	98	0.36	236.92	114	0.01	6.22	109	0.33
BETA M703 BLEND (APHAN SPE	220	187.67	85	0.03	1511	96	0.06	213.12	102	0.66	5.25	92	0.40
BETA M704 (APHAN SPEC)	243	206.39	93	0.32	1603	102	0.51	183.03	88	0.03	5.37	94	0.53
BETA M705 (RHIZOMANIA)	210	223.23	101	0.90	1739	110	0.00	215.64	104	0.50	4.20	74	0.01
BETA M706 (RHIZOMANIA)	225	250.75	113	0.05	1630	103	0.16	232.67	112	0.03	5.50	96	0.70
BETA M707 (RHIZOMANIA)	237	198.57	90	0.13	1630	103	0.16	255.34	123	0.00	6.81	119	0.04
CROPLAN EX103	213	213.44	96	0.60	1540	97	0.28	198.86	96	0.41	5.18	91	0.33
CRYSTAL 9601 (APHAN SPEC)	235	252.30	114	0.04	1612	102	0.38	241.30	116	0.00	5.67	99	0.95
CRYSTAL 9700 (APHAN SPEC)	246	184.08	83	0.01	1588	101	0.81	212.00	102	0.73	5.28	93	0.43
CRYSTAL 9708	201	194.22	88	0.07	1463	93	0.00	193.47	93	0.19	6.22	109	0.33
CRYSTAL 9711	198	242.36	110	0.16	1468	93	0.00	208.90	100	0.94	5.59	98	0.83
CRYSTAL 9712	217	224.69	102	0.82	1662	105	0.02	213.36	103	0.64	6.42	113	0.18
CRYSTAL 9720 (APHAN SPEC)	247	196.27	89	0.10	1553	98	0.47	206.52	99	0.89	5.98	105	0.60
CRYSTAL 9727	239	238.34	108	0.26	1564	99	0.68	173.61	83	0.00	6.59	115	0.10
CRYSTAL 9740 (APHAN SPEC)	223	226.47	102	0.73	1585	100	0.88	262.03	126	0.00	7.15	125	0.01
CRYSTAL 9744 (APHAN SPEC)	205	179.05	81	0.01	1522	96	0.12	204.14	98	0.72	5.63	99	0.89
FILLER #1	228	208.93	94	0.41	1558	99	0.56	263.55	127	0.00	6.10	107	0.46
FILLER #2	233	225.78	102	0.77	1563	99	0.65	189.88	91	0.10	6.47	113	0.16
FILLER #3	214	190.97	86	0.05	1721	109	0.00	217.62	105	0.40	5.98	105	0.60
HILLESHOG HECTOR (CHECK #3	219	224.77	102	0.82	1460	92	0.00	212.76	102	0.68	5.25	92	0.40
HM 7054	207	278.51	126	0.00	1400	89	0.00	212.40	102	0.70	6.70	118	0.06
HM 7057	245	214.36	97	0.65	1391	88	0.00	217.73	105	0.39	6.07	106	0.49
HM 7065	203	178.17	81	0.00	1685	107	0.00	211.53	102	0.76	5.33	94	0.49
HM 7066	227	204.20	92	0.26	1439	91	0.00	222.56	107	0.20	5.56	98	0.80
HM 7071 (RHIZOMANIA SPEC)	238	233.81	106	0.41	1822	115	0.00	223.18	107	0.18	5.72	100	0.97
HM 7072 (RHIZOMANIA SPEC)	221	224.76	102	0.82	1603	101	0.52	188.13	90	0.08	6.76	119	0.05
HM 7073 (RHIZOMANIA SPEC)	212	217.23	98	0.79	1644	104	0.08	217.38	104	0.41	5.83	102	0.82
HM 7076 (RHIZOMANIA SPEC)	218	235.08	106	0.36	1863	118	0.00	197.63	95	0.35	5.57	98	0.81
HOLLY 97HX708	209	203.60	92	0.24	1630	103	0.17	239.68	115	0.01	5.65	99	0.92
HOLLY 97HX712	202	212.16	96	0.55	1601	101	0.56	212.82	102	0.67	5.91	104	0.70
HOLLY 97HX713	232	211.55	96	0.52	1696	107	0.00	207.01	99	0.92	6.20	109	0.36
HOLLY 97HX714	242	258.48	117	0.01	1562	99	0.63	203.97	98	0.71	4.56	80	0.03
HOLLY 97HX721	248	275.54	125	0.00	1609	102	0.42	219.00	105	0.33	5.29	93	0.44
HOLLY 97HX722	197	224.21	101	0.85	1614	102	0.35	181.17	87	0.02	4.98	87	0.18
MARIBO 9767	250	223.51	101	0.88	1495	95	0.02	187.13	90	0.06	5.13	90	0.29
MARIBO 9363 (CHECK #4)	208	257.79	116	0.02	1676	106	0.01	217.70	105	0.39	5.20	91	0.35
MARIBO 9757	215	273.58	124	0.00	1502	95	0.03	190.18	91	0.11	5.93	104	0.67
MARIBO 9759	204	200.05	90	0.16	1694	107	0.00	183.36	88	0.03	5.61	98	0.87
MARIBO 9766	234	261.24	118	0.01	1538	97	0.26	230.05	111	0.05	4.77	84	0.08
SEEDEX 1015	199	204.41	92	0.26	1507	95	0.05	194.02	93	0.21	5.63	99	0.90
SEEDEX SX1011	240	249.65	113	0.06	1657	105	0.03	185.12	89	0.04	5.42	95	0.60
SEEDEX SX1012	244	206.66	93	0.33	1486	94	0.01	202.17	97	0.60	6.13	108	0.42
SEEDEX SX1013	224	236.48	107	0.32	1572	100	0.84	178.74	86	0.01	5.87	103	0.76
SEEDEX SX1014	211	225.54	102	0.78	1562	99	0.63	196.50	94	0.30	4.51	79	0.03
VAN DER HAVE H46109	222	159.91	72	0.00	1614	102	0.35	168.68	81	0.00	5.67	99	0.95
VAN DER HAVE H66287	229	236.81	107	0.31	1534	97	0.21	182.50	88	0.02	6.33	111	0.24
VAN DER HAVE H66339	252	247.47	112	0.08	1549	98	0.40	191.79	92	0.15	6.07	107	0.49
VAN DER HAVE H66340	241	214.43	97	0.65	1540	97	0.28	181.60	87	0.02	5.07	89	0.24
VAN DER HAVE H66341	226	241.30	109	0.19	1615	102	0.33	191.83	92	0.15	5.70	100	1.00
VAN DER HAVE H68108	216	273.81	124	0.00	1578	100	0.96	212.90	102	0.67	5.54	97	0.76

GENERAL MEAN	221.29	1579.39	208.11	5.70
COEFF. OF VAR (%)	18.45	6.2	14.74	26.2
F VALUE	3.65	6.58	3.42	1.26
L.S.D. (.05)	6	0.05	102	0.45
L.S.D. (.01)	8	0.01	134.3	0.59

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

TABLE 17C. DANUBE SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		BOLTERS %			VIGOR		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	0.00			1.22	72	0.00
BETA 3456 (APHAN SPEC)	251	0.00			1.71	102	0.84
BETA 3945 (APHAN SPEC)	236	0.00			2.41	143	0.00
BETA 5296 (APHAN SPEC)	206	0.00			2.01	120	0.04
BETA 6904 (CHECK #1)	231	0.00			1.61	96	0.66
BETA M701 (APHAN SPEC)	230	0.00			2.36	140	0.00
BETA M702 (APHAN SPEC)	200	0.00			2.03	121	0.03
BETA M703 BLEND (APHAN SPE	220	0.00			1.96	116	0.09
BETA M704 (APHAN SPEC)	243	0.00			1.93	115	0.13
BETA M705 (RHIZOMANIA)	210	0.00			1.53	91	0.34
BETA M706 (RHIZOMANIA)	225	0.00			1.85	110	0.29
BETA M707 (RHIZOMANIA)	237	0.00			1.37	82	0.06
CROPLAN EX103	213	0.00			1.49	89	0.23
CRYSTAL 9601 (APHAN SPEC)	235	0.00			2.36	141	0.00
CRYSTAL 9700 (APHAN SPEC)	246	0.00			1.60	95	0.60
CRYSTAL 9708	201	0.00			2.11	126	0.01
CRYSTAL 9711	198	0.00			1.85	110	0.28
CRYSTAL 9712	217	0.00			1.63	97	0.74
CRYSTAL 9720 (APHAN SPEC)	247	0.00			1.89	112	0.20
CRYSTAL 9727	239	0.00			1.76	105	0.60
CRYSTAL 9740 (APHAN SPEC)	223	0.00			2.10	125	0.01
CRYSTAL 9744 (APHAN SPEC)	205	0.00			1.26	75	0.01
FILLER #1	228	0.00			1.85	110	0.31
FILLER #2	233	0.00			1.66	99	0.90
FILLER #3	214	0.00			1.16	69	0.00
HILLESHOG HECTOR (CHECK #3	219	0.00			2.39	142	0.00
HM 7054	207	0.00			1.56	93	0.44
HM 7057	245	0.00			2.02	120	0.03
HM 7065	203	0.00			1.88	112	0.22
HM 7066	227	0.00			2.09	124	0.01
HM 7071 (RHIZOMANIA SPEC)	238	0.00			1.50	89	0.27
HM 7072 (RHIZOMANIA SPEC)	221	0.00			2.51	149	0.00
HM 7073 (RHIZOMANIA SPEC)	212	0.00			2.04	121	0.03
HM 7076 (RHIZOMANIA SPEC)	218	0.00			1.60	95	0.60
HOLLY 97HX708	209	0.00			1.15	68	0.00
HOLLY 97HX712	202	0.00			1.12	67	0.00
HOLLY 97HX713	232	0.00			1.99	119	0.05
HOLLY 97HX714	242	0.00			1.13	67	0.00
HOLLY 97HX721	248	0.00			1.21	72	0.00
HOLLY 97HX722	197	0.00			1.16	69	0.00
MARIBO 9767	250	0.00			1.13	67	0.00
MARIBO 9363 (CHECK #4)	208	0.00			1.51	90	0.30
MARIBO 9757	215	0.00			1.49	88	0.23
MARIBO 9759	204	0.00			2.14	128	0.00
MARIBO 9766	234	0.00			1.48	88	0.21
SEEDEX 1015	199	0.00			1.36	81	0.05
SEEDEX SX1011	240	0.00			1.31	78	0.02
SEEDEX SX1012	244	0.00			1.51	90	0.28
SEEDEX SX1013	224	0.00			1.36	81	0.04
SEEDEX SX1014	211	0.00			1.37	81	0.05
VAN DER HAVE H46109	222	0.00			1.84	109	0.32
VAN DER HAVE H66287	229	0.00			1.72	102	0.81
VAN DER HAVE H66339	252	0.00			1.48	88	0.21
VAN DER HAVE H66340	241	0.00			1.38	82	0.06
VAN DER HAVE H66341	226	0.00			1.14	68	0.00
VAN DER HAVE H68108	216	0.00			1.88	112	0.23

GENERAL MEAN		1.68
COEFF. OF VAR (%)		26.01
F VALUE		5.67
L.S.D. (.05)		0.05
L.S.D. (.01)		0.01

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

TABLE 18A. DEGRAFF SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		REC/T LBS			REC/A LBS			LTM			SUGAR %			YIELD T/A		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	266.82	99	0.45	4512	88	0.00	1.02	104	0.15	14.37	99	0.57	16.76	88	0.00
BETA 3456 (APHAN SPEC)	251	270.18	100	0.95	4953	97	0.42	0.98	100	0.96	14.49	100	0.94	18.32	97	0.34
BETA 3945 (APHAN SPEC)	236	285.76	106	0.00	5188	101	0.71	0.94	97	0.25	15.23	105	0.00	18.14	96	0.21
BETA 5296 (APHAN SPEC)	206	281.15	104	0.01	5307	104	0.33	1.00	102	0.52	15.05	104	0.00	18.86	100	0.90
BETA 6904 (CHECK #1)	231	279.65	104	0.02	5015	98	0.61	0.91	93	0.02	14.89	103	0.03	17.90	94	0.11
BETA M701 (APHAN SPEC)	230	291.45	108	0.00	5153	101	0.85	0.88	90	0.00	15.45	107	0.00	17.65	93	0.05
BETA M702 (APHAN SPEC)	200	270.82	100	0.83	4623	90	0.01	0.95	97	0.33	14.49	100	0.93	16.96	90	0.00
BETA M703 BLEND (APHAN SPEC	220	279.38	104	0.02	5429	106	0.11	0.92	95	0.06	14.90	103	0.03	19.46	103	0.43
BETA M704 (APHAN SPEC)	243	277.18	103	0.08	4839	95	0.16	0.89	92	0.00	14.75	102	0.15	17.47	92	0.02
BETA M705 (RHIZOMANIA)	210	265.79	98	0.31	5267	103	0.44	0.99	102	0.56	14.28	99	0.32	19.81	105	0.18
BETA M706 (RHIZOMANIA)	225	267.62	99	0.57	4940	97	0.38	0.97	100	0.94	14.36	99	0.54	18.44	97	0.44
BETA M707 (RHIZOMANIA)	237	255.59	95	0.00	4900	96	0.28	0.98	101	0.83	13.76	95	0.00	19.13	101	0.77
CROPLAN EX103	213	275.67	102	0.16	5373	105	0.19	0.99	101	0.63	14.78	102	0.11	19.50	103	0.38
CRYSTAL 9601 (APHAN SPEC)	235	270.04	100	0.98	5027	98	0.66	1.01	104	0.20	14.52	100	0.82	18.54	98	0.53
CRYSTAL 9700 (APHAN SPEC)	246	264.84	98	0.21	4882	95	0.24	0.97	99	0.69	14.21	98	0.17	18.42	97	0.41
CRYSTAL 9708	201	277.06	103	0.08	5106	100	0.97	0.96	98	0.58	14.81	102	0.07	18.36	97	0.37
CRYSTAL 9711	198	268.65	100	0.76	5263	103	0.45	0.97	100	0.89	14.41	100	0.74	19.52	103	0.37
CRYSTAL 9712	217	275.16	102	0.20	5215	102	0.61	1.04	107	0.03	14.80	102	0.08	18.96	100	0.98
CRYSTAL 9720 (APHAN SPEC)	247	257.39	95	0.00	4981	97	0.50	0.97	99	0.71	13.84	96	0.00	19.33	102	0.55
CRYSTAL 9727	239	266.42	99	0.39	5269	103	0.44	0.98	100	0.94	14.30	99	0.35	19.79	104	0.19
CRYSTAL 9740 (APHAN SPEC)	223	276.85	103	0.09	4567	89	0.01	1.04	106	0.04	14.88	103	0.03	16.49	87	0.00
CRYSTAL 9744 (APHAN SPEC)	205	270.94	100	0.80	5142	101	0.89	0.93	95	0.08	14.48	100	0.99	18.96	100	0.97
FILLER #1	228	282.04	104	0.00	4911	96	0.30	0.96	98	0.58	15.06	104	0.00	17.42	92	0.02
FILLER #2	233	271.48	101	0.70	4819	94	0.14	0.99	101	0.67	14.56	101	0.64	17.74	94	0.06
FILLER #3	214	268.93	100	0.81	4228	83	0.00	0.98	100	0.89	14.43	100	0.81	15.67	83	0.00
HILLESHOG HECTOR (CHECK #3)	219	271.29	101	0.74	4835	95	0.16	0.93	95	0.12	14.49	100	0.91	17.81	94	0.08
HM 7054	207	274.27	102	0.29	5547	108	0.03	0.91	94	0.03	14.62	101	0.43	20.21	107	0.05
HM 7057	245	279.21	103	0.02	5073	99	0.83	0.90	92	0.01	14.85	103	0.05	18.15	96	0.22
HM 7065	203	273.51	101	0.38	4638	91	0.02	0.96	98	0.55	14.64	101	0.39	16.94	89	0.00
HM 7066	227	275.80	102	0.15	5666	111	0.01	0.87	89	0.00	14.66	101	0.31	20.49	108	0.02
HM 7071 (RHIZOMANIA SPEC)	238	266.63	99	0.42	5085	99	0.88	1.08	111	0.00	14.41	100	0.75	19.02	100	0.91
HM 7072 (RHIZOMANIA SPEC)	221	266.24	99	0.37	4882	95	0.24	1.06	108	0.00	14.37	99	0.58	18.34	97	0.35
HM 7073 (RHIZOMANIA SPEC)	212	269.49	100	0.92	5318	104	0.31	0.96	98	0.50	14.43	100	0.83	19.69	104	0.25
HM 7076 (RHIZOMANIA SPEC)	218	257.97	96	0.00	5471	107	0.07	1.14	117	0.00	14.04	97	0.02	21.25	112	0.00
HOLLY 97HX708	209	265.61	98	0.29	5508	108	0.05	1.00	102	0.43	14.28	99	0.31	20.68	109	0.01
HOLLY 97HX712	202	267.87	99	0.62	4765	93	0.08	1.04	106	0.04	14.43	100	0.83	17.79	94	0.07
HOLLY 97HX713	232	277.83	103	0.05	4780	93	0.09	0.99	101	0.63	14.88	103	0.03	17.17	91	0.01
HOLLY 97HX714	242	265.28	98	0.26	5578	109	0.02	1.03	105	0.08	14.29	99	0.33	21.05	111	0.00
HOLLY 97HX721	248	246.59	91	0.00	4787	94	0.10	1.09	111	0.00	13.43	93	0.00	19.40	102	0.48
HOLLY 97HX722	197	258.27	96	0.00	5032	98	0.68	1.00	102	0.45	13.91	96	0.00	19.55	103	0.34
MARIBO 9767	250	277.48	103	0.07	5800	113	0.00	0.98	101	0.79	14.86	103	0.04	20.89	110	0.00
MARIBO 9363 (CHECK #4)	208	283.52	105	0.00	5319	104	0.30	0.98	100	0.99	15.15	105	0.00	18.74	99	0.75
MARIBO 9757	215	271.94	101	0.62	5161	101	0.81	0.98	100	0.98	14.57	101	0.60	18.97	100	0.96
MARIBO 9759	204	272.23	101	0.57	4601	90	0.01	1.01	104	0.23	14.62	101	0.43	16.83	89	0.00
MARIBO 9766	234	262.99	97	0.09	4800	94	0.11	0.94	96	0.16	14.09	97	0.04	18.14	96	0.21
SEEDEX 1015	199	265.37	98	0.27	5439	106	0.10	0.94	96	0.16	14.21	98	0.16	20.52	108	0.02
SEEDEX SX1011	240	265.79	98	0.31	4925	96	0.34	0.98	100	0.87	14.26	99	0.27	18.55	98	0.54
SEEDEX SX1012	244	268.67	100	0.76	5014	98	0.61	0.93	96	0.13	14.36	99	0.55	18.69	99	0.70
SEEDEX SX1013	224	254.27	94	0.00	5564	109	0.02	1.00	102	0.50	13.71	95	0.00	21.92	116	0.00
SEEDEX SX1014	211	259.34	96	0.01	5183	101	0.73	0.99	101	0.65	13.96	96	0.01	19.88	105	0.15
VAN DER HAVE H46109	222	271.26	100	0.74	5011	98	0.60	0.90	92	0.01	14.46	100	0.95	18.49	98	0.49
VAN DER HAVE H66287	229	272.24	101	0.57	5618	110	0.01	0.97	100	0.89	14.58	101	0.57	20.58	109	0.01
VAN DER HAVE H66339	252	268.90	100	0.80	5355	105	0.23	0.96	98	0.53	14.41	100	0.74	19.83	105	0.17
VAN DER HAVE H66340	241	267.95	99	0.63	5842	114	0.00	0.91	93	0.02	14.31	99	0.38	21.78	115	0.00
VAN DER HAVE H66341	226	263.77	98	0.13	5682	111	0.00	1.01	103	0.33	14.19	98	0.14	21.54	114	0.00
VAN DER HAVE H68108	216	257.13	95	0.00	5230	102	0.56	1.05	108	0.01	13.91	96	0.00	20.28	107	0.04

GENERAL MEAN		269.92			5115			0.98			14.47			18.94		
COEFF. OF VAR (%)		3.8			9.82			7.33			3.31			8.66		
F VALUE		4.19			3.12			3.36			4.28			4.97		
L.S.D. (.05)		0.05			11.46			6			1.81			0.05		
L.S.D. (.01)		0.01			15.09			4			2.38			0.01		

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

TABLE 18B. DEGRAFF SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

		NA ppm			K ppm			Am. N ppm			Tare %		
ENTRY	CODE	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL	MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	458.92	99	0.89	1668	108	0.00	179.78	102	0.72	3.86	126	0.02
BETA 3456 (APHAN SPEC)	251	456.94	98	0.85	1439	93	0.01	206.31	117	0.00	3.87	126	0.02
BETA 3945 (APHAN SPEC)	236	402.90	87	0.10	1542	100	0.89	174.19	99	0.87	3.45	112	0.26
BETA 5296 (APHAN SPEC)	206	431.18	93	0.38	1584	102	0.39	194.02	110	0.09	2.64	86	0.22
BETA 6904 (CHECK #1)	231	449.40	97	0.70	1420	92	0.00	163.14	93	0.22	3.53	115	0.17
BETA M701 (APHAN SPEC)	230	322.69	70	0.00	1447	93	0.02	181.62	103	0.59	2.47	80	0.08
BETA M702 (APHAN SPEC)	200	407.17	88	0.13	1533	99	0.73	176.08	100	0.99	3.10	101	0.91
BETA M703 BLEND (APHAN SPEC	220	417.46	90	0.22	1441	93	0.01	179.56	102	0.73	3.49	114	0.21
BETA M704 (APHAN SPEC)	243	359.43	77	0.01	1486	96	0.14	164.45	93	0.28	3.59	117	0.12
BETA M705 (RHIZOMANIA)	210	461.84	100	0.95	1626	105	0.06	170.42	97	0.60	2.61	85	0.18
BETA M706 (RHIZOMANIA)	225	496.43	107	0.39	1525	99	0.59	170.74	97	0.62	3.48	114	0.22
BETA M707 (RHIZOMANIA)	237	437.25	94	0.48	1525	99	0.58	198.87	113	0.03	3.96	129	0.01
CROPLAN EX103	213	481.53	104	0.64	1614	104	0.11	163.57	93	0.24	2.55	83	0.13
CRYSTAL 9601 (APHAN SPEC)	235	525.57	113	0.10	1523	98	0.55	188.96	107	0.22	2.79	91	0.42
CRYSTAL 9700 (APHAN SPEC)	246	368.32	79	0.01	1536	99	0.78	208.11	118	0.00	2.64	86	0.21
CRYSTAL 9708	201	385.70	83	0.04	1566	101	0.66	184.70	105	0.41	2.72	89	0.32
CRYSTAL 9711	198	521.81	112	0.12	1525	99	0.58	156.92	89	0.07	2.87	94	0.56
CRYSTAL 9712	217	464.34	100	0.99	1646	106	0.02	200.13	114	0.02	2.85	93	0.53
CRYSTAL 9720 (APHAN SPEC)	247	401.46	87	0.10	1613	104	0.12	172.70	98	0.76	3.09	101	0.93
CRYSTAL 9727	239	537.76	116	0.05	1470	95	0.06	169.85	97	0.56	2.93	95	0.68
CRYSTAL 9740 (APHAN SPEC)	223	453.12	98	0.77	1551	100	0.94	226.54	129	0.00	3.97	130	0.01
CRYSTAL 9744 (APHAN SPEC)	205	349.71	75	0.00	1570	101	0.59	175.67	100	0.98	3.69	121	0.06
FILLER #1	228	331.73	71	0.00	1565	101	0.68	209.28	119	0.00	3.84	125	0.02
FILLER #2	233	486.12	105	0.56	1564	101	0.69	171.59	98	0.68	3.24	106	0.60
FILLER #3	214	441.71	95	0.55	1640	106	0.03	162.65	92	0.21	4.27	139	0.00
HILLESHOG HECTOR (CHECK #3)	219	414.90	89	0.19	1479	96	0.10	174.26	99	0.87	2.86	93	0.55
HM 7054	207	486.93	105	0.54	1397	90	0.00	158.97	90	0.11	2.83	92	0.49
HM 7057	245	349.72	75	0.00	1466	95	0.05	178.05	101	0.84	3.00	98	0.86
HM 7065	203	336.95	73	0.00	1622	105	0.07	188.27	107	0.24	2.35	77	0.04
HM 7066	227	422.54	91	0.27	1320	85	0.00	172.79	98	0.76	2.97	97	0.79
HM 7071 (RHIZOMANIA SPEC)	238	552.10	119	0.02	1744	113	0.00	173.67	99	0.83	2.55	83	0.13
HM 7072 (RHIZOMANIA SPEC)	221	507.25	109	0.25	1692	109	0.00	183.29	104	0.49	2.63	86	0.20
HM 7073 (RHIZOMANIA SPEC)	212	413.36	89	0.18	1628	105	0.05	157.05	89	0.07	3.35	109	0.40
HM 7076 (RHIZOMANIA SPEC)	218	611.06	132	0.00	1776	115	0.00	188.94	107	0.22	2.41	79	0.06
HOLLY 97HX708	209	515.86	111	0.17	1503	97	0.28	188.65	107	0.23	2.45	80	0.07
HOLLY 97HX712	202	521.38	112	0.13	1613	104	0.11	183.76	104	0.46	3.64	119	0.09
HOLLY 97HX713	232	459.25	99	0.90	1592	103	0.29	178.80	102	0.79	3.36	110	0.38
HOLLY 97HX714	242	526.25	113	0.10	1583	102	0.39	180.08	102	0.70	3.02	98	0.89
HOLLY 97HX721	248	589.02	127	0.00	1709	110	0.00	176.15	100	0.99	3.19	104	0.70
HOLLY 97HX722	197	525.39	113	0.10	1579	102	0.46	158.19	90	0.09	2.26	74	0.02
MARIBO 9767	250	540.13	116	0.04	1488	96	0.15	169.96	97	0.57	2.32	76	0.03
MARIBO 9363 (CHECK #4)	208	454.29	98	0.80	1630	105	0.05	157.28	89	0.08	3.08	101	0.95
MARIBO 9757	215	493.70	106	0.43	1544	100	0.92	165.09	94	0.30	3.29	107	0.50
MARIBO 9759	204	565.03	122	0.01	1560	101	0.77	164.63	94	0.28	3.31	108	0.47
MARIBO 9766	234	407.24	88	0.13	1551	100	0.95	166.75	95	0.38	3.47	113	0.23
SEEDEX 1015	199	458.44	99	0.88	1488	96	0.15	160.56	91	0.15	2.64	86	0.21
SEEDEX SX1011	240	545.65	118	0.03	1538	99	0.81	147.85	84	0.01	2.20	72	0.01
SEEDEX SX1012	244	409.13	88	0.14	1436	93	0.01	188.61	107	0.23	3.36	110	0.39
SEEDEX SX1013	224	549.74	118	0.02	1495	97	0.21	172.05	98	0.71	2.48	81	0.09
SEEDEX SX1014	211	545.52	118	0.03	1487	96	0.14	174.03	99	0.85	2.54	83	0.12
VAN DER HAVE H46109	222	403.38	87	0.11	1491	96	0.18	152.16	86	0.02	2.40	78	0.05
VAN DER HAVE H66287	229	544.61	117	0.03	1432	93	0.01	173.67	99	0.83	2.97	97	0.78
VAN DER HAVE H66339	252	511.13	110	0.21	1468	95	0.06	168.58	96	0.48	2.80	91	0.44
VAN DER HAVE H66340	241	440.20	95	0.53	1512	98	0.39	143.16	81	0.00	2.73	89	0.33
VAN DER HAVE H66341	226	498.11	107	0.36	1570	101	0.58	178.52	101	0.81	3.77	123	0.04
VAN DER HAVE H68108	216	533.78	115	0.06	1662	107	0.01	180.05	102	0.70	3.84	125	0.02

GENERAL MEAN	463.97	1548	175.96	3.06
COEFF. OF VAR (%)	19.99	6.87	14.9	28.52
F VALUE	3.76	4.44	2.24	2.4
L.S.D. (.05)	10	0.05	116.7	0.51
L.S.D. (.01)	13	0.01	153.7	0.67

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropriate for comparing entry means with each other when F value is signficant

TABLE 18C. DEGRAFF SEMI COMMERCIAL

1997 SOUTHERN MINNESOTA SEMI COMMERCIAL CODED TEST
AMERICAN CRYSTAL SUGAR COMPANY RESEARCH CENTER

ENTRY	CODE	BOLTERS % MEAN	%	P-VAL	VIGOR MEAN	%	P-VAL
ACH 309 (CHECK #2)	249	0.00			1.28	73	0.01
BETA 3456 (APHAN SPEC)	251	0.00			1.28	73	0.01
BETA 3945 (APHAN SPEC)	236	0.00			2.71	154	0.00
BETA 5296 (APHAN SPEC)	206	0.00			2.14	122	0.03
BETA 6904 (CHECK #1)	231	0.00			1.71	97	0.81
BETA M701 (APHAN SPEC)	230	0.00			3.00	171	0.00
BETA M702 (APHAN SPEC)	200	0.00			2.43	138	0.00
BETA M703 BLEND (APHAN SPEC	220	0.00			2.86	163	0.00
BETA M704 (APHAN SPEC)	243	0.00			2.15	122	0.03
BETA M705 (RHIZOMANIA)	210	0.00			1.86	106	0.57
BETA M706 (RHIZOMANIA)	225	0.00			2.00	114	0.18
BETA M707 (RHIZOMANIA)	237	0.00			1.00	57	0.00
CROPLAN EX103	213	0.00			1.14	65	0.00
CRYSTAL 9601 (APHAN SPEC)	235	0.00			2.42	138	0.00
CRYSTAL 9700 (APHAN SPEC)	246	0.00			1.72	98	0.81
CRYSTAL 9708	201	0.21			1.85	105	0.59
CRYSTAL 9711	198	0.00			2.00	114	0.18
CRYSTAL 9712	217	0.00			1.72	98	0.82
CRYSTAL 9720 (APHAN SPEC)	247	0.00			2.29	130	0.00
CRYSTAL 9727	239	0.00			1.86	106	0.57
CRYSTAL 9740 (APHAN SPEC)	223	0.00			2.00	114	0.18
CRYSTAL 9744 (APHAN SPEC)	205	0.00			1.86	106	0.57
FILLER #1	228	0.00			1.85	105	0.60
FILLER #2	233	0.00			1.43	81	0.07
FILLER #3	214	0.00			1.43	81	0.07
HILLESHOG HECTOR (CHECK #3)	219	0.00			2.72	155	0.00
HM 7054	207	0.00			1.43	82	0.07
HM 7057	245	0.00			2.29	130	0.00
HM 7065	203	0.00			2.43	138	0.00
HM 7066	227	0.00			1.71	97	0.80
HM 7071 (RHIZOMANIA SPEC)	238	0.00			1.57	89	0.30
HM 7072 (RHIZOMANIA SPEC)	221	0.00			2.72	155	0.00
HM 7073 (RHIZOMANIA SPEC)	212	0.00			2.29	130	0.00
HM 7076 (RHIZOMANIA SPEC)	218	0.00			1.57	90	0.31
HOLLY 97HX708	209	0.00			1.43	81	0.07
HOLLY 97HX712	202	0.00			1.43	81	0.07
HOLLY 97HX713	232	0.00			1.85	105	0.60
HOLLY 97HX714	242	0.00			1.14	65	0.00
HOLLY 97HX721	248	0.00			1.43	81	0.07
HOLLY 97HX722	197	0.00			1.14	65	0.00
MARIBO 9767	250	0.00			1.15	65	0.00
MARIBO 9363 (CHECK #4)	208	0.00			1.71	97	0.81
MARIBO 9757	215	0.00			1.71	97	0.80
MARIBO 9759	204	0.00			2.43	138	0.00
MARIBO 9766	234	0.00			1.14	65	0.00
SEEDEX 1015	199	0.00			1.43	81	0.07
SEEDEX SX1011	240	0.00			1.43	81	0.07
SEEDEX SX1012	244	0.00			1.57	89	0.30
SEEDEX SX1013	224	0.00			1.29	73	0.01
SEEDEX SX1014	211	0.00			1.14	65	0.00
VAN DER HAVE H46109	222	0.00			2.14	122	0.03
VAN DER HAVE H66287	229	0.00			1.28	73	0.01
VAN DER HAVE H66339	252	0.00			1.14	65	0.00
VAN DER HAVE H66340	241	0.00			1.00	57	0.00
VAN DER HAVE H66341	226	0.00			1.00	57	0.00
VAN DER HAVE H68108	216	0.00			1.71	98	0.81

GENERAL MEAN		1.76	
COEFF. OF VAR (%)		27.37	
F VALUE		8.26	
L.S.D. (.05)		0.05	
L.S.D. (.01)		0.01	

* Significant at 5% ** Significant at 1% NS - Not significant
2nd column for each trait is percent of check. General Mean used as check.
3rd column for each trait is prob. that detection of a diff. of this size is due to chance.
Mean LSD is only appropritate for comparing entry means with each other when F value is signficant

VARIETIES EVALUATED FOR HIGH SUGAR AND CERCOSPORA LEAF SPOT TOLERANCE

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

EXPERIMENTAL PROCEDURES

Trials were planted at three locations in 1997. Two of three trials were carried through to harvest. 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 two trials that were retained for harvest were planted May 12.

Trials were harvested on September 5 at the Prinsburg location and September 9 at Clara City. 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 four times periodically from July 31 to August 22. KWS scale of 1-9 was used for rating criteria. Beta 5014, American Crystal 309 and Seedex Laser were used as approved variety checks and should be considered as such in analysis of data.

SUMMARY

Cercospora leaf spot in the growing season of 1997 again was a significant factor in the production of sugarbeets. The disease was kept in check through August. However, September was uncommonly favorable for cercospora leaf spot infestation. The data presented in Tables 1-3 indicate good production capabilities with varieties in comparison to Beta 5014, Seedex Laser and ACH 309. Cercospora leaf spot tolerance was equal or better in comparing varieties to check varieties. However, one needs to realize the data shows that existing approved varieties have equal tolerance to cercospora leaf spot and sugar production when compared to the majority of the tested varieties.

Sugarbeets were not significantly infested by cercospora leaf spot by late August. September climatic conditions presented a few infectious periods for cercospora leaf spot. This prompted severe cercospora leaf spot condition by mid to late September. The test results may have been more significantly affected if cercospora leaf spot would have infected sugarbeets at an earlier date.

Table 1. Cercospora leaf spot tolerant and high sugar variety trial, Prinsburg location. 1997

	SUCROSE	PERCENT OF MEAN (APPROVED) SUCROSE	LTM	PERCENT OF MEAN (APPROVED) LTM	TPA	PERCENT OF MEAN (APPROVED) TPA	RST	PERCENT OF MEAN (APPROVED) RST	RSA	PERCENT OF MEAN (APPROVED) RSA
97SXSM-1	13.90	105.8	1.02	97.2	20.4	97.9	258	106.5	5269	104.2
97SXSM-2	12.58	95.8	1.13	107.9	21.2	101.7	229	94.6	4853	96.0
97SXSM-3	12.77	97.2	1.07	101.9	20.6	99.0	234	96.7	4771	94.3
ACH 96001	12.99	98.9	1.09	104.2	21.2	102.0	238	98.4	5100	100.9
ACH 9601	12.97	98.7	1.11	105.6	19.3	92.5	237	98.0	4566	90.3
ACH 90400	13.02	99.1	1.07	102.0	20.1	96.6	239	98.8	4828	95.5
ACH 9700	13.37	101.8	1.03	98.1	20.5	98.5	247	102.0	5060	100.1
ACH 555	13.06	99.4	1.06	101.1	22.5	108.2	240	99.1	5430	107.4
ACH 640	13.59	103.4	0.98	93.9	19.6	94.3	252	104.2	4968	98.3
Beta M731	13.85	105.4	1.03	98.0	21.0	100.7	257	106.1	5372	106.2
Beta M732	13.03	99.2	1.14	108.9	22.3	107.2	238	98.2	5300	104.8
Beta M733	13.07	99.5	1.10	105.4	21.7	104.2	239	98.9	5188	102.6
Beta M734	13.12	99.9	1.08	103.2	21.9	105.4	241	99.5	5276	104.3
MEAN	13.18	100.3	1.07	102.1	20.9	100.6	242	100.1	5075	100.4
APPROVED VARIETIES										
Beta 5014	13.45	102.4	1.04	98.9	22.0	105.8	249	102.7	5512	109.0
Laser	12.90	98.2	1.08	103.2	20.5	98.6	236	97.7	4857	96.0
ACH 309	13.06	99.4	1.03	97.9	19.9	95.6	241	99.6	4801	95.0
MEAN	13.14	100.00	1.05	100.00	20.82	100.00	242	100.00	5057	100.00
OVERALL	**13.16**		**1.06**		**20.88**		**242**		**5066**	
C.V.	7.64		12.30		16.6		9		20	
L.S.D.	1.00		0.13		NS		22		NS	

Table 2. Cercospora leaf spot tolerant and high sugar variety trial, Clara City location. 1997

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TPA	PERCENT OF MEAN TPA	RST	PERCENT OF MEAN RST	RSA	PERCENT OF MEAN RSA
97SXSM-1	13.80	101.6	1.02	103.0	21.7	113.5	256	101.5	5544	115.0
97SXSM-2	13.15	96.8	0.95	95.9	19.4	101.2	244	96.9	4731	98.2
97SXSM-3	13.96	102.8	0.97	97.8	19.3	101.0	260	103.2	5023	104.2
ACH 96001	13.77	101.4	0.98	99.7	19.7	103.1	256	101.5	5045	104.7
ACH 9601	13.59	100.1	1.06	107.1	19.3	100.8	251	99.4	4837	100.4
ACH 90400	13.63	100.3	0.98	99.1	18.9	98.9	253	100.4	4781	99.2
ACH 9700	13.76	101.3	0.97	98.4	20.7	108.0	256	101.5	5277	109.5
ACH 555	12.93	95.2	0.96	97.0	20.1	105.2	240	95.1	4891	101.5
ACH 640	13.78	101.5	0.91	92.6	19.5	101.9	257	102.2	5000	103.7
Beta M731	13.96	102.8	0.96	97.5	19.8	103.5	260	103.2	5141	106.7
Beta M732	13.83	101.8	0.98	99.3	20.2	105.2	257	102.0	5169	107.2
Beta M733	13.41	98.7	1.06	107.8	20.0	104.5	247	97.9	4910	101.9
Beta M734	13.55	99.7	0.99	100.6	21.0	109.8	251	99.7	5259	109.1
MEAN	13.63	100.3	0.98	99.7	19.98	104.3	253	100.3	5047	104.7
Beta 5014	13.54	99.7	0.94	94.9	19.5	101.7	252	100.0	4907	101.8
Laser	13.72	101.0	1.06	106.9	20.5	107.2	253	100.5	5189	107.7
ACH 309	13.50	99.4	0.97	98.2	17.4	91.0	251	99.5	4364	90.5
MEAN	13.58	100.0	0.99	100.00	19.15	100.00	252	100.00	4820	100.00
OVERALL	**13.60**		**0.99**		**19.57**		**252**		**4933**	
C.V.	6.08		9.57		12.47		6.67		13.04	
L.S.D.	0.82		0.09		2.4		17		647	

Table 3. Cercospora leaf spot tolerant and high sugar variety trial, Combined data 1997

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TPA	PERCENT OF MEAN TPA	RST	PERCENT OF MEAN RST	RSA	PERCENT OF MEAN RSA
97SXSM-1	13.85	103.7	1.02	100.0	21.1	105.3	257	104.0	5407	109.5
97SXSM-2	12.87	96.3	1.04	102.1	20.3	101.4	236	95.8	4792	97.0
97SXSM-3	13.36	100.0	1.02	99.9	20.0	100.0	247	100.0	4897	99.2
ACH 96001	13.38	100.2	1.04	102.0	20.5	102.5	247	100.0	5072	102.7
ACH 9601	13.28	99.4	1.08	106.3	19.3	96.5	244	98.7	4701	95.2
ACH 90400	13.32	99.7	1.02	100.6	19.5	97.7	246	99.6	4805	97.3
ACH 9700	13.56	101.5	1.00	98.2	20.6	103.0	251	101.8	5168	104.7
ACH 555	13.00	97.3	1.01	99.1	21.3	106.8	240	97.0	5160	104.5
ACH 640	13.69	102.4	0.95	93.3	19.6	97.9	255	103.1	4984	100.9
Beta M731	13.91	104.1	0.99	97.7	20.4	102.0	258	104.6	5256	106.4
Beta M732	13.43	100.5	1.06	104.3	21.2	106.2	247	100.2	5234	106.0
Beta M733	13.24	99.1	1.08	106.5	20.9	104.4	243	98.4	5049	102.2
Beta M734	13.34	99.8	1.04	101.9	21.5	107.5	246	99.6	5268	106.7
MEAN	13.40	100.3	1.03	100.9	20.46	102.4	247	100.2	5061	102.5
APPROVED VARIETIES										
Beta 5014	13.49	101.0	0.99	97.0	20.8	103.8	250	101.3	5209	105.5
Laser	13.31	99.6	1.07	105.0	20.5	102.7	245	99.1	5023	101.7
ACH 309	13.28	99.4	1.00	98.0	18.7	93.4	246	99.6	4583	92.8
MEAN	13.36	100.0	1.02	100.0	19.98	100.0	247	100.0	4938	100.0
OVERALL	**26.76**		**1.02**		**20.22**		**247**		**5000**	
C.V.	6.99		11.73		14.79		8.15		16.37	
L.S.D.	0.65		0.08		2.1		14		574	

SMBSC RESEARCH - CODED CERCOSPORA, APHANOMYCES DATA AT SHAKOPEE

	CERCOSPORA READINGS					
	31 JUL	01 AUG	11 AUG	22 AUG	AVERAGE	ADJ. TO A.C. 5.5 EQUIV. *
CHECK	2.5	3.7	3.9	5	3.8	
LSD .05	0.6	0.7	0.8	0.9	0.5	
GRAND MEAN	2.4	3.6	3.8	5.4	3.9	
97SXSM-1	2.3	3.1	3.6	4.7	3.4	3.7
97SXSM-2	2.1	3.5	3.6	5.1	3.6	3.9
97SXSM-3	2.7	3.5	3.9	6.0	4.0	4.3
ACH 9600124	2.1	3.2	3.3	4.3	3.2	3.5
ACH 9601	2.2	3.7	4.1	5.2	3.8	4.1
ACH 9040013	2.0	2.8	3.7	4.2	3.2	3.5
ACH 9700	2.1	3.1	3.1	4.8	3.3	3.6
ACH 555	1.8	3.0	2.8	4.2	3.0	3.3
ACH 640	2.7	3.6	3.8	5.0	3.8	4.1
ACH 309	2.3	3.4	4.1	5.0	3.5	3.8
Beta M731	2.8	4.0	4.2	4.9	4.0	4.3
Beta M732	1.9	3.4	4.2	4.7	3.6	3.9
Beta M733	2.3	3.8	3.8	4.1	3.5	3.8
Beta M734	2.5	3.3	3.9	5.0	3.7	4.0
Beta 5014	2.3	4.0	3.8	5.0	3.8	4.1
Laser	2.7	3.6	3.4	5.1	3.7	4.0
SUSC. HYBRID CHECK	2.9	4.6	5.1	6.6	4.8	5.2
RESISTANT SOURCE	2	2.8	2.8	3.5	2.7	2.9

* Average cercospora ratings can be adjusted to American Crystal's 5.5 equivalent as the common checks were also included in their coded test.

VARIETY EVALUATED FOR SUGAR PRODUCTION IN RHIZOMANIA SOILS

OBJECTIVE: Evaluate varieties for yield and quality in presence of Rhizomania positive soils.

EXPERIMENTAL PROCEDURES

Trials were planted at three locations in 1997. Varieties were replicated eight times in a randomized complete block design. Entries were chosen by their tolerance to Rhizomania. The trials were planted May 22, 26 and 27. Varieties planted were as follows:

97SXSM-4	Beta M724	SSNB7R
97SXSM-5	Beta M725	VDH 68108
97SXSM-6	HM 7071	
ACH 9400464	HM 7072	
ACH 95060370	HM 7073	
ACH 95060373	HM 7076	
ACH 9650598	Maribo 9372	
ACH 9790001	Rhizosen	
ACH 9790002	Rival	
Beta M705	Rhizor	
Beta M706	SS-1V2R	
Beta M707	SS-289R	
Beta M721	SS-338R	
Beta M722	SS-694R	
Beta M723	SS-781R	

Beta 5014 was planted as border for experiment. Yield and quality data were obtained for comparisons.

Trials were harvested on September 10, 17 and 19. All three trials were harvested. However, data from one location is not presented due to experiment variability from aphanomyces root rot. The sugarbeets were harvested with a two row harvester and 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 and Aphanomyces root rot. Sugarbeets were rated for cercospora leaf spot four times periodically from July 31 through August 22. KWS scale of 1-9 was used for rating criteria. Aphanomyces root rot ratings were taken as a visual 1-9 scale.

SUMMARY

Rhizomania was discovered in the Southern Minnesota Sugar growing area in 1996. The need for Rhizomania tolerant varieties is great to maintain and increase the productivity of grower operations. Growers need varieties that are Rhizomania tolerant as well as cercospora leaf spot and seedling disease tolerant. To obtain all three of these factors and maintain production will be a challenge.

The data in Tables 1-3 indicate that varieties are available that provide good production of sugar in the presence of Rhizomania. Table 4-6 present data showing production data of these same varieties where Rhizomania was not present. These varieties were also tested for tolerance to Aphanomyces root rot and cercospora leaf spot (Table 7). When considering these data, one should concentrate on Tables 3 and 6 which are combined data for sites with and without Rhizomania. These data provide a good perspective of the varieties performance over various environments.

Table 1. Rhizomania positive variety trial , Bird Island location

EXPERIMENT 797

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TPA	PERCENT OF MEAN TPA	RST	PERCENT OF MEAN RST	RSA	PERCENT OF MEAN RSA
97SXSM-4	11.40	96.36	1.16	95.98	10.85	63.76	205	96.42	2214	61.62
97SXSM-5	11.26	95.19	1.21	100.32	14.31	84.11	201	94.54	2847	79.24
97SXSM-6	10.65	90.10	1.37	113.63	13.85	81.39	186	87.42	2568	71.48
ACH 9400464	11.63	98.31	1.16	96.33	13.64	80.18	209	98.54	2854	79.44
ACH 95060370	12.05	101.91	1.25	103.50	17.24	101.32	216	101.84	3707	103.18
ACH 95060373	12.92	109.22	1.09	90.02	14.35	84.35	237	111.37	3398	94.58
ACH 9650598	11.96	101.13	1.27	104.66	19.46	114.40	214	100.72	4145	115.38
ACH 9790001	11.39	96.32	1.10	90.64	13.54	79.58	206	97.01	2796	77.83
ACH 9790002	11.43	96.69	1.21	100.39	15.85	93.17	204	96.25	3260	90.74
BETA M705	12.16	102.83	1.19	98.17	17.99	105.74	220	103.37	3944	109.78
BETA M706	11.76	99.44	1.18	97.70	15.21	89.36	212	99.66	3207	89.27
BETA M707	12.24	103.49	1.31	108.08	23.15	136.03	219	103.01	5058	140.79
BETA M721	11.74	99.29	1.26	104.12	16.11	94.68	210	98.72	3388	94.29
BETA M722	11.31	95.68	1.28	106.13	17.31	101.73	201	94.42	3491	97.18
BETA M723	12.41	104.95	1.14	94.39	18.95	111.39	226	106.19	4223	117.53
BETA M724	12.58	106.34	1.05	87.11	18.58	109.21	230	108.49	4277	119.06
BETA M725	11.81	99.90	1.23	101.85	22.46	132.01	212	99.72	4718	131.32
HM 7071	12.41	104.94	1.21	100.16	19.66	115.54	224	105.55	4341	120.82
HM 7072	12.66	107.03	1.19	98.69	16.21	95.24	229	107.96	3632	101.11
HM 7073	12.84	108.58	1.17	96.50	17.69	103.98	234	110.02	4109	114.36
HM 7076	11.67	98.70	1.14	94.22	15.68	92.17	211	99.19	3285	91.43
MARIBO 9372	11.90	100.60	1.31	108.21	14.40	84.61	212	99.66	3026	84.24
RHIZOSEN (HH44)	11.15	94.26	1.19	98.71	15.01	88.21	199	93.83	2996	83.39
RIVAL (H103)	12.09	102.24	1.21	99.83	17.53	103.01	218	102.43	3794	105.61
RIZOR (HH108)	11.98	101.28	1.21	99.97	19.02	111.80	215	101.43	4060	113.01
SS-1V2R	11.00	93.04	1.26	104.29	18.20	106.99	195	91.71	3484	96.97
SS-289R	11.40	96.43	1.25	103.73	13.86	81.46	203	95.60	2790	77.67
SS-338R	11.84	100.10	1.19	98.83	14.15	83.13	213	100.31	2996	83.38
SS-694R	11.39	96.29	1.23	101.89	17.03	100.07	203	95.72	3422	95.25
SS-781R	10.95	92.63	1.34	110.66	18.22	107.06	192	90.59	3498	97.35
SS-NB7R	11.87	100.36	1.23	101.92	13.88	81.60	213	100.13	2933	81.64
VDH 68108	11.43	96.65	1.12	92.91	15.45	90.78	206	97.07	3185	88.66
MEAN	11.82	100.00	1.21	100.00	17.01	100.00	212	100.00	3593	100.00
C.V.	7.46		10.61		18.26		9.28		17.52	
L.S.D.	0.87		0.13		2.98		19		602	
BETA 5014	11.65		1.09		11.16		211		2357	

* BETA 5014 was planted as border to the trial and yield and quality data are presented as comparison only

Table 2. Rhizomania positive variety trial, Montevideo location

EXPERIMENT 597

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TONS/ ACRE	PERCENT OF MEAN TPA	REC. SUG./ TON (RST)	PERCENT OF MEAN RST	REC. SUG./ ACRE (RSA)	PERCENT OF MEAN RSA
97SXSM-4	12.09	98.73	1.13	96.33	12.59	79.62	219	98.87	2769	78.68
97SXSM-5	11.95	97.61	1.17	99.95	14.67	92.81	216	97.46	3190	90.64
97SXSM-6	11.71	95.70	1.21	103.49	16.19	102.43	210	94.80	3415	97.04
ACH 9400464	12.46	101.80	1.18	100.72	14.83	93.82	226	101.92	3382	96.11
ACH 95060370	12.58	102.76	1.15	98.52	15.78	99.84	228	103.16	3608	102.51
ACH 95060373	11.99	97.98	1.20	102.00	15.75	99.63	216	97.57	3417	97.10
ACH 9650598	12.21	99.78	1.17	99.83	16.53	104.56	221	99.72	3677	104.47
ACH 9790001	12.26	100.15	1.06	90.67	12.87	81.41	224	101.13	2935	83.40
ACH 9790002	12.30	100.49	1.15	97.89	14.97	94.69	223	100.73	3347	95.11
BETA M705	12.39	101.18	1.15	97.93	15.68	99.22	225	101.47	3549	100.83
BETA M706	11.83	96.67	1.24	105.90	17.14	108.45	212	95.71	3611	102.61
BETA M707	12.32	100.61	1.14	97.52	17.63	111.52	224	100.96	3962	112.57
BETA M721	12.32	100.68	1.15	98.41	15.98	101.06	224	100.96	3573	101.51
BETA M722	12.52	102.29	1.13	95.98	14.90	94.23	228	102.88	3414	97.01
BETA M723	12.43	101.57	1.14	97.60	16.75	105.97	226	102.03	3792	107.74
BETA M724	12.67	103.47	1.14	97.52	17.51	110.77	231	104.12	4039	114.75
BETA M725	12.46	101.83	1.21	103.38	17.31	109.50	225	101.69	3918	111.32
HM 7071	12.44	101.62	1.19	101.47	17.12	108.30	225	101.69	3878	110.19
HM 7072	12.54	102.48	1.14	96.94	15.25	96.46	228	103.05	3493	99.26
HM 7073	12.38	101.13	1.14	96.83	15.83	100.13	225	101.58	3617	102.76
HM 7076	12.60	102.96	1.16	98.57	17.15	108.47	229	103.44	3951	112.25
MARIBO 9372	12.08	98.71	1.16	98.90	14.54	91.98	219	98.70	3186	90.54
RHIZOSEN (HH4	12.07	98.64	1.22	104.15	15.69	99.23	217	97.97	3406	96.78
RIVAL (H103)	11.99	97.99	1.20	102.47	16.85	106.57	216	97.57	3638	103.37
RIZOR (HH108)	12.35	100.86	1.17	99.70	16.12	101.95	224	101.01	3639	103.40
SS-1V2R	11.89	97.15	1.30	111.00	16.45	104.06	212	95.71	3493	99.25
SS-289R	12.34	100.85	1.15	98.35	15.37	97.20	224	101.13	3479	98.85
SS-338R	12.32	100.65	1.16	98.85	15.73	99.48	223	100.79	3560	101.14
SS-694R	11.80	96.40	1.27	108.09	17.39	110.01	211	95.20	3738	106.21
SS-781R	12.24	99.97	1.17	99.59	16.14	102.07	222	100.11	3581	101.75
SS-NB7R	11.71	95.64	1.21	103.57	15.53	98.26	210	94.80	3259	92.59
VDH 68108	12.44	101.66	1.15	97.86	13.65	86.33	226	102.09	3106	88.25
MEAN	12.24	100.00	1.17	100.00	15.81	100.00	221	100.00	3519	100.00
L.S.D.	0.86		0.14		3.65		18		948	
C.V.	7.09		12.23		23.41		8.43		27.35	
BETA 5014	12.01		1.12		10.36		218		2256	

*BETA 5014 was planted as border to the trial and yield and quality data are presented as comperison only

Table 3. Rhizomania positive variety trial, Combined data

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TPA	PERCENT OF MEAN TPA	RST	PERCENT OF MEAN RST	RSA	PERCENT OF MEAN RSA
97SXSM-4	11.74	97.71	1.14	96.10	11.72	72.48	212	97.84	2491	71.09
97SXSM-5	11.60	96.57	1.19	100.08	14.49	89.63	208	96.19	3019	86.14
97SXSM-6	11.18	93.09	1.29	108.57	15.02	92.91	198	91.34	2992	85.37
ACH 9400464	12.04	100.24	1.17	98.44	14.24	88.06	217	100.44	3118	88.99
ACH 95060370	12.31	102.50	1.20	100.99	16.51	102.13	222	102.69	3657	104.37
ACH 95060373	12.45	103.66	1.14	95.86	15.05	93.09	226	104.51	3408	97.25
ACH 9650598	12.09	100.59	1.22	102.22	18.00	111.32	217	100.38	3911	111.60
ACH 9790001	11.82	98.41	1.08	90.61	13.21	81.68	215	99.28	2866	81.78
ACH 9790002	11.87	98.77	1.18	99.10	15.41	95.32	214	98.70	3304	94.28
BETA M705	12.27	102.15	1.17	98.00	16.84	104.15	222	102.57	3746	106.91
BETA M706	11.80	98.18	1.21	101.68	16.17	100.05	212	97.81	3409	97.29
BETA M707	12.28	102.18	1.22	102.83	20.39	126.10	221	102.14	4510	128.70
BETA M721	12.03	100.15	1.21	101.25	16.04	99.23	217	100.03	3480	99.31
BETA M722	11.92	99.19	1.20	101.08	16.10	99.60	214	98.91	3453	98.53
BETA M723	12.42	103.38	1.14	95.92	17.85	110.42	226	104.25	4007	114.36
BETA M724	12.62	105.04	1.10	92.18	18.05	111.62	230	106.44	4158	118.66
BETA M725	12.14	101.03	1.22	102.55	19.89	123.00	218	100.90	4318	123.22
HM 7071	12.42	103.41	1.20	100.75	18.39	113.75	225	103.76	4109	117.27
HM 7072	12.60	104.87	1.16	97.77	15.73	97.28	229	105.63	3563	101.68
HM 7073	12.61	104.94	1.15	96.61	16.76	103.67	229	105.89	3863	110.23
HM 7076	12.14	101.02	1.15	96.31	16.41	101.53	220	101.53	3618	103.24
MARIBO 9372	11.99	99.79	1.23	103.57	14.47	89.49	215	99.34	3106	88.65
RHIZOSEN (HH	11.61	96.63	1.21	101.33	15.35	94.93	208	96.11	3201	91.35
RIVAL (H103)	12.04	100.23	1.20	101.07	17.19	106.31	217	100.12	3716	106.05
RIZOR (HH108)	12.16	101.21	1.19	99.78	17.57	108.67	220	101.39	3849	109.85
SS-1V2R	11.45	95.27	1.28	107.53	17.33	107.17	203	93.91	3489	99.55
SS-289R	11.87	98.83	1.20	101.03	14.61	90.39	213	98.59	3135	89.45
SS-338R	12.08	100.53	1.18	98.79	14.94	92.38	218	100.72	3278	93.53
SS-694R	11.59	96.49	1.25	104.88	17.21	106.44	207	95.61	3580	102.17
SS-781R	11.59	96.50	1.25	105.15	17.18	106.24	207	95.61	3539	101.00
SS-NB7R	11.79	98.11	1.22	102.68	14.71	90.98	211	97.58	3096	88.35
VDH 68108	11.94	99.35	1.14	95.29	14.55	89.98	216	99.80	3146	89.77
MEAN	12.01	100.00	1.19	100.00	16.17	100.00	216	100.00	3504	100.00
C.V.	5.62		8.56		14.26		7.38		13.29	
L.S.D.	0.54		0.09		1.69		14		430	
BETA 5014	11.63		1.11		10.76		215		2307	

Table 4. Rhizomania negative variety trial, Clara City location

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TPA	PERCENT OF MEAN TPA	RST	PERCENT OF MEAN RST	RSA	PERCENT OF MEAN RSA
RHIZOSEN (HH44)	14.10	99.56	0.91	99.91	18.680	110.89	264	99.59	4929	110.47
BETA M723	13.97	98.62	0.93	101.23	18.845	111.87	261	98.46	4886	109.49
ACH 95060373	14.28	100.87	0.94	102.25	18.225	108.19	267	100.77	4855	108.82
97SXSM-6	14.32	101.12	0.92	100.29	18.092	107.40	268	101.15	4847	108.62
MARIBO 9372	14.33	101.22	0.91	99.49	17.972	106.69	268	101.33	4839	108.45
SS-781R	13.89	98.11	0.92	100.30	18.393	109.19	260	97.98	4762	106.72
SS-NB7R	14.11	99.65	0.90	98.35	17.855	105.99	264	99.78	4708	105.51
SS-338R	13.80	97.42	0.95	103.53	18.261	108.41	257	96.99	4668	104.62
BETA M721	14.22	100.42	0.93	101.13	17.316	102.80	266	100.39	4612	103.36
RIVAL (H103)	14.48	102.26	0.93	101.23	17.011	100.98	271	102.28	4612	103.36
SS-694R	13.76	97.14	0.94	102.23	18.150	107.75	257	96.85	4611	103.33
RIZOR (HH108)	14.55	102.75	0.89	96.93	16.836	99.95	273	103.18	4608	103.28
SS-1V2R	13.98	98.75	0.95	104.03	17.266	102.50	261	98.46	4499	100.83
SS-289R	14.06	99.28	0.92	100.35	17.109	101.57	263	99.16	4478	100.36
HM 7076	14.05	99.20	0.92	100.35	17.142	101.76	263	99.21	4470	100.19
BETA M705	14.13	99.77	0.93	101.59	16.674	98.98	264	99.68	4407	98.77
HM 7073	14.34	101.27	0.91	99.96	16.211	96.24	269	101.38	4357	97.65
ACH 9400464	14.06	99.29	0.90	97.87	16.632	98.73	263	99.45	4356	97.63
HM 7072	14.30	100.95	0.91	99.55	16.332	96.95	268	101.10	4355	97.61
97SXSM-5	14.62	103.27	0.89	97.78	15.867	94.19	275	103.74	4354	97.58
BETA M722	14.28	100.84	0.90	98.78	16.220	96.29	268	101.00	4344	97.35
ACH 9790001	13.93	98.33	0.93	101.93	16.694	99.10	260	98.17	4337	97.21
BETA M724	14.12	99.72	0.92	100.25	15.701	93.21	262	98.97	4322	96.85
ACH 95060370	14.58	102.97	0.91	99.24	15.731	93.39	274	103.27	4292	96.18
BETA M706	14.19	100.21	0.90	98.72	15.570	92.43	265	100.11	4286	96.05
BETA M725	14.07	99.37	0.93	101.08	16.090	95.52	263	99.31	4245	95.14
VDH 68108	14.37	101.45	0.91	99.01	15.635	92.82	269	101.62	4211	94.38
ACH 9790002	14.12	99.70	0.92	100.20	16.140	95.81	264	99.64	4201	94.16
BETA M707	14.19	100.23	0.93	101.24	15.680	93.08	266	100.25	4167	93.38
HM 7071	14.44	101.94	0.90	97.85	15.241	90.48	271	102.23	4136	92.70
97SXSM-4	14.09	99.53	0.95	103.67	15.413	91.50	263	99.31	4055	90.89
ACH 9650598	13.42	94.80	0.82	89.70	16.061	95.34	252	95.20	3975	89.08
MEAN	**14.16**	**100.00**	**0.92**	**100.00**	**16.85**	**100.00**	**265**	**100.00**	**4462**	**100.00**
L.S.D.	0.88		0.09		3.113		17.70		821.91	
BETA 5014	14.5		0.91		16.93		271.8		4602	

* BETA 5014 was planted as border to the trial and yield and quality data are presented as comparison only

Table 5. Rhizomania negative variety trial, Prinsburg locaton

	SUCROSE	percent of mean SUCROSE	LTM	percent of mean LTM	TPA	percent of mean TPA	RST	percent of mean RST	RSA	percent of mean RSA
ACH 95060373	12.35	101.28	1.24	105.30	25.40	119.89	222	100.80	5648	121.40
RIZOR (HH108)	12.09	99.12	1.16	98.32	25.03	118.14	219	99.21	5483	117.86
BETA M724	12.02	98.55	1.27	107.74	25.24	119.11	215	97.57	5407	116.22
VDH 68108	12.59	103.26	1.14	96.89	22.42	105.83	229	103.98	5097	109.57
ACH 95060370	12.06	98.87	1.24	105.24	23.59	111.33	216	98.19	5094	109.49
HM 7071	12.11	99.30	1.22	103.80	22.80	107.62	218	98.87	4956	106.54
BETA M707	11.80	96.72	1.14	97.04	23.44	110.64	213	96.71	4929	105.95
HM 7072	12.59	103.27	1.16	98.82	21.56	101.74	229	103.75	4897	105.26
BETA M722	12.25	100.44	1.16	98.68	21.86	103.18	222	100.63	4854	104.33
97SXSM-5	13.08	107.29	1.11	93.91	20.01	94.47	240	108.69	4800	103.18
ACH 9790001	12.28	100.65	1.21	102.82	21.40	101.01	221	100.46	4745	101.99
RHIZOSEN (HH44)	12.80	104.96	1.07	91.19	20.20	95.35	235	106.42	4738	101.84
SS-694R	12.30	100.82	1.19	101.34	21.30	100.52	222	100.80	4689	100.79
97SXSM-6	12.82	105.11	1.11	94.15	19.91	94.00	234	106.30	4659	100.15
BETA M723	11.53	94.54	1.31	110.92	22.73	107.26	204	92.74	4643	99.81
BETA M721	11.66	95.64	1.24	105.53	22.16	104.60	209	94.62	4636	99.65
SS-1V2R	12.23	100.24	1.15	97.35	20.99	99.05	221	100.46	4629	99.51
MARIBO 9372	11.54	94.63	1.26	106.77	22.36	105.54	206	93.37	4597	98.81
97SXSM-4	12.29	100.74	1.14	97.26	20.45	96.54	223	101.08	4564	98.10
ACH 9650598	11.76	96.45	1.17	99.43	21.55	101.72	212	96.15	4546	97.71
SS-781R	12.77	104.72	1.08	91.66	19.34	91.28	234	106.13	4521	97.18
HM 7076	12.33	101.10	1.16	98.23	20.44	96.47	223	101.37	4496	96.66
SS-338R	12.28	100.73	1.12	95.25	20.14	95.04	223	101.25	4480	96.31
SS-NB7R	12.52	102.62	1.10	93.85	19.61	92.56	228	103.58	4447	95.59
BETA M705	12.02	98.52	1.20	101.97	20.46	96.57	216	98.19	4443	95.50
BETA M725	12.26	100.52	1.17	99.37	20.00	94.38	222	100.63	4419	95.00
SS-289R	12.47	102.23	1.17	99.20	19.15	90.40	226	102.56	4314	92.73
ACH 9790002	12.55	102.94	1.21	102.67	18.78	88.62	227	102.95	4230	90.94
RIVAL (H103)	12.56	103.00	1.09	92.63	17.97	84.82	229	104.09	4121	88.58
BETA M706	11.70	95.93	1.24	105.35	19.42	91.66	209	94.90	4070	87.49
HM 7073	11.05	90.61	1.19	101.09	20.30	95.81	197	89.51	3992	85.82
ACH 9400464	11.61	95.20	1.25	106.23	17.98	84.84	207	94.05	3724	80.05
MEAN	**12.20**	100.00	**1.18**	100.00	**21.19**	100.00	**220**	100.00	**4652**	100.00
C.V.	8.73		12.56		11.36		10.64		13.9	
L.S.D.	1.05		0.15		2.37		23.12		637.2	
BETA 5014	12.49		1.14		20.08		227		4554	

* BETA 5014 was planted as border to the trial and yield and quality data are presented as comparison only

TABLE 6. Rhizomania negative variety trial, combined data.

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TPA	PERCENT OF MEAN TPA	RST	PERCENT OF MEAN RST	RSA	PERCENT OF MEAN RSA
ACH 95060373	13.32	101.06	1.09	101.35	21.810	114.70	244.50	100.78	5251.4	115.24
RIZOR (HH108)	13.32	101.07	1.02	95.29	20.930	110.07	245.94	101.38	5045.6	110.72
BETA M724	13.07	99.18	1.09	101.87	20.468	107.64	238.56	98.33	4864.1	106.74
RHIZOSEN (HH44	13.45	102.06	0.99	92.61	19.441	102.24	249.12	102.69	4833.4	106.07
BETA M723	12.75	96.73	1.12	104.03	20.785	109.31	232.56	95.86	4764.3	104.55
97SXSM-6	13.57	102.97	1.01	94.54	19.003	99.93	251.06	103.49	4752.8	104.30
MARIBO 9372	12.94	98.17	1.09	101.18	20.166	106.05	237.06	97.72	4717.9	103.53
ACH 95060370	13.32	101.07	1.07	100.19	19.659	103.38	244.94	100.96	4692.7	102.98
VDH 68108	13.48	102.28	1.02	95.52	19.028	100.07	249.12	102.69	4654.2	102.13
SS-694R	13.03	98.85	1.06	99.20	19.723	103.72	239.31	98.64	4649.6	102.03
SS-781R	13.33	101.17	1.00	93.02	18.865	99.21	246.69	101.69	4641.3	101.85
HM 7072	13.44	102.02	1.04	96.57	18.944	99.62	248.19	102.30	4625.9	101.51
BETA M721	12.94	98.21	1.84	171.39	19.738	103.80	237.19	97.77	4623.8	101.47
BETA M722	13.26	100.65	1.03	96.28	19.039	100.12	244.62	100.83	4598.7	100.92
SS-NB7R	13.31	101.03	1.00	93.43	18.733	98.51	246.25	101.50	4577.4	100.45
97SXSM-5	13.85	105.13	1.00	93.25	17.941	94.35	257.12	105.99	4576.8	100.43
SS-338R	13.04	98.95	1.03	96.40	19.199	100.96	240.00	98.93	4574.4	100.38
SS-1V2R	13.10	99.44	1.05	97.68	19.126	100.58	241.06	99.37	4564.2	100.16
BETA M707	12.99	98.60	1.03	96.40	19.561	102.87	239.31	98.64	4547.8	99.80
HM 7071	13.27	100.71	1.06	98.79	19.021	100.03	244.31	100.70	4546.2	99.76
ACH 9790001	13.10	99.41	1.07	99.95	19.046	100.16	240.69	99.21	4541	99.65
HM 7076	13.19	100.08	1.04	96.69	18.791	98.82	243.06	100.19	4483.3	98.38
BETA M705	13.07	99.20	1.07	99.49	18.566	97.64	240.19	99.01	4424.8	97.10
SS-289R	13.26	100.65	1.04	97.21	18.131	95.35	244.31	100.70	4395.8	96.46
RIVAL (H103)	13.52	102.60	1.10	102.52	17.491	91.98	250.12	103.10	4366.4	95.82
BETA M725	13.17	99.90	1.05	97.57	18.043	94.89	242.37	99.91	4332.3	95.07
97SXSM-4	13.19	100.08	1.05	97.68	17.933	94.31	242.87	100.11	4309.4	94.57
ACH 9650598	12.59	95.56	0.99	92.73	18.806	98.90	232.00	95.63	4260.2	93.49
ACH 9790002	13.34	101.20	1.06	99.08	17.458	91.81	245.37	101.14	4215.8	92.51
BETA M706	12.94	98.23	1.07	100.01	17.494	92.00	237.12	97.74	4177.8	91.68
HM 7073	12.70	96.34	1.05	98.09	18.254	96.00	232.87	95.99	4174.7	91.61
ACH 9400464	12.84	97.41	1.07	100.01	17.304	91.00	235.31	97.00	4040.1	88.66
MEAN	13.18	100.00	1.07	100.00	19.02	100.00	242.60	100.00	4557.00	100.00
C.V.	10.71		17.52		19.51		12.79		16.8	
L.S.D.	0.9807		0.13		2.57		21.57		532.08	
BETA 5014	13.50		1.03		18.50		250		4578	

* BETA 5014 was planted as border to the trial and yield and quality data are presented as comparison only

TABLE 7. SMBSC RESEARCH - CODED CERCOSPORA, APHANOMYCES DATA AT SHAKOPEE WITH RHIZOMANIA TOLERANT VARIETIES

	CERCOSPORA READINGS						APHANOMYCES RESISTANCE READINGS	R1**	
	31 JUL	01 AUG	11 AUG	22 AUG	AVG.	ADJ. TO A.C. 5.5 EQUIV. *		ACTUAL	% CHECK
CHECK	2.5	3.7	3.9	5.0	3.8		CHECK	3.6	3.6
LSD .05	0.6	0.7	0.8	0.9	0.5		LSD .05	1.3	36
GRAND MEAN	2.4	3.6	3.8	5.4	3.9		GRAND MEAN	4.4	120
SS-338R	2.2	3.4	3.3	5.2	3.5	3.8	SS-338R	4.5	124
SS-NB7R	2.1	3.5	3.9	6.3	3.9	4.2	SS-NB7R	4.8	131
SS-1V2R	2.1	3.5	4.0	6.1	4.0	4.3	SS-1V2R	4.6	128
SS-781R	2.5	3.9	4.5	5.6	4.2	4.6	SS-781R	5.8	159
SS-289R	2.7	3.6	3.7	6.0	4.0	4.3	SS-289R	3.9	107
SS-694R	2.6	3.7	4.0	5.5	3.9	4.2	SS-694R	5.3	145
RIVAL (H103)	2.1	3.9	4.7	6.1	4.2	4.6	RIVAL (H103)	4.3	117
RIZOR (HH108)	2.5	4.6	5.1	6.4	4.7	5.1	RIZOR (HH108)	5.1	141
RHIZOSEN (HH44)	2.4	3.6	4.5	5.7	4.1	4.5	RHIZOSEN (HH44)	4.0	110
HM 7076	2.5	3.3	4.2	6.5	4.1	4.5	HM 7076	5.9	162
HM 7072	2.6	3.6	4.7	6.2	4.3	4.7	HM 7072	4.0	110
HM 7071	2.7	3.8	4.5	6.6	4.4	4.8	HM 7071	5.8	159
HM 7073	2.4	3.5	4.1	5.6	3.9	4.2	HM 7073	4.0	110
97SXSM-4	1.8	2.7	3.4	3.9	3.0	3.3	97SXSM-4	2.5	69
97SXSM-5	2.4	4.1	4.1	5.5	4.0	4.3	97SXSM-5	4.1	114
97SXSM-6	2.7	3.7	4.1	5.2	3.9	4.2	97SXSM-6	3.8	103
BETA M705	2.8	3.9	4.3	6.2	4.3	4.7	BETA M705	4.0	110
BETA M706	2.3	3.6	3.8	4.4	3.5	3.8	BETA M706	4.6	128
BETA M707	2.6	4.2	4.1	5.2	4.1	4.5	BETA M707	5.5	152
BETA M721	2.4	3.8	3.8	5.5	3.9	4.2	BETA M721	4.9	134
BETA M722	2.8	3.8	4.2	6.1	4.2	4.6	BETA M722	4.6	128
BETA M723	2.5	4.0	3.6	5.1	3.8	4.1	BETA M723	4.8	131
BETA M724	3.3	4.1	3.9	5.6	4.2	4.6	BETA M724	3.5	97
BETA M725	3.3	3.7	3.9	5.9	4.2	4.6	BETA M725	3.6	100
MARIBO 9372	2.2	3.9	4.0	5.5	3.9	4.2	MARIBO 9372	3.8	103
ACH 9790001	2.6	3.6	3.6	5.0	3.7	4.0	ACH 9790001	2.3	62
ACH 9790002	2.8	3.7	3.8	6.1	4.1	4.5	ACH 9790002	3.8	103
ACH 95060373	2.6	4.2	4.1	6.7	4.4	4.8	ACH 95060373	5.0	138
ACH 95060370	2.2	3.7	4.4	6.2	4.1	4.5	ACH 95060370	5.1	141
ACH 9400464	2.1	3.9	4.1	6.1	4.0	4.3	ACH 9400464	4.5	124
ACH 9650598	2.7	3.7	4.1	6.8	4.3	4.7	ACH 9650598	5.3	145
VDH 68108	2.0	3.5	3.2	4.4	3.3	3.8	VDH 68108	2.0	55
							MICH. TOLERANT VARIETY	2.6	72
							RRV SUSCEPTIBLE	4.3	117
SUSC. HYBRID CHECK	2.9	4.6	5.1	6.6	4.8	5.2	SUSC. HYBRID CHECK	5.1	141
RESISTANT SOURCE	2.0	2.8	2.8	3.5	2.7	2.9	RESISTANT SOURCE	2.5	69

* Average cercospora ratings can be adjusted to American Crystal's 5.5 equivalent as the common checks were also included in their coded test.

** Aphanomyces rating R1 is based on a Visual scale of 1 to 9. This scale factors in plant stand and plant health, where "1" is healthiest and "9" is dead. The % of check value is directly comparable to that reported for the A.C. coded Aphanomyces readings, as the same 4 checks were used in both tests.

VAPAM CONTROL OF RHIZOMANIA

OBJECTIVE: To evaluate Vapam (sodium methyldithiocarbomate) on control of Rhizomania and that influence on sugarbeet yield and quality.

EXPERIMENTAL PROCEDURES

Vapam was applied to 0, 4, 6 and 9 gallons per acre in 20 gallons per acre solution. The treatments were incorporated immediately with a 5 ft. rototiller at a depth of 4 inches.

The experimental design was a randomized complete block design. Experimental units were 11 ft. (6 rows) wide and 30 ft. long.

Sugarbeet seed Beta 5014 was planted on May 22, 26 and 27. The middle 2 rows of the 6 row experimental unit were harvested on September 10, 17 and 19. Sugarbeets were analyzed for yield and quality.

SUMMARY

Two of three trial data are included in Tables 1 and 2. The third trial is not presented due to excess root rot. Combined data from the two trials presented are shown in Table 3. Data was non-significant regardless of the treatment or production factor. This indicates that the use of Vapam at rates tested did not control Rhizomania. Higher rates of Vapam may need to be tested for control of Rhizomania in future tests.

TABLE 1. RHIZOMANIA CONTROL WITH VAPAM, MONTEVIDEO LOCATION

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TPA	PERCENT OF MEAN TPA	RST	PERCENT OF MEAN RST	RSA	PERCENT OF MEAN RSA
Vapam 0 gal/A	12.045	100.6	0.9757	100.4	13.012	107.4	221.33	100.6	2893.2	108.1
Vapam 4 gal/A	12.075	100.8	0.9585	98.7	12.225	100.9	222.33	101.0	2721.0	101.7
Vapam 6 gal/A	11.948	99.7	0.9608	98.9	12.180	100.5	219.67	99.8	2679.5	100.1
Vapam 9 gal/A	11.848	98.9	0.9907	102.0	11.052	91.2	217.00	98.6	2411.2	90.1
MEAN	**11.979**		**0.971425**		**12.11725**		**220.0833**		**2676.225**	
C.V.	3.28		6.73		22.54		3.78		24.19	
L.S.D.	NS		NS		NS		NS		NS	

TABLE 2. RHIZOMANIA CONTROL WITH VAPAM, BIRD ISLAND LOCATION

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TPA	PERCENT OF MEAN TPA	RST	PERCENT OF MEAN RST	RSA	PERCENT OF MEAN RSA
Vapam 0 gal/A	11.712	99.8	0.9838	101.4	10.632	100.4	214.667	99.7	2286.8	100.3
Vapam 4 gal/A	12.023	102.4	0.9095	93.7	10.352	97.8	222.333	103.2	2295.3	100.7
Vapam 6 gal/A	11.700	99.6	1.0235	105.5	10.888	102.8	213.500	99.1	2318.3	101.7
Vapam 9 gal/A	11.530	98.2	0.9647	99.4	10.478	99.0	211.167	98.0	2219.8	97.4
MEAN	**11.741**		**0.970**		**10.588**		**215.417**		**2280.1**	
C.V.	5.16		7.62		19.09		5.91		19.84	
L.S.D.	NS		NS		NS		NS		NS	

TABLE 3. COMBINED DATA FOR RHIZOMANIA CONTROL WITH VAPAM

	SUCROSE	PERCENT OF MEAN SUCROSE	LTM	PERCENT OF MEAN LTM	TPA	PERCENT OF MEAN TPA	RST	PERCENT OF MEAN RST	RSA	PERCENT OF MEAN RSA
Vapam 0 gal/A	11.878	100.2	0.9798	100.9	11.822	104.1	218.000	100.1	2590.0	104.5
Vapam 4 gal/A	12.049	101.6	0.9340	96.2	11.288	99.4	222.333	102.1	2508.2	101.2
Vapam 6 gal/A	11.824	99.7	0.9922	102.2	11.534	101.6	216.583	99.5	2498.9	100.8
Vapam 9 gal/A	11.689	98.6	0.9777	100.7	10.765	94.8	214.083	98.3	2315.5	93.4
MEAN	**11.860**		**0.9709**		**11.352**		**217.750**		**2478.150**	
C.V.	4.26		7.22		21.59		4.88		23.26	
L.S.D.	NS		NS		NS		NS		NS	

CERCOSPORA LEAFSPOT CONTROL IN EASTERN NORTH DAKOTA AND MINNESOTA IN 1997

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Cercospora leafspot, caused by the fungus ***Cercospora beticola***, is the most serious disease of sugarbeet in the Red River Valley. This disease may cause reductions in tonnage and sucrose, and increased impurities. Losses of 30 percent in recoverable sucrose are fairly common under moderate disease conditions. Roots of affected plants do not store in the pile as well as roots of healthy plants. Limited tolerance to the triphenyl tin hydroxide (TPTH) fungicides was identified in the Southern Red River Valley and Southern Minnesota in 1994. This tin tolerance has increased in incidence and severity in the Red River Valley and southern Minnesota.

OBJECTIVES:

The research objectives were to evaluate efficacy of fungicides alone or in tank mixes for control of Cercospora leafspot. Research sites were established near known sites of TPTH tolerance near Hector and Breckenridge, Minnesota. A third site was established at the Northwest Experiment Station of the University of Minnesota at Crookston, Minnesota. TPTH tolerance was identified in varying degrees at all three sites. Cooperating producers who made this research possible were Doug Tischer and Richard Kruse, Jr. at Breckenridge, Minnesota and Bill Luschen and Terry Noble in southern Minnesota.

PROCEDURES:

The cultural practice information is given for each location in **Table 1**. At all locations plots were six rows wide and 30 or 35 feet long. The middle four rows received the fungicide applications. The middle two rows of each plot were harvested for yield and quality determinations. The Crookston and Wahpeton-Breckenridge analysis was completed at the East Grand Forks American Crystal quality lab. Southern Minnesota site samples were analyzed for quality at the Southern Minnesota Cooperative Lab at Renville, MN. Each treatment was replicated four or six times. All treatments containing Dithane had CS-7 spreader sticker used at the recommended rate. Leafspot severity was rated on the KWS scale of 1 to 9. One is no disease, a 3 rating is at early stages of economic loss level, and a 9 rating has only new leaf growth living. **Table 2** provides more information on the registration status of each product evaluation

A few general comments about the 1997 season. Planting was delayed some in Southern Minnesota and wet conditions prevailed for several periods in 1997 in all areas. However, the 1997 growing season was cooler than normal through much of July and part of August. Cool temperatures slowed cercospora development in July and early August. Disease development accelerated in the last half of August, and progressed at a much greater rate in September than normal. Disease development continued for at least 7-10 days into October with above normal temperatures, adequate relative humidity or rainfall and absence of a killing frost.

Rainfall was below normal through the late summer and early fall at Breckenridge. This resulted in above expected crop quality and lower than expected yields at that site. Disease severity was lower than 1995 at all locations and generally similar to 1996 disease severity at Crookston and Breckenridge. It was observed that many 1997 fields probably should have received at least one more fungicide application in September. The agronomic practices and fungicide application dates for each location are shown in Table 1.

Table 1. Cultural Practice Information For Each Research Site in 1997.

	Breckenridge	So. MN.	Crookston
Planting Date	5-May	14-May	6-May
Previous Crop	Wheat	Corn	Small Grain
Variety	VDH 66140	VDH 66140	VDH 66140
Weed Control	Betamix/Stinger	Eptam-Roneet	Betamix/Stinger
	Betanex	Betamix/Stinger	Betanex
	Poast	Betanex	Poast
	Hand Labor	Poast	Hand Labor
	Cultivation	Hand Labor	Cultivation
		Cultivation	
Insecticide	None	None	Counter
Plant Pop. at Thinning	35,000 plants/A	35,000 plants/A	35,000 plants/A

Spray Dates	Wahpeton	So. MN.	Crookston
1st	11-July	14-July	29-July
2nd	18-July	21-July	5-August
3rd	21-July	24-July	8-August
4th	24-July	28-July	12-August
5th	31-July	4-August	18-August
6th	7-August	11-August	19-August
7th	11-August	14-August	26-August
8th	15-August	18-August	28-August
9th	21-August		2-September
10th	22-August		5-September
11th	29-August		
Spray Volume (gpa)	20.0	20.0	20.0
Spray Pressure (psi)	110	120	100
Rain and/or wet conditions may have occasionally kept application intervals from being exactly correct.			
Harvest Date	24-September	25-September	26-September

Table 2. A Description of Treatments Evaluated and their Present Registration Status

Treatment	Labeled	Description
Terranil 6L	No	Terra Chemical – contains Chlorthalinol
Terranil Copper	No	Terra Chemical – contains Chlorthaninal plus Copper
Quadris	No	Zeneca Experimental
Quadris	No	Zeneca Experimental
Quadris	No	Zeneca Experimental
Quadris + TPTH(Super Tin)	No	Zeneca plus Griffin Tank mix
Bravo Weather Stick	No	ISK Biosciences Chlorthalinol
Bravo Weather Stick	No	ISK Biosciences Chlorthalinol
Bravo Ultrex	No	ISK Biosciences Chlorthalinol
Bravo Weather Stick + TPTH	No	ISK Biosciences Plus Griffin Tank mix
Experiment 1 low rate	No	Registered and used in Europe
Experiment 1 high rate	No	Registered and used in Europe
Experiment 2 low rate	No	Registered and used in Europe
Experiment 2 high rate	No	Registered and used in Europe
Check		Season long unsprayed
Govern (+ Latron CS-7 @ 0.12% v/v)	No	Rohm & Haas Experimental
Govern + TPTH + (Latron CS-7 @ 0.12% v/v)	No	Rohm & Haas plus Griffin
Persist	No	Rohn & Haas oil based Mancozeb
Protex (appl 1-4) Manex remaining appl.	Yes	Griffin products
GX 514	No	Griffin TPTH plus Tilt
Eminent 125 SC	No	Sostram Co. Experimental
Eminent Star	No	Sostram Co. Experimental
Tilt	No	Novartis Experimental
TPTH + Tactic	No	Griffin TPTH Plus Silicone Sticker/Spreader
TPTH (4 appl.) Manex (remaining)	Yes	Griffin TPTH at 5.0 oz/A rate
TPTH (3 appl.) Manex (Remaining)	Yes	Griffin TPTH at 3.75 oz/A rate
Topsin M 70 W	Yes	Elf-Atochem benzimidazole
Topsin M + TPTH	Yes	Elf-Atochem + Griffin
Dithane	Yes	Rohm & Haas Mancozeb
See Attached # 30	Yes	Resistance management strategy programs
See Attached # 31	Yes	Resistance management strategy programs
See Attached # 32	Yes	Resistance management strategy programs
See Attached # 33	Yes	Resistance management strategy programs
SM Experimental/A	No	Experimental registered in Europe
SM Experimental/B	No	Experimental registered in Europe
SM Experimental/C	No	Experimental registered in Europe
SM Experimental/D	No	Experimental registered in Europe
SM Experimental/E	No	Experimental registered in Europe

Treatment 30

Day 0	Day 7	Day 14	Day 21	Day 28	Day 35	Day 42
Penncozeb 75 DF 2 lb/A + Tactic	Super Tin 3.75 oz/A	Penncozeb 75 DF 2 lb/A + Tactic	Super Tin 80W 3.75 oz/A 21.	Penncozeb 75 DF 2 lb/A + Tactic	Super Tin 80W 3.75 oz/A	Penncozeb 75 DF 2 lb/A + Tactic

Treatment 31

Day 0	Day 7	Day 14	Day 21	Day 31	Day 38	Day 45
Penncozeb 75 DF 2 lb/A + Tactic	Super Tin 80W 3.75 oz/A	Penncozeb 75 DF 2 lb/A + Tactic	Penncozeb 75 DF 2 lb/A + Topsin M 70W 0.5 lb/A	Super Tin 80W 3.75 oz/A	Penncozeb 75 DF 2 lb/A + Tactic	Super Tin 80W 3.75 oz/A

Treatment 32

Day 0	Day 7	Day 14	Day 24	Day 31	Day 38	Day 48
Penncozeb 75 DF 2 lb/A + Tactic	Penncozeb 75 DF 2 lb/A + Tactic	Penncozeb 75 DF 2 lb/A + Topsin M 70W 0.5 lb/A	Penncozeb 75 DF 2 lb/A + Tactic	Penncozeb 75 DF 2 lb/A + Tactic	Penncozeb 75 DF 2 lb/A + Topsin M 70 W 0.5 lb/A	Penncozeb 75 DF 2 lb/A + Tactic

Treatment 33

Day 0	Day 7	Day 21	Day 28	Day 42
Penncozeb 75 DF 2 lb/A + Tactic	Topsin M 70W 0.5 lb/A	Penncozeb 75 DF 2 lb/A + Tactic	Topsin M 70W 0.5 lb/A	Penncozeb 75 DF 2 lb/A + Tactic

RESULTS AND DISCUSSION

The effect of fungicide use for Cercospora control on sugarbeets in 1997 is shown in **tables 3, 4, 5, and 6.** The following discussions will emphasize treatment effects on recoverable sugar per acre results. Complete results are presented in these tables.

Wahpeton-Breckenridge

Root yields ranged from a low of 20.2 T/A for the check to a high of over 24 tons per acre for several treatments **(table 3)**. No significant differences in root sucrose content, tons per acre or recoverable sugar per ton were observed. Significant differences in cercospora leafspot rating and recoverable sugar per acre were observed. Treatment No. 32, a leaf spot management strategy with two applications of Penncozeb on 7 day intervals followed by a Topsin-Penncozeb tank mix on a 14 day interval and two more Penncozeb treatments on a 7 day interval and Dithane on a 7 day interval, all performed very well. The 5.0 oz/A rate of Super Tin at a 14 day application interval and the 3.75 oz/A rate of Super Tin at 10 day intervals gave very effective disease control at this site with a past history of TPTH tolerance. Topsin alone gave good recoverable sugar per acre yields but had a leafspot rating over 4.0 at harvest indicating a late season buildup of benzimidazole resistant fungi. The Protex treatment gave poorer than anticipated results at this site in 1997.

Several experimental compounds gave superior Cercospora leafspot control in 1997. Experimental compound #1, Quadris and Tilt show promise and merit further evaluation. The Govern plus TPTH tank mix and the TPTH plus Tilt tank mix also gave very good disease control. The Terranil copper treatment gave very good disease control in 1997, however, much less disease control was observed at Crookston and Southern Minnesota with this compound.

Crookston

Exceptional disease control and high recoverable sugar/A yields resulted with registered treatments #32 & #33 (resistance management strategy programs), Topsin alone, and Topsin + Super Tin. The 5.0 oz/A rate of Super Tin (14 day interval) and 3.75 oz/A rate of Super Tin (10 day interval) gave acceptable but not superior disease control. The Protex and Dithane alone treatment performance was unacceptable.
Experimental compound #1, Eminent, Eminent Star and Quadris gave excellent Cercospora control. The Govern plus Super Tin tank mix and Tilt performance, while acceptable, was not as good as at Breckenridge and Southern Minnesota. The Bravo and Terranil treatments gave adequate but not exceptional disease control. Govern alone gave unacceptable disease control.

Southern Minnesota

Plant populations were not as uniform at this site and root rot was more prevalent than at Breckenridge and Crookston. These conditions/problems contributed to yield variability in the trial. More than 1400 lbs/A difference in recoverable sugar per acre was observed, but without statistically significant differences when the data was analyzed. Results at this location may have been more similar to results at Crookston and Breckenridge with optimum plant stands and no root rot present.

Presently registered treatments giving good disease control were Supertin plus Tactic and the Dithane alone treatment. The Super Tin at 3.75 oz/A (10 day interval) and 5.0 oz/A at 14 day intervals and Protex gave only adequate disease control. TPTH performance should probably not be expected to be exceptional in this area with a proven history of high levels of TPTH tolerance by the Cercospora fungus.

Experimental compound #1, Eminent Star, and Tilt and some Bravo or Bravo Tank mix treatments gave very good to excellent disease control and certainly merit further testing. The Quadris alone, Persist, Govern alone and Terranil treatments gave poorer disease control. Eminent alone gave less control than at other locations in 1997 or in previous years.

Combined Site Data

Data from only the Crookston and Wahpeton sites where significant treatment responses occurred is combined and shown in table 6. Only those treatments common to both locations are shown. Treatment responses paralleled those at the individual sites quite closely. Only one presently registered treatment is ranked in the top 11 treatments based on recoverable sugar per acre.

SUMMARY/CONCLUSIONS

A. Registered treatments

1. Super Tin performance at 14 day intervals was enhanced using the 5 oz/A rate or the 3.75 oz/A rate at shortened 10 day application intervals when TPTH tolerance is present.
2. Benzimadozole (Topsin) disease control was very good at Breckenridge and Crookston. A Topsin/Supertin tank mix gave excellent control at Crookston. Growers should never use a brenzimidazole fungicide in Southern Minnesota. They should only be used with great care to manage cercospora resistance to the fungicide in the middle or northern part of the Red River Valley.
3. Dithane at a 2 lb./A rate at a 7 day interval gave good or very good disease control in general.
4. Treatment #32 a Pennocozeb and Penncozeb plus Topsin resistance/tolerance management strategy gave excellent disease control and recoverable sugar per acre.

B. Non-registered fungicides

5. **a)** Experimental product #1 **b)** Quadris, **c)** Eminent, **d)** Eminent Star, **e)** Tilt, **f)** Bravo & Terranil, **g)** and tank mixes with Supertin gave good to excellent Cercospora control and merit further evaluation.
6. Growers, cooperative agriculturists and others should refer to other reports in this book or the 1998 Pocket Production Guide for recommended cercospora leafspot management strategies for 1998.
7. The Cercospora Leafspot Prediction Model indicated very well the potential for Cercospora leafspot in 1997, (assuming instruments were working properly).
8. Errors in Cercospora leafspot management strategies were greatly magnified and became economically acute late in the growing season given the favorable disease climate in September and early October.
9. Fungicide applications to the Minnesota-North Dakota sugarbeet crop were about normal in 1997 (see fungicide use survey data in this report).
10. Individual grower fields had recoverable sugar per acre losses of up to 1000 lbs/A in 1997.
11. Cercospora leafspot problems in 1998 will be very severe if suitable season long climatic conditions occur because of the high levels of disease innoculum present in 1997 fields.
12. Extensive 1998 research efforts are planned to develop better data to make future decisions.

ACKNOWLEDGEMENTS:

1. Special thanks is due the Sugarbeet Research and Education Board of Minnesota and North Dakota for partial financial support of this research.
2. The assistance of Charles Hotvedt in quality sample analysis at the American Crystal Lab at East Grand Forks and analysis at Southern Minnesota Beet Sugar Coop is greatly appreciated.
3. A special thanks to Barb Mahoney and Norman Cattanach for assistance with day-to-day care of these research trials at Wahpeton and Jeff Nielson and Roger Ruthenberg at the Northwest Experiment Station at Crookston.
4. Financial support of Rohm and Haas, Elf Atochem, ISK Biosciences, Sostram, Novartus, Zeneca, Griffin Corp., Terra, Ostlund and other companies was greatly appreciated.

Table 3. Cercospora leafspot control at Wahpeton/Breckenridge in 1997 with registered and experimental fungicides.

Treatment	Rate	Trt #	Int (days)	8/25/97 *CLS Rtng.	9/16/97 *CLS Rtng	Sugar (%)	Mol. (%)	Root Yield (ton/A)	Ext Sgr/A (lb/A)	Rec Sgr/T (lbs.)
Experiment 1	Low rate	11	14	2.1	3.1	19.5	1.4	24.0	8582	362
Terranil Copper	3.4 pt (P)	2	14	1.7	2.0	19.3	1.4	24.2	8578	358
Experiment 1	High rate	12	14	1.8	3.0	19.7	1.4	23.4	8496	366
Eminent Star	500 ml (P)	22	14	1.7	2.7	19.4	1.6	24.2	8484	356
Trt 32	Attached	32		1.5	1.9	19.6	1.5	23.3	8347	362
Govern (RH 7592) + TPTH + (Latron CS-7 @ 0.12% v/v)	2.0 oz + 3.0 oz (P)	17	14	1.5	2.1	19.2	19.2	23.8	8272	352
Experiment 2	Low rate	13	14	1.6	3.1	19.0	1.5	23.8	8260	351
Tilt	4 oz (P)	23	14	2.1	3.1	19.2	1.4	23.2	8230	357
Quadris	0.25 (ai)	5	14	2.1	2.0	19.3	1.7	23.6	8224	352
Dithane	2 lb (P)	29	7	1.4	1.8	18.8	1.7	24.3	8171	342
TPTH (3 app) / Manex remaining app	5.0 oz (P) / 1.5 qt. (P)	26	14	1.6	3.2	19.7	1.3	22.4	8140	367
GX 514 (Orbit) + TPTH	3.0 oz (P) + 5.0 oz (P)	20	14	1.6	2.1	19.6	1.6	22.8	8133	361
TPTH (4app) / Manex remaining app.	3.75 oz (P) / 1.5 qt (P)	25	10	1.7	2.7	19.2	1.5	23.3	8108	353
Topsin M 70W	0.5 lb. (P)	27	14	2.3	4.0	18.8	1.6	23.7	8058	344
Bravo Weather Stick	2.0 pt. (P)	7	10	1.8	2.2	19.3	1.6	23.1	8049	354
Bravo Ultrex	1.8 lb./A (P)	9	10	1.5	2.2	18.8	1.8	23.8	8021	340
Trt 31	Attached	31		1.5	1.9	18.7	1.7	23.8	7985	340
Bravo Weather Stick + TPTH	1.0 pt. + 2.5 oz.	10	10	1.8	2.4	18.9	1.6	23.1	7908	345
Quadris + TPTH	0.20 (ai) + 3.75 oz. (P)	6	14	1.4	1.8	18.3	1.8	24.2	7895	331
Bravo Weather Stick	1.5 pt. (P)	8	10	1.9	2.5	18.5	1.6	23.7	7891	338
Quadris	0.20 (ai)	4	14	1.8	2.1	19.2	1.8	22.8	7877	349
Eminent 125 SC (aka tetraconozal)	400 ml (P)	21	14	1.5	1.8	19.4	1.4	21.9	7794	359
TPTH + Tactic	3.75 oz. + 16 oz. (P)	24	14	1.8	2.5	18.7	1.6	23.1	7793	342
Topsin M + TPTH	0.5 lb. + 3.75 oz. (P)	28	14	1.6	2.3	18.8	1.5	22.8	7747	345
Persist	1.0 qt (P)	18	10	2.1	3.6	19.2	1.6	22.2	7741	352
Trt 30	Attached	30		1.5	2.1	18.8	1.7	22.6	7675	343
Protex (app 1-4) / Manex remaining app.	1.5 qt. (P) / 1.5 qt. (P)	19	10	1.9	3.8	18.9	1.4	21.9	7548	350
Govern (RH 7592) (+ Latron CS-7 @ 0.12% v/v)	2.7 oz. (P)	16	10	1.5	2.8	19.3	1.5	21.3	7475	356
Experiment 2	High rate	14	14	1.7	1.7	19.0	1.5	21.4	7408	350
Quadris	0.15 (ai)	3	14	1.6	2.3	18.0	1.8	23.3	7395	324
Trt 33	Attached	33		1.9	3.3	18.7	1.7	21.5	7245	341
Terranil 6 L	1.5 pt. (P)	1	14	2.0	3.7	18.5	1.6	21.6	7241	338
Check	*****	15	**	3.3	6.6	19.3	1.5	20.2	7117	356
	C.V. %			17.9	17.9	5.0	13.0	7.5	8	6
	LSD 10%			0.4	0.6	NS	0.2	NS	719	NS
	LSD .05%			0.4	0.7	NS	0.3	NS	860	NS

Table 4. Cercospora leafspot control at Crookston, MN. In 1997 with registered and experimental fungicides.

Treatment	Rate	Trt #	Int (days)	*CLS Rtng.	Sugar (%)	Mol. (%)	Root Yield (ton/A)	Ext Sgr/A (lb/A)	Rec Sgr/T (lbs.)
Trt 33	Attached	33		2.4	16.9	1.4	21.8	6776	311
Topsin M + TPTH	0.5 lb. + 3.75 oz. (P)	28	14	2.0	16.3	1.3	22.1	6606	299
Trt 32	Attached	32		2.6	16.6	1.3	21.3	6535	307
Quadris	0.15 (ai)	3	14	2.7	16.4	1.3	21.3	6429	302
Experiment 1	High rate	12	14	2.7	16.5	1.4	21.2	6382	302
Eminent 125 SC (aka tetraconozal)	400 ml (P)	21	14	2.4	16.6	1.4	20.8	6352	305
Topsin M 70W	0.5 lb. (P)	27	14	2.4	16.6	1.4	20.9	6351	304
Quadris	0.25 (ai)	5	14	2.7	16.7	1.4	20.6	6323	307
Eminent Star	500 ml (P)	22	14	2.7	16.4	1.3	20.8	6291	302
TPTH (3 app.) / Manex remaining app.	5.0 oz. (P) / 1.5 qt. (P)	26	14	2.5	16.1	1.4	21.0	6208	296
Govern (RH 7592) + TPTH + Latron CS-7 @ 0.12% v/v)	2.0 oz. + 3.0 oz. (P)	17	14	2.7	16.4	1.4	20.6	6201	301
Quadris	0.20 (ai)	4	14	2.7	16.5	1.5	20.6	6173	300
Bravo Ultrex	1.8 lb./A (P)	9	10	2.8	16.2	1.4	20.8	6163	297
Quadris + TPTH	0.20 (ai) + 3.75 oz. (P)	6	14	2.3	16.2	1.4	20.9	6148	295
Bravo Weather Stick	1.5 pt. (P)	8	10	3.0	16.3	1.3	20.4	6107	300
GX 514 (Orbit) + TPTH	3.0 oz. (P) + 5.0 oz. (P)	20	14	2.7	16.2	1.4	20.6	6089	295
Experiment 1	Low rate	11	14	2.8	16.0	1.5	20.9	6066	291
TPTH (4 app.) / Manex remaining app.	3.75 oz. (P) / 1.5 qt. (P)	25	10	3.0	16.2	1.4	20.4	6022	296
Bravo Weather Stick	2.0 pt. (P)	7	10	2.8	16.0	1.4	20.5	5981	292
Bravo Weather Stick + TPTH	1.0 pt. + 2.5 oz.	10	10	2.5	16.1	1.5	20.4	5976	293
Tilt	4 oz. (P)	23	14	3.7	16.5	1.3	19.5	5946	305
Tilt	5 oz.	14	14	3.8	16.4	1.5	19.8	5907	298
Terranil Copper	3.4 pt. (P)	2	14	3.1	16.3	1.4	19.5	5814	299
Dithane	2 lb. (P)	29	7	3.1	16.6	1.3	18.9	5811	308
Terranil 6L	1.5 pt. (P)	1	14	3.1	16.5	1.4	19.2	5805	302
Persist	1.0 qt. (P)	18	10	3.8	16.0	1.5	20.0	5793	290
Trt 31	Attached	31		2.8	16.4	1.4	19.2	5782	301
Tilt	3 oz.	13	14	3.7	15.9	1.5	19.9	5727	288
Protex (app. 1-4) / Manex remaining app.	1.5 qt. (P) / 1.5 qt. (P)	19	10	3.5	15.9	1.3	19.5	5688	293
Govern (RH 7592) (+ Latron CS-7 @ 0.12% v/v)	2.7 oz. (P)	16	10	3.2	16.1	1.4	19.2	5633	294
Trt 30	Attached	30		3.2	15.9	1.4	19.3	5587	291
TPTH + Tactic	3.75 oz. + 16 oz. (P)	24	14	3.2	16.2	1.4	18.7	5554	297
Check	*****	15	***	5.9	15.6	1.6	17.8	4955	279
	C.V. %			9.2	3.1	9.0	4.3	5.1	3.7
	LSD .05%			0.4	NS	0.2	1.2	428	15.5
	# OF REPS			4	4	4	4	4	4

Table 5. Cercospora leafspot control in Southern Minnesota in 1997 with registered and experimental fungicides.

Treatment	Rate	Trt #	Int (days)	CLS	Sugar (%)	Mol. (%)	Root Yield (ton/A)	Ext Sgr/A (lb/A)	Rec Sgr/Ton (lbs.)
Quadris + TPTH	0.20 (ai) + 3.75 oz. (P)	6	14	4.0	15.0	1.1	24.9	6770	277
TPTH + Tactic	3.75 oz. + 16 oz. (P)	23	14	6.3	15.2	1.0	23.5	6558	282
SM Experiment C	.178 lb. ai 1% v/v	29	10	4.3	14.9	1.1	24.1	6535	277
Experiment 1	High rate	33	14	4.5	14.8	1.2	23.8	6464	274
SM Experiment D	.356 lb. ai 1% v/v	30	10	3.2	14.4	1.1	24.3	6387	266
Tilt	4 oz (P)	21	10	5.2	14.9	1.2	23.5	6376	275
Eminent Star	500 ml (P)	18	14	3.3	15.2	1.1	22.9	6367	282
Tilt	2 oz. (P)	19	10	5.7	14.8	1.1	23.3	6352	275
Tilt	5 oz. (P)	22	10	4.8	15.2	1.2	22.7	6312	280
Bravo Weather Stick + TPTH	1.0 pt. + 2.5 oz.	10	10	5.0	15.2	1.1	22.7	6265	281
Dithane	2 lb. (P)	36	7	4.0	14.9	1.1	22.9	6239	275
Experiment 2	High rate	35	14	4.5	14.8	1.2	23.0	6230	274
SM Experiment B	.089 lb. ai 1% v.v	28	10	5.5	15.0	1.1	22.5	6222	279
Eminent 125 SC (aka tetraconozal)	400 ml (P)	17	14	3.2	15.1	1.1	22.3	6217	281
Experiment 2	Low rate	34	14	5.8	15.0	1.1	22.4	6200	279
Sm Experiment A	.445 lb. ai 1% v.v	27	10	6.5	14.8	1.1	22.8	6175	274
Bravo Weather Stick	2.0 pt. (P)	7	10	4.5	15.1	1.1	22.4	6174	280
SM Experiment E	.089 lb. ai 1% v/v	31	10	3.8	14.5	1.2	23.4	6169	265
Govern (RH 7592) + TPTH + (Latron CS-7 @ 0.12% v/v)	2.0 oz + 3.0 oz. (P)	13	14	5.8	15.0	1.1	22.5	6155	277
Tilt	3 oz. (P)	20	10	5.8	14.7	1.2	22.9	6133	270
TPTH (4app) / Manex remaining app.	3.75 oz. (P) / 1.5 qt. (P)	24	10	4.8	15.0	1.1	22.2	6114	277
TPTH/Penozeb	3.75 oz./2 lb.	26	10 & 7	6.0	14.4	1.3	23.4	6063	262
Bravo Weather Stick	1.5 pt. (P)	8	10	4.5	14.9	1.2	22.6	6036	274
Quadris	0.20 (ai)	4	14	5.3	14.9	1.2	22.3	6000	275
TPTH (3 app.) / Manex remaining app.	5.0 oz. (P) / 1.5 qt. (P)	25	14	5.2	14.9	1.1	21.9	5941	275
Protex (app. 1-4) / Manex remaining app.	1.5 qt. (P) / 1.5 qy. (P)	15	10	5.0	14.6	1.1	22.3	5932	269
Quadris	0.15 (ai)	3	14	5.2	14.5	1.2	22.6	5919	268
Quadris	0.25 (ai)	5	14	4.8	14.7	1.2	22.1	5904	270
Check	****	11	**	8.0	14.7	1.2	22.3	5862	269
Terranil 6L	1.5 pt. (P)	1	14	6.0	15.0	1.1	21.5	5814	277
Experiment 1	Low rate	32	14	5.7	15.1	1.2	20.9	5784	279
Bravo Ultrex	1.8 lb./A (P)	9	10	3.8	14.9	1.2	21.2	5719	274
GX 514 (Orbit) + TPTH	3.0 oz. (P) + 5.0 oz. (P)	16	14	6.0	15.1	1.2	20.7	5703	279
Terranil Copper	3.4 pt. (P)	2	14	6.0	15.1	1.1	20.1	5528	281
Govern (RH 7592) (+Latron CS-7 @ 0.12% v/v)	2.7 oz. (P)	12	10	5.3	15.1	1.1	19.9	5507	280
Persist	1.o qt (P)	14	10	5.7	14.8	1.2	19.9	5363	273
	C.V.%			18.1	4.8	10.4	12.0	11	6
	LSD 10%			0.9	NS	NS	NS	NS	NS
	LSD .05%			1.1	NS	NS	NS	NS	NS
	# of Reps			6	6	6	6	6	6

Table 6. Cercospora leafspot control and Wahpeton and Crookston with registered and experimental fungicides.

Treatment	Rate	Trt #	Int (days)	Sugar (%)	Mol. (%)	Root Yield (ton/A)	Ext Sgr/A (lb./A)	Rec Sgr/Ton (lbs.)
Experiment 1	High rate	12	14	18.1	1.4	22.3	7439	334
Eminent Star	500 ml (P)	20	14	17.9	1.4	22.5	7388	329
Experiment 1	Low rate	11	14	17.7	1.4	22.4	7324	326
Quadris	0.25 (ai)	5	14	18.0	1.5	22.2	7274	329
Govern (RH 7592) + TPTH + (Latron CS-7 @ 0.12% v/v)	2.0 oz. + 3.0 oz. (P)	15	14	17.8	1.5	22.2	7236	326
Terranil Copper	3.4 pt. (P)	2	14	17.8	1.4	21.9	7196	328
TPTH (3 app.) / Manex remaining app.	5.0 oz. (P) / 1.5 qt. (P)	24	14	17.9	1.3	21.7	7174	331
GX 514 (orbit) + TPTH	3.0 oz. (P) + 5.0 oz. (P)	18	14	17.9	1.5	21.7	7111	328
Bravo Ultrex	1.8 lb./A (P)	9	10	17.5	1.6	22.3	7092	319
Tilt	4 oz. (P)	21	14	17.9	1.3	21.4	7088	331
Eminent 125 SC (aka tetraconozal)	400 ml (P)	19	14	18.0	1.4	21.4	7073	332
TPTH (4 app.) / Manex remaining app.	3.75 oz. (P) / 1.5 qt. (P)	23	10	17.7	1.5	21.9	7065	324
Quadris	0.20 (ai)	4	14	17.8	1.6	21.7	7025	325
Quadris + TPTH	0.20 (ai) + 3.75 oz. (P)	6	14	17.2	1.6	22.5	7021	313
Bravo Weather Stick	2.0 pt. (P)	7	10	17.7	1.5	21.8	7015	323
Bravo Weather Stick	1.5 pt. (P)	8	10	17.4	1.5	22.0	6999	319
Dithane	2 lb. (P)	25	7	17.7	1.5	21.6	6991	325
Bravo Weather Stick + TPTH	1.0 pt. + 2.5 oz.	10	0	17.5	1.6	21.8	6942	319
Quadris	0.15 (ai)	3	14	17.2	1.6	22.3	6912	313
Persist	1.0 qt. (P)	16	10	17.6	1.5	21.1	6767	321
TPTH + Tactic	3.75 oz. + 16 oz. (P)	22	14	17.4	1.5	20.9	6674	319
Protex (app. 1-4) / Manex remaining app.	1.5 qt. (P) / 1.5 qt. (P)	17	10	17.4	1.4	20.7	6618	321
Govern (RH 7592) (+Latron CS-7 @ 0.12% v/v)	2.7 oz. (P)	14	10	17.7	1.5	20.2	6554	325
Terranil 6L	1.5 pt. (P)	1	14	17.5	1.5	20.4	6523	320
Check	*****	13	**	17.4	1.5	19.0	6036	318
	C.V. %			4.4	12.5	6.4	7	6
	LSD 10%			NS	0.2	1.1	396	NS
	LSD 05%			NS	NS	1.4	472	NS

CHEMICAL CONTROL OF SEEDLING DISEASE

OBJECTIVE: Evaluate chemicals on their effect on sugarbeet seedling diseases and the sugar production.

EXPERIMENTAL PROCEDURES

Van der Have 66140 (VDH 140) pelleted sugarbeet seed which has minimal tolerance to Aphanomyces chochlioides was planted at four inch spacing. Tachigaren was applied to seed for Tachigaren treatments. Apron and Thiram was applied to all seed as (check) standard treatment. Fungicides tested were Quadris, and Ridomil as well as fumigant Vapam.

Sugarbeet seed was planted on June 3 and 4, 1997. Experimental design was a randomized complete block design. Experimental units were 11 ft. wide (6 rows wide) and 30 ft. long. (Stand counts were collected from the center two rows on June 13 and July 27.

Yield and quality were taken from the center two rows on September 24.

SUMMARY

Stand count was higher with all chemical treatments in comparison to the check at Buffalo and tended to be higher at Granite Falls. Combined data showed that chemical treatments gave a higher stand count than the check.

Regardless of the stand count, sugar production is the criteria that one needs to consider when analyzing effectiveness of treatments. Vapam at 9 gal/A generally gave the highest sugar production per acre with Tachigaren as a close second. Quadris at 0.76 oz/1000 $ft.^2$ with the seed or at 41F stage gave recoverable sugar per acre similar to Vapam at 9 gal/A or Tachigaren at 45 g/100 kg seed. Ridomil at 1 oz/100 $ft.^2$ gave recoverable sugar per acre significantly lower than Vapam at 9 gal/A, Quadris at 0.76 oz/1000 $ft.^2$ or Tachigaren at 45 g/100 kg seed. This indicates that the three mentioned chemical products provide good control of seedling disease and enhance sugar production.

Table 1. Chemical control of seedling disease, Granite Falls location

	RATE	STAND COUNT \30 FT	SUCROSE	LOSS TO MOLL.	TONS PER ACRE	REC. SUGAR \TON	REC. SUGAR \ACRE
Quadris	0.19 oz/1000 ft.-2 w/seed	36	13.85	1.42	13.49	249	3346
Quadris	0.38 oz/1000 ft.-2 w/seed	38	13.69	1.44	16.59	245	4057
Quadris	0.76 oz/1000 ft.-2 w/seed	38	13.50	1.40	15.38	242	3721
Quadris	0.19 oz/1000 ft.-2 4 lf.	44	13.41	1.40	15.98	240	3862
Quadris	0.38 oz/1000 ft.-2 4 lf.	33	13.78	1.37	14.24	248	3523
Quadris	0.76 oz/1000 ft.-2 4 lf.	43	13.89	1.38	16.47	250	4118
Vapam	4 gal/A ppi	36	14.11	1.28	15.23	257	3891
Vapam	6 gal/A ppi	43	13.33	1.35	15.64	240	3750
Vapam	9 gal/A ppi	39	14.11	1.31	16.99	256	4356
Ridomil	1 oz/1000 ft.-2 w/seed	40	13.74	1.37	12.68	248	3138
Tachigaren	45 g/100 kg seed	35	14.09	1.28	15.93	256	4077
Untreated	0	31	13.32	1.42	11.10	238	2649
MEAN		38	13.73	1.37	14.975	247	3707
C.V.		5.55	5.63	10.53	12.42	6.94	14.32
L.S.D.		5	1.11	0.21	2.67	25	762

Table 2. Chemical control of seedling disease, Buffalo Lake location

	RATE	STAND COUNT \30 FT	SUCROSE	LOSS TO MOLL.	TONS PER ACRE	REC. SUGAR \TON	REC. SUGAR \ACRE
Quadris	0.19 oz/1000 ft.-2 w/see	28	14.813	1.3830	13.84	268.50	3728
Quadris	0.38 oz/1000 ft.-2 w/see	24	14.723	1.3110	14.23	268.25	3789
Quadris	0.76 oz/1000 ft.-2 w/see	31	15.340	1.2240	15.28	282.50	4309
Quadris	0.19 oz/1000 ft.-2 4 lf.	37	15.055	1.1750	14.66	277.50	4062
Quadris	0.38 oz/1000 ft.-2 4 lf.	29	14.385	1.3160	14.34	261.50	3734
Quadris	0.76 oz/1000 ft.-2 4 lf.	31	15.168	1.3010	15.21	277.50	4211
Vapam	4 gal/A ppi	31	14.925	1.1780	14.02	274.75	3854
Vapam	6 gal/A ppi	39	14.878	1.2770	15.49	272.00	4217
Vapam	9 gal/A ppi	34	14.955	1.2630	17.41	273.75	4781
Ridomil	1 oz/1000 ft.-2 w/seed	34	14.708	1.2290	13.29	269.50	3586
Tachigaren	45 g/100 kg seed	33	14.947	1.2660	16.42	273.50	4501
Untreated	0	12	14.058	1.3390	12.99	254.25	3318
MEAN		30	14.830	1.272	14.764	271.125	4007
C.V.		8.92	4.19	11.88	10.50	5.119	11.54
L.S.D.		6	0.892	0.216	2.22	19.906	663

Table 3. Combined data for chemical control of seedling disease, 1997

	RATE	STAND COUNT \30 FT	SUCROSE	LOSS TO MOLL.	TONS PER ACRE	REC. SUGAR \TON	REC. SUGAR \ACRE
Quadris	0.19 oz/1000 ft.-2 w/see	32	14.33	1.40	13.7	259	3537
Quadris	0.38 oz/1000 ft.-2 w/see	31	14.20	1.38	15.4	257	3923
Quadris	0.76 oz/1000 ft.-2 w/see	35	14.61	1.31	15.9	266	4216
Quadris	0.19 oz/1000 ft.-2 4 lf.	41	14.23	1.29	15.3	259	3962
Quadris	0.38 oz/1000 ft.-2 4 lf.	31	14.08	1.34	14.3	255	3628
Quadris	0.76 oz/1000 ft.-2 4 lf.	37	14.53	1.34	15.8	264	4164
Vapam	4 gal/A ppi	34	14.52	1.23	14.6	266	3872
Vapam	6 gal/A ppi	41	14.11	1.32	15.6	256	3984
Vapam	9 gal/A ppi	37	14.53	1.29	17.2	265	4569
Ridomil	1 oz/1000 ft.-2 w/seed	37	14.23	1.30	13.0	259	3362
Tachigaren	45 g/100 kg seed	34	14.52	1.27	16.2	265	4289
Untreated	0	22	13.69	1.38	12.0	246	2983
MEAN		34	14.30	1.32	14.9	260	3874.025
C.V.		7.57	6.25	11.35	10.83	7.61	12.5
L.S.D.		6	0.89	0.15	1.6	20	482

PERFORMANCE OF TACHIGAREN® SEED TREATMENT ON SUGARBEET VARIETIES SUSCEPTIBLE AND RESISTANT TO APHANOMYCES ROOT ROT IN 1997 FIELD TRIALS

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Aphanomyces cochlioides (= *A. cochlioides*) is a "water mold" that causes damping-off of sugarbeet seedlings and root rot of older plants when soil conditions are warm and wet. The fungus is prevalent in southern Minnesota and in the southern Red River Valley (RRV) and also is becoming more common in the northern RRV.

Options for control of this soilborne pathogen are limited. Planting early into cool soil can help avoid conditions favorable for disease during stand establishment when seedlings are susceptible to damping-off. Also, varieties with partial resistance to *Aphanomyces* are available. These varieties can be infected by *A. cochlioides*, but root rot develops slower and to a lesser extent than on susceptible varieties (no sugarbeet variety is immune to infection by this pathogen). The fungicide Tachigaren® has been registered in the United States for use on pelleted sugarbeet seed since the 1996 growing season. Producers have many questions, however, regarding effectiveness of different rates of Tachigaren on varieties that are susceptible and resistant to *Aphanomyces*.

OBJECTIVES

The objectives of this research were to determine the effectiveness of three rates of Tachigaren seed treatment on resistant and susceptible varieties for 1) control of Aphanomyces damping-off and root rot and 2) sugarbeet yield and quality in fields heavily infested with *A. cochlioides*.

MATERIALS AND METHODS

Medium-sized seed of ACH 205 and HM Resist (each with partial resistance to *A. cochlioides*) and VDH 140 (susceptible) were pelleted and treated with Tachigaren 70 WP at 45, 75, or 90 g per 100,000 seed. Control seed was not treated with Tachigaren. All seed was pretreated with standard rates of Apron and Thiram to control other damping-off pathogens (*Phoma betae*, *Pythium* spp., and *Rhizoctonia solani*).

Plots were established in producers' fields located near Buffalo Lake and Granite Falls, MN where root rot index values (0-100 scale, 0=healthy, 100=all plants dead) averaged 89 and 76, respectively. Seed of each variety treated with each rate of Tachigaren was planted to stand (4½ to 5¼ inches between seeds) in six-row plots (25 feet long, 22 inches between rows) on May 27, 1997. Plots were arranged in a randomized complete block design with six replicates. Herbicides, insecticides, and fungicides (to control Cercospora leaf spot) were applied as appropriate for each location.

Stand counts were taken on the four middle rows of each plot at 15 and 49 days after planting. On September 9, 20 plants from each plot at Buffalo Lake were rated for Aphanomyces root rot (0-7 scale, 0=clean root, 7=root completely rotted). There was little evidence of *Aphanomyces* root rot at the Granite Falls site, so disease ratings only were made for each variety not treated with Tachigaren (to compare susceptible and resistant varieties in the absence of Tachigaren). Plots were harvested September 19 at Buffalo Lake and September 10 at Granite Falls.

Table 1. Stand, root rot ratings, and yield attained from seed of three sugarbeet varieties not treated with Tachigaren (0=control) or treated with Tachigaren 70 WP at 45, 75, or 90 g/100,000 seed. Plots were established in fields near Buffalo Lake and Granite Falls, MN that were naturally infested with *Aphanomyces cochlioides*.

Treatment[v]	No. plants/100 ft row[w] 15 DAP	49 DAP	Root rot[x] rating	Yield[y] T/A	% Sucrose	lb/A
			Buffalo Lake, MN			
Seed treatment						
0 = Control	107	103	1.0	18.1	12.1	3893
45 g Tachigaren	102	107	1.1	20.0	12.2	4347
75 g Tachigaren	107	110	1.2	20.1	12.3	4416
90 g Tachigaren	107	108	1.0	19.1	12.1	4132
LSD (P=0.05)[z]	NS	NS	NS	NS	NS	NS
Variety						
ACH 205	114	115	0.7	19.4	11.9	4104
HM Resist	101	110	1.2	19.0	12.5	4292
VDH 140	102	96	1.4	19.5	12.0	4194
LSD (P=0.05)[z]	NS	11	0.3	NS	0.4	NS
			Granite Falls, MN			
Seed treatment						
0 = Control	133	125	-	16.7	12.0	3628
45 g Tachigaren	126	130	-	17.6	12.3	3926
75 g Tachigaren	122	125	-	18.1	12.1	3913
90 g Tachigaren	120	127	-	17.0	12.2	3758
LSD (P=0.05)[z]	9	NS		NS	NS	NS
Variety						
ACH 205	126	131	0.9	17.5	12.2	3833
HM Resist	126	128	1.3	17.4	12.4	3924
VDH 140	124	123	1.1	17.2	11.9	3662
LSD (P=0.05)[z]	NS	NS	NS	NS	0.3	NS

[v] All seed was pelleted and treated with standard rates of Apron + Thiram to control seedling pathogens other than *A. cochlioides*; ACH 205 and HM Resist have partial resistance to *Aphanomyces* and VDH 140 is susceptible.

[w] DAP=days after planting; plots were planted on May 25, 1997.

[x] Roots were rated for Aphanomyces root rot with a 0-7 scale (0=root healthy, 7=root completely rotted and foliage dead) on September 9, 1997.

[y] Plots were harvested on September 19 at Buffalo Lake and on September 10 at Granite Falls.

[z] Least significant difference (LSD) value is provided (P=0.05); NS=not significant.

RESULTS

At both locations, weather conditions were unfavorable for infection of sugarbeet seedlings or roots by *A. cochlioides*, despite a high concentration of the fungus in soil. The amount of disease was negligible, but was somewhat more noticeable at Buffalo Lake than Granite Falls. There was only one interaction between seed treatment and variety (for stand at 15 days after planting) at the Granite Falls site. Therefore, only main effects (seed treatment and variety) will be presented.

Effect of Tachigaren seed treatment. By 15 days after planting at Buffalo Lake, there were no significant differences (P=0.05) in emergence from Tachigaren-treated seed or the control (seed not treated with Tachigaren) (Table 1). At Granite Falls, stands were significantly higher in the control compared to the 75 and 90 g rates of Tachigaren (Table 1). At both locations, stands increased from 15 to 49 days after planting for all rates of Tachigaren-treated seed but decreased in the control (Table 1). By 49 days after planting, there were no significant differences in stand among the three rates of Tachigaren and the control at either location.

Root rot ratings at harvest were extremely low. At Buffalo Lake, there were no differences in ratings among roots from seed that had been treated or not treated with Tachigaren (Table 1). Aphanomyces root rot occurred in trace amounts at Granite Falls, so data were not collected to determine effects of seed treatment on disease.

Sugarbeet yield (tons of beets per acre, percent sucrose, pounds of recoverable sucrose per acre) were not significantly different (P=0.05) when seed had been treated or not treated with Tachigaren at either location (Table 1). Tons of beets per acre and recoverable sucrose per acre, however, were highest when seed had been treated with the 45 or 75 g rates of Tachigaren compared to the 90 g rate or no Tachigaren seed treatment.

Effect of variety resistance to *Aphanomyces*. Stands at 15 days after planting were not significantly different among varieties at either location (Table 1). At both locations, stands increased slightly between 15 and 49 days after planting for ACH 205 and HM Resist (both with partial resistance to *Aphanomyces*) but decreased for VDH 140 (susceptible to *Aphanomyces*). By 49 days after planting at Buffalo Lake, ACH 205 and HM Resist had significantly higher stands (P=0.05) than VDH 140, but at Granite Falls, there were no differences in stand among varieties (Table 1).

Root rot ratings for ACH 205 were significantly lower (P=0.05) than for HM Resist and VDH 140 at Buffalo Lake (Table). There were no significant differences among varieties at Granite Falls (Table 1).

Tons of beets per acre were similar among the three varieties at each location (Table 1). The partially resistant variety HM Resist yielded a significantly (P=0.05) higher percent sucrose than the other two varieties at Buffalo Lake and the susceptible variety (VDH 140) at Granite Falls (Table 1). There were no differences in recoverable sucrose among varieties at either location.

DISCUSSION

Soil conditions were too dry at Buffalo Lake and Granite Falls to favor infection of sugarbeet seedlings or adult roots by *A. cochlioides*. Thus, the trials did not provide a good field evaluation for rates of Tachigaren or for varietal resistance on stand establishment or sugarbeet yield and quality.

Despite the low amounts of disease detected, the 45 and 75 g rates of Tachigaren tended to yield more tons of beets per acre and pounds of recoverable sucrose per acre than the 90 g rate or the control. Similarly, trials conducted at three locations in 1996 did not encounter conditions favorable for *Aphanomyces* activity, yet the 45 and 75 g rates of Tachigaren tended to result in the highest yields (see 1996 Sugarbeet Research and Extension Reports, 24: 244-251). There are no clear explanations for these yield increases. Decomposition of Tachigaren is favored by wet, warm soil conditions, so there was a slower than normal breakdown of Tachigaren in the dry soils encountered early in 1996 and 1997. This situation may have resulted in longer persistence of the chemical, which would allow it to protect the root system from minor infections by *A. cochlioides* for an extended period of time. Perhaps, Tachigaren directly enhances sugarbeet growth.

During warm, wet conditions favorable for Aphanomyces damping-off, Tachigaren seed treatment significantly increases seedling emergence and stand (see 1996 Sugarbeet Research and Extension Reports, 27:228-238). About 3 to 4 weeks after planting, Tachigaren has decomposed, so plants are vulnerable to infection by *A. cochlioides*. Varieties with partial resistance to *Aphanomyces* start to become more active in expression of resistance to root rot after about 4 weeks. Thus, the combination of Tachigaren seed treatment on a variety with partial resistance to *Aphanomyces* provides some control of *A. cochlioides* throughout the season. If Aphanomyces root rot occurs, varieties with partial resistance to the pathogen outyield other commercial varieties.

Some producers are concerned about the yield potential of varieties with partial resistance to *Aphanomyces*. If Aphanomyces root rot does not occur, the yield potential of *Aphanomyces*-resistant varieties is comparable to other commercial varieties (see the 1996 Sugarbeet Research and Extension Reports, 27:299-336). As shown in the 1997 field trials at Buffalo Lake and Granite Falls (yields are low because of an early harvest date), when Aphanomyces root rot was negligible, the two varieties with resistance to Aphanomyces resulted in the same yield as a susceptible variety.

SUMMARY

1. Disease pressure was too low to evaluate effectiveness of Tachigaren seed treatment or varietal resistance in controlling *Aphanomyces*.

2. Tachigaren applied at 45 and 75 g per 100,000 seed did not affect stand establishment or root rot ratings, but tended to result in higher tonnage and recoverable sucrose per acre compared to the 90 g rate or the control.

3. Aphanomyces root rot was negligible, but ACH 205 (with partial resistance to *Aphanomyces*) still resulted in the lowest root rot ratings by harvest at both locations.

4. *Aphanomyces*-resistant varieties (ACH 205 and HM Resist) tended to result in higher stands, and in similar yields and quality, compared to the susceptible variety.

CONCLUSION

The combination of Tachigaren seed treatment on a variety with resistance to Aphanomyces root rot is recommended.

ACKNOWLEDGEMENTS

We thank American Crystal Sugar Company, Hilleshog, and Van der Have for providing seed; Seed Systems for pelleting and treating seed with fungicides; grower-cooperators for providing land and controlling Cercospora leafspot; Southern Minnesota Beet Sugar Cooperative for yield and quality analyses; Alan Dyer for technical assistance; Jeff Nielsen for statistical analysis of data; and the Sugarbeet Research and Education Board of Minnesota and North Dakota for funding provided in support of this research.

EVALUATION OF THE ADDITION OF LIME TO SOIL FOR SUGARBEET AND CORN

The lime-by-product produced in extraction of sugar by Southern Minnesota Beet Sugar Cooperative was tested again in 1997 for the effect on sugarbeet and corn production. Soybean production was not tested in 1997. The soil in which the test was conducted in was alkaline soil. The soil tested at a pH of 7.8 in 1996. The pH of the soil that was limed in 1996 had risen .1 to .2 by spring of 1997. The soil was fertilized according to soil test with N-P-K to meet nutrient requirements for sugarbeets. Lime was applied on 11 x 30 ft. experimental units at 0, 4 and 6 ton per acre in 1996. The experimental design was a randomized complete block design with six replications.

SUMMARY

Lime applied in 1996 did not detrimentally effect yields or quality of sugarbeets in 1997 (Table 1). Yield and quality of sugarbeets were not significantly different regardless of treatment. Corn yields in 1997 were not influenced by the 1996 application of lime (Table 2). Tables 3 and 4 show data combined over two years for sugarbeets and corn, respectively. These data show that over two years of testing, sugarbeet and corn yield and quality were not effected by the application of lime.

Table 1. 1997 Sugarbeet yield and quality as influenced by lime added to soil in 1996

Trt	Tons/A	Sugar	LTM	RST	RSA
No lime	22.6	15.7	1.15	291	6489
4 ton lime	22.8	15.3	1.21	282	6430
6 ton lime	21.9	15.9	1.09	296	6487
Mean	22.3	15.6	1.15	290	6469
C.V. %	6.98	5.60	8.73	6.31	7.04
LSD	NS	NS	NS	NS	NS

Table 2. 1997 Corn yield as influenced by lime added to soil in 1996

Trt	Bu/A	Test Wt.	Moisture
No lime	136	54	18.6
4 ton lime	138	53	18.1
6 ton lime	140	54	18.5
Mean	138	54	18.4
C.V. %	10.1	4.98	9.6
LSD	NS	NS	NS

Table 3. Combined data (1996 and 1997) for sugarbeet yield and quality as influenced by lime added soil

Trt	Tons/A	Sugar	LTM	RST	RSA
No lime	24.16	15.19	1.31	277	6502
4 ton lime	23.38	14.99	1.34	273	6484
6 ton lime	23.46	15.32	1.26	281	6508
Mean	23.66	15.77	1.30	277	6498
C.V. %	5.73	4.39	6.79	5.17	6.48
LSD	NS	NS	NS	NS	NS

Table 4. Combined data (1996 and 1997) for corn yield as influenced by lime added to soil in 1996.

Trt	Bu/A	Test Wt.	Moisture
No lime	131	53	20.6
4 ton lime	133	52	20.9
6 ton lime	132	53	20.7
Mean	132	53	20.7
C.V. %	9.73	3.81	10.16
LSD	NS	NS	NS